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LIBRARIES IN THE DIGITAL AGE

PROCEEDINGS

QUALITATIVE METHODS IN ASSESSING LIBRARIES, USERS, & USE: APPLICATIONS, RESULTS

ALTMETRICS - NEW METHODS IN ASSESSING SCHOLARLY COMMUNICATION AND LIBRARIES: APPLICATIONS, RESULTS

Libraries In the Digital Age (LIDA)

Zadar, Croatia, 16-20 June, 2014

Co-directors:

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LIBRARIES IN THE DIGITAL AGE (LIDA)

ASSESSING LIBRARIES AND LIBRARY USERS AND USE

Proceedings of the 13th international conference
Libraries in the Digital Age (LIDA), Zadar, 16-20 June 2014

Edited by
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and Boris Bosančić

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2014.

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FOREWORD

Libraries in the Digital Age (LIDA) is a biennial international conference that focuses on the transformation of libraries and information services in the digital environment. The thirteenth LIDA conference was held in Zadar, Croatia, June 16 – 20, 2014 and was co-directed by Tatjana Aparac-Jelusic (Department of Library and Information Science, University of Zadar, Croatia) and Tefko Saracevic (School of Communication and Information, Rutgers University, New Jersey, USA).

In recognition of evolving online and social technological influences that present both challenges and opportunities, assessment was set as the main topic for LIDA 2014. The conference theme was traditionally divided into two parts. The first part addressed advances in qualitative assessment methods and practices and the second part covered assessment methods involving alternative metrics based on social media and a wider array of communicative activities, commonly referred to as “altmetrics.” The first thematic section was chaired by David Bawden (Centre for Information Science, City University London, UK) and its goal was to explore efforts, concepts, and results in using qualitative methods in assessing library impact, value, effectiveness, and use of new and old services. The second thematic section of the conference, chaired by Blaise Cronin (School of Informatics and Computing, Indiana University, USA), explored efforts, concepts, and results in use of altmetric methods in assessing two areas: scholarly communication and application of social media in libraries. The general aim was to further and improve altmetrics methods and use of social media in libraries.

LIDA 2014 brought together over a hundred researchers, educators, students and practitioners from Australia, Austria, Bosnia and Herzegovina, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Portugal, Slovenia, Spain, Sweden, Switzerland, UK and US in a forum for personal exchanges, discussions, and learning. A total of sixty speakers from 21 countries presented 34 papers, 19 posters, three workshops, three PhD forum presentations and one demonstration. LIDA 2014 hosted five invited speakers (Elke Greifeneder from the Royal School of Library and Information Science, Denmark; Donald Case from University of Kentucky, USA; Paul Wouters from Centre for Science and Technology Studies, Netherlands; Cassidy Sugimoto from Indiana University, USA and Marija Brajdic Vuković from University of Zagreb, Croatia) and a distinguished guest of honor, Gary Marchionini (University of North Carolina at Chapel Hill, USA).

Traditionally, at the conference awards for the best poster presentations were awarded. Best Poster Award was given to Marica Šapro-Ficović (Dubrovnik Libraries, Croatia) for her poster presentation entitled "How qualitative methods can show value of libraries : results from an unusual study", and Best Student Poster Award was given to Dina Vrkić (Central Library, Faculty of Electrical Engineering and Computing, Croatia) for her poster presentation entitled "Scholarly and social visibility of top hundred most cited articles affiliated by Croatian authors".

In the Proceedings we gathered the majority of contributions, either as full-text papers or extended abstracts (for example for poster presentations), which have been divided into two sections, according to the thematic units they belong to. We hope that the wide spectrum of topics presented in the Proceedings will contribute to the international discussion of these important issues in the field of assessment and stimulate further studies and collaborations among researchers and practitioners from across the Globe.

Editors

THEME 1

Qualitative methods in assessing libraries, users & use: applications, results

Chair:

Professor David Bowden

(Centre for Information Science

City University London, UK)

The cross self-confrontation method and challenges in researching the active information-seeking of young people

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Abstract

This paper provides a presentation on cross self-confrontation (CSC) as a useful qualitative method to address the challenges in studying active information-seeking of youth. There are two great methodological challenges and a major theoretical issue. First, youth information-seeking behaviour is characterised by frequent heuristic reasoning, very quick ways of dealing with digital media, making it difficult to give an exhaustive account of actions. This fundamental characteristic has never been discussed from a methodological point of view. Second, a well-known problem is that young people may have difficulties in articulating all their thoughts. Third, young information seekers are frequently compared to expert information seekers. Therefore, what they aren't doing is well known and what they are doing is unknown. The CSC method presented is based on confronting individuals with their own activity and also with the activity of others with the help of video recordings. The method emerged from educational research known as stimulated recall and developed for work analysis in occupational settings, in allowing individuals to comment on the activities of others. Expected benefits are to assist memory, increase the participants' reflexivity and provide significant knowledge about "personal touch", "personal dexterity". To discuss the potential methodological and theoretical benefits of studying youth information-seeking behaviour, we examine CSC using data from our former research project in Library and Information Science with 30 students aged 10-19 in France, working in tandem on imposed and self-generated information tasks. The results contribute to knowledge about using image and copying and pasting in the youth information-seeking process.

Keywords: cross self-confrontation method, youth information-seeking behaviour, students, image, copy and paste.

Introduction

Constructive discussions about methodological concerns related to adolescents and information have been already conducted in the field of young information behaviour, stressing the importance of matching methods to the unique social and cognitive attributes of youth, different from adults' attributes (Agosto & Hughes-Hassell, 2006 ; Meyers *et al.*, 2007 ; 2006, Bowler & Mattern, 2012). In taking up these questions, we rejoin this discussion by presenting the methodological approach that we implemented to examine active information-seeking of youth. In order to proceed, we first present an overview of the cross self-confrontation method (CSC) and its response to the central methodological and theoretical issues regarding youth information-seeking behaviour (YISB). We then provide an illustrative understanding of the CSC method based on our former empirical study with 30 students, aged 10-19, seeking information in tandem on imposed and self-generated information tasks. A description of two findings on the uses of image and copy and paste will follow. These results make clear that our methodological proposal, focused on information-seeking behaviour, is a means of exit from completed theoretical perspectives on Digital Natives or Naives.

Overview of the cross self-confrontation method

The method can be defined as one of a specific research interview. The notion of confrontation is key to understanding its specific nature. This involves presenting the people observed with as much evidence as possible of their behaviour and asking them to comment on it (Theureau, 2010).

Origins and expected benefits

The origins of CSC lie in the works of educational psychologists; Bloom, who named it "stimulated recall" in the early 1950s, Nielsen who then used the term "self-confrontation" in the 1960s (Guérin *et al.*, 2004). Bloom used it as an ethnographic method, confronting students with the film of their activity (Yinger, 1986). Von Cranach in the 1980s, brought a new variation to the method. He confronted a person with their behaviour (in a laboratory) but also showed it to others in order to understand its social meaning (Lacoste, 1997). This method would go on to be used in workplace ergonomic studies in France

(Theureau 2010; Clot 1999). The two variants of the method were developed in this context under the terms of simple self-confrontation (a person is confronted with their activity[1]) or cross-confrontation (pairs with the same level of expertise are confronted with one or more activities).[2] Similar practices can be identified in anthropology, which very early on developed methods for filming human activities. Rouch thus relates the importance of dialogue with people who have been filmed in ethnological surveys (France, 1989). It is not hard to guess that, video, which adds another more real dimension to reconstructing human activity through the multisensory richness of audiovisual, is the preferred tool of self-confrontation. The image has another benefit (Lacoste, 1997): it gets people talking. This can help to reduce the social distance between interviewees and researchers.

There are several expected benefits: help with memory recall, reproducing the situation (or context) that is defined during the activity by the persons being observed, or, in other words reproducing the dynamics of the activity, increased reflexivity of the interviewees, joint analysis by the participant(s) / researcher. Cross self-confrontation is thought to accentuate both these two latter qualities. Any beyond this, in a professional environment, during exchanges between pairs, the discovery of discrepancies from requirements and "official practices" is to be expected. When conducting interviews, the key is to create the conditions for an exchange between pairs in order to reveal implicit practices, like a "personal touch"[3] or a "personal dexterity". In addition, seeing how one acts "through the eyes of another" (Clot, 1999) can enable a better understanding of one's activity and the ability to express it.

Practical and theoretical limitations?

Implementing CSC is burdensome. It takes more time for participants and requires them to double their participation. Furthermore, there are much greater ethical and legal obligations. Indeed, video recording causes problems when watching back an image of oneself and also with the difficulty of maintaining anonymity. Conducting the interview itself also proves to be a complex process as the ability to listen carefully to the interviewees is impeded by operating the filming equipment. Lastly, the scale of the data processing task, which is inherent in qualitative approaches, is increased by the presence of two bodies of analysis, one of direct observations and the other of interviews. From a theoretical perspective, there is much criticism. One related to its introspective character. Henderson and Tallman (2006), using stimulated recall to study teaching activity of librarians, reiterate previously expressed reservations by behaviourists regarding introspection, an old psychological method, who classified it as unscientific. The second relates to the fact that it is also a retrospective interview, unreliable according to cognitive psychologists. Ericsson and Simon (1993, [1984]) suggest that, among the verbalisations caused by the researchers, the think aloud ones that are expressed during the action provide more reliable data than those which occur after the action (*think after*). The third criticism stems from the ethnomethodology, which dismisses the validity of any research interview, as the accounts are conducted in a different context to the action that they are referring to. These arguments are rejected in different ways. Wilson (1994) points out the mismatch of thinking aloud by emphasising that not everything is conscious nor can it be easily expressed. Theureau (2004) points out that self-confrontation by its very nature contradicts the argument of "retrospective illusion" and provides a criticism of the argument for the "transparency" of ethnomethodology. Indeed, by promoting awareness of the unknown aspects of its activity, by representing the context of the action and by involving co-analysis, which implies a criticism of the expertise of the single researcher, self-confrontation is itself theoretically causing a stir among the other methodological options. In this respect, the CSC method is part of a constructivist approach in which "knower and respondent co-create understandings" (Denzin & Lincoln, 2013).

Self-confrontation is used to investigate many types of human activities, such as teaching practices, train driving, administrative work, sports refereeing. The video methods used are becoming more refined as they strive to achieve the effect of a subjective camera, a camera on the forehead or to explore new areas such as mobile phone usage with camera glasses. The positive opinion of the use of the self-confrontation method and the variety of activities that it allows access to, would thus appear to leave the door open to its use for seeking information. And yet, in information behaviour research, the method, in its stimulated recall version, has very rarely been implemented regardless of the subjects. This is not surprising. Surveys and interviews are the principal methods used here (McKechnie *et al.*, 2002; Julien *et al.* 2011), and when the same single study combines several methods, they all too rarely interact with one another, regrets Fidel (2008), stating the case for the implementation of genuine mixed methods.

[1] The word "activity" here is a synonym of "behaviour". However, its meaning is broader; "activity" refers to activity theory (see Wilson, 2006, for a good presentation of this practice theory).

[2] Mollo and Falzon (2004) suggest the terms "auto-confrontation" and "allo-confrontation" (including in English) which correspond to "simple self-confrontation" and "cross self-confrontation" respectively (English translation of the French expressions "auto-confrontation simple" and "auto-confrontation croisée"). Despite its relevance, the lexical choice of Mollo & Falzon has not become widespread.

[3] « Tour de main » in French.

Matching a method to issues raised by YISB examination: CSC interests

The study of young information-seeking behaviour raises several challenges, both methodological and theoretical. Reviewing them enables us to demonstrate the compatibility of the CSC method with their study.

Youth information-seeking behaviour is characterised by frequent heuristic reasoning

The speed with which the youngest people search for information, whatever their age, is one of the key points of youth information-seeking behaviour, which has been observed in all phases of the information-seeking process. It was measured early on, it took just a few seconds to enter a query, assess and then select or copy and paste. This speed at which the various information-seeking tasks are carried out can be approximated to a specific mode of reasoning, heuristic reasoning which is from the field of psychology (Tversky & Kahneman in 1974). Heuristic reasoning is a simple, easy, imprecise and imperfect reasoning process. In this respect, it is an alternative to analytical reasoning, which is also called reflective reasoning (Kahneman, 2011). This heuristic reasoning method is used on a daily basis by all humans to reduce the complexity of activities, meaning make them shorter and less difficult (Fiske & Taylor, 2007). Kahneman attempted to demonstrate that they could lead us to make mistakes whereas Fiske and Taylor endeavoured to demonstrate that they were not all entirely fallible (for example, merely reading the headings of articles in the press to decide whether to read them or not is simple and effective). Some are general, i.e. they are commonly used by a number of people and others are unique to one person (Fiske & Taylor, 2011). The notion of heuristic was used early on to qualify certain searching strategies, notably browsing strategies (Marchionini, 1997), considered as a beginner's strategy and easier to implement than the better formulated queries used by experts in the field or in information searching. More recently, Metzger and Flanagin (2010) used a heuristic approach to the credibility assessment of media and web-based information by young people. Although the survey by questionnaire did not enable them to identify the heuristic methods actually used by young people, adolescents, and incidentally more so than pre-adolescents, say they use heuristic processes consistently.

Performing an information-related activity also quickly poses a serious methodological problem when carrying out a qualitative study, which requires the use of interviews, which is key to identifying the logical determinants, i.e. the meaning that young people give to their actions. Indeed, these very quick ways of dealing with digital media make it difficult for interviewees to give an exhaustive account of actions. In literature, there is some evidence of this phenomenon, especially in the early days of investigating digital practices. Navarro, Scaife and Rogers (1999), who even use immediate post-research interviews, observe incomplete recall from adult participants, when searching online. Significantly, they forget the choices of tools and queries that did not produce satisfactory results. Branch (2000) reports the same distinctive feature with young people aged 12 to 15 who are searching in an electronic encyclopaedia. During the think after, without confrontation, she notes that there is no real mention of dead ends or incorrect terms in the search query. Participants tend to describe the shortest path that enabled them to find the answer. They also sometimes said that they couldn't remember what they did. In contrast, Large and Beheshti (2000) theorise that young people omit the strategy that is the easiest for them. The authors highlight the fact that hypertextual browsing is not mentioned in post-information-seeking interviews with young pupils, unlike the query formulation which is mentioned several times. Bowler and Mattern (2012) who use a series of techniques (focus group, brainstorming, stories, draws) to help the 13 to 14-year-old adolescents remember their "own memory processes during the information search process", note that in spite of these techniques, the adolescents are not easily able to recall their activity. They do not spend time thinking about their search for information, note the researchers. In other words, the adolescents lack reflexivity on their information behaviour. The confrontation with the information-seeking activity that was recorded beforehand can therefore prove to be of twin value – more memories and increased reflexivity. Branch (2000; 2001) confirmed and quantified this in his comparison of methods. In short, there are serious cognitive difficulties in obtaining a valid account of information-seeking activity. The self-confrontation interviews seem to be able to address these cognitive limitations, including with young information seekers. But other social difficulties can emerge when investigating young people's practices.

A well-known problem: young people may have difficulties to articulate all their actions and thoughts

A lack of articulateness is not only a matter of linguistic skills. The research interview or observation places young participants, children and adolescents in an asymmetric and unequal relationship in relation to the adult researcher. This status may lead young people to not be honest. They want to give a good impression or they may even be intimidated by the face to face with an adult that they don't know, as they still lack experience in this type of situation. The young people may also think that they have to answer quickly and give the right answers (Punch, 2002 for a comprehensive review of these points). The reliability of the data may suffer as a result. And beyond this, conducting a research interview may be compromised. The youngest may remain silent or give very short answers which provides little in terms of useful data.

The self-confrontation interviews provide an appropriate response to social methodological difficulties: no face to face with an adult researcher, the exchanges taking place as much between the participants themselves as between researcher and participants. In addition, the images are likely to provoke discussion and in doing so can help reduce the effects of intimidation, which inhibit conversation. Nevertheless, specifics limitations have arisen in literature, in relation to the use of the CSC method with adolescents. Guerin *et al.* (2004) point out that cross self-confrontation, initially chosen to study the work of a class, had to be abandoned because the disruption caused during interviews with several pupils was too great. The comments especially related to their physical appearance and clothes and the technical qualities of the sound and picture. The comments about their activities were sporadic. The researchers had to make do with simple self-confrontation (a single pupil during the confrontation interview) which then went according to plan, demonstrating the ability of the youngest people to become actively involved in a research project. The experience of these researchers tells us that transforming a self-confrontation interview into a focus group is not without its risks. It is wiser to plan for a reduced number of adolescents. But this also shows the youngest people have the ability to become seriously involved in research, once some measures have been put in place. This ability is broadly recognised in the works conducted in this area (Agosto *et al.*, (2006), Meyers *et al.* (2007), Foss *et al.*, (2013) and Watson (2014)). The recognition of the youngest people as competent social actors who are able to get involved in research is now a common feature in all disciplines. As one of the aims of self-confrontation is the co-analysis between the observer and the observed parties, it is important to have some assurances about the abilities of the adolescents to perform their role of co-data provider.

Theoretical perspectives in YISB studies are based too much on information expertise

The research method must be appropriate to the research question and vice-versa in the case of the CSC method. Indeed, this method is intended to observe an activity such as it is carried out, personally, by the person(s) observed. For observing information-seeking behaviour by young people, this poses a great theoretical challenge given the usual framework of investigation. Young information-seeking behaviour has been studied for several decades (for an overview, Chelton *et al* (2004), Case (2010), Boubée & Tricot, (2011); Gasser *et al.* (2012)). What is striking in this field is the consistency of the results for more than thirty years, which basically highlight the difficulties of seeking information and at all stages of the information-seeking process. Some criticism has been directed at this framework. Bernier (2007) raised the problem of observing pupils (*vs* adolescents) carrying out an imposed question (*vs* self-generated). This type of question, of which they have little knowledge and sometimes have little interest in, can only foil young information seekers. Works dealing with the everyday information behaviour of young people (Agosto *et al.*, Meyers *et al.*, previously cited), and providing a perspective on more complex information-seeking activity are along the same lines. More recently, Koh (2013) attempted to identify the innovative behaviours of young people as part of a theory called radical change theory, and in doing so requalify the failures that were attributed to a lack of skills. Our criticism of the works in this field is markedly different. What characterises the majority of works in this area as soon as the subject is young people, is that young information seekers are compared to expert information seekers. Therefore, what they aren't doing is well known and what they are doing is unknown. Our research question asks (i) what young information seekers do, without referring to expert activity, and (ii) the meaning that the young people attribute to their information-seeking behaviour. The cross self-confrontation method provides practical and theoretical means of discovering such information-seeking behaviours.

Illustrative understanding of the CSC method to study the active YISB

To illustrate how to take account of these three methodological and theoretical challenges, we present some experiences and significant findings from a former work that sought to explore what happens during the young information-seeking process by examining what young information seekers do and not what they don't do and the potential of the CSC method. These former works were carried out 2005-2007 (3 years to collect data and data analysis) on young people aged 10-19. We then, in discussion, clarify some assumptions in relation to the methods' interests with our current works, carried out in January and February 2014 with young people aged 17-19 and based only on open-ended interviews (32)[4].

Observation system

In order to meet the requirements of the cross self-confrontation method, we developed our system in the following way. Our sample is comprised of 15 pairs of students from Year 7 to Year 13, aged 11 to 19. 5 schools were contacted. Our observation system involves videoing a pair. The information task can be imposed by a teacher or chosen by the pair. The length of the sessions (information-seeking activities) varies. The decision to stop the search is taken by the pair. It is worth noting that the length of the sessions and interviews are consistent.

[4] CSC will be used in the second stage of the research project.

They provide the first indications that the method is working correctly, supporting the involvement of the pre-adolescents and adolescents in the research project. Although the shortest session lasts 15 minutes and the longest 1 hour 4 minutes, the most common length of session is around 45 minutes. The majority of the self-confrontation interviews last around 50 minutes. The shortest lasts 40 minutes and the longest 1 hour and 4 minutes The cross self-confrontation interviews based on the video playback and viewing (on a TV, big screen) of their information-seeking process are conducted 8 days after the activity was recorded [5]. Allowing a week is necessary, both to have the time to conduct the initial analysis of the data (researcher constraint) and to have a second meeting with the participants (a constraint for the participants who are also pupils with busy schedules). To make it easier to recall the activity, excerpts of the activity are shown at the start of the interview. These excerpts follow the time sequence of the activity. After this first showing, the young information seekers all say that they clearly remember their actions. The film is then shown again, by each series of actions, at the request of the young people themselves who point out the actions that they wish to comment on and based on the choices made by the researcher. The interviews are also filmed in order to allow a detailed analysis of the interview data.

To meet the requirements of the method, recording an information-seeking activity and having pairs comment on it, we therefore instigated the information seeking activity and formed pairs (not more than 2 participants to avoid the problems encountered by Guérin *et al.* (2004)). Nevertheless, to maintain the characteristics of a natural situation, the pairs are formed by affinity and choose the information task they have to complete, which is imposed (by a third party, most often a teacher) or self-generated (from a personal interest). They carry out the information task, when it suits them, using one or two computers. The young people also decide when to end their task. The sessions take place in a location that they are familiar with, the CDI[6]. We could have recorded the activity of a single participant and asked a second one to come in just for the interview. However, the pairing system from the 1st stage only increased the spontaneous verbalisations during the activity and the shared experience of the task increased the volume of the exchanges during the interview. The activity is filmed with a camera on a pedestal which serves to capture the screen and gestures (fingers pointed towards the screen, for example), and thus stores more evidence of the activity than screen capture software. During the interviews, the youngsters/students rely heavily on the video footage, pointing at the screen, answering everything while looking at the images. The exposure of "personal touch", joint or different ways of doing things, indeed occurred. The system thus enabled the observers to achieve the primary aim of the method, which was defined as a research interview that specifically promotes their reflexivity.

[5] Everything takes place in the schools that the students attend.

[6] "Documentation and Information Centre" in a school (school library). The interviews were also held in the CDIs or in the classrooms that had a television.

Image and copy and paste in young information-seeking

Two significant results (out of four established results) are presented here, because of the topical nature of the scientific issues they raise. One concerns the role of image in the information-seeking, an important issue which remains under-studied. The second concerns copy and paste in information-seeking, a practice which had only been addressed from an educational perspective, as literacy and plagiarism problems.

Uses and functions of image in YISB. Results and discussion

The focus on the images in literature was so inconsistent that the images were not our concern. A few mentions of the presence of the image in the youth information-seeking process have punctuated studies for several decades – but in a very subtle way, as the works have not focused on this specific feature. Beyond seeking images to embellish the final document and the use of illustrations as a way of gaining the interest of the pairs and the teachers (Large and Beheshti (2000)), the young people seem to use the images in another way, during the information-seeking process. One of the first large-scale studies into young information-seeking behaviour was an ethnographic study carried out by Fidel *et al.* (1999), which observed a use of the image in the process of evaluating a web page. The observed sixth-form students who were carrying out an imposed task, use the image to select a web page. However, the explicitations remain vague as the pupils simply mention a "good image". A much more recent example of the use of image by young information seekers is given by Foss *et al.* (2013) who observe that "frequently adolescents verbally discussed and referred to images during their interview". The images are mentioned more than the videos. During the activity, with a few adolescents (16%), which the researchers class as "Visual Searchers", who make a common use of Google Images that they use at the start of the search. For all that, the researchers do not offer any discussion on this point.

The findings that we are currently reporting are very close to those of Foss *et al.* (2013) and also more detailed and discussed: image plays multiple roles in YISB. We have seen multiple image uses, at different stages of the search process, among all the pairs, both secondary and sixth-form pupils. The images used were photographs, reproductions of pictures and caricatures. We have drawn

up a list of four usages of the image which demonstrate diverse functions of the image in the information-seeking process of young people.

Use 1 – Searching by image. One of the noteworthy uses of the image concerns the use of the "Image search" function in *Google*. Indeed, some pupils don't just look for an image with *Google Images*, they also look for a website. Two pupils in Year 9, the first observed pairing to demonstrate this use of it, search for information on the tsunami (imposed task) using several queries entered into *Google Images*. During the self-confrontation process, one of the pupils comments: "When I put tsunami for the image, it will show me a wave (…) and I'll go on the image and it will show me the site at the bottom." The teacher's instructions required text and images which could explain the use of *Google Images*. Nevertheless, in the same interview, his partner suggested that this visual search method is the one they usually use: "After, when you click [on an image from *Google Images*], it gives you a good website (...). On the Internet, sometimes they say, I don't know, it can't be found. Whereas with this method you get a good website straight away... to find something else". *Google Images* allows them to access, as they say, "something else" other than the image, a "good website", that is relevant to them. By doing this, they avoid having to read pages of results containing text that are produced by the search engine and reading the websites. The process, as described by the youngsters, indeed falls within the definition of the heuristic method, a way of finding their way around the Internet which they find fast and effective to the extent that they routinely use it. This is a smart method. It allows them to resolve in their own way the problems they encounter on the Internet and when seeking information.

Use 2 - Assessing by image. The image is used as a criterion of negative relevance. This is a second use of the image in the process of selecting web pages. The image is used to quickly reject the document that it is in. In answer to the question of what made them leave the page so quickly, the reason given is the image. "We could see from the photos that it had nothing to do with it," said one pupil from Year 10, "the images were in black and white," said the Year 10 pupil from another pair, "I quickly saw that they were old," confirms the second pupil from this pair, "the photos at the bottom didn't match what we were looking for," she added, about another website. The image represents a sufficiently negative criterion. One of the features of judging relevance, when it is negative, is that it can be made based on a single criterion, whereas, generally speaking, several criteria are needed for a positive assessment. Furthermore, judgements about relevance follow a pattern from negative to positive (Greisdorf, 2003). This quick method is not without its errors of judgement, at least for the youngest participants ... The highly negative effect produced by an image leads a Year 7 pupil to dismiss a website that could have been suitable for his project. He accesses a page containing the fable of La Fontaine [a French writer from the 17th century] that he is looking for but immediately leaves it, saying that it is "strange". During the self-confrontation interview, he explains: "because there was an image on it [small image at the top of the page depicting hostages in a country at war]. (…) In a thing about history [i.e. the fables of La Fontaine], they are talking about modern things." This use of an image as a basis shows that young people assign the same informative content to the entire web page as the one assessed in the image that drew their attention.

Use 3 – Extracting the image and the arguments that are found there. The image helps start discussions with the teachers who assign the information-seeking task and with the pairs. "Ah, this gives me everything," said a Year 10 pupil who was carrying out an imposed information task on Antigone. She adds: "it tells us everything about it here. There are even images." When she sees the image she exclaims: "oh, Antigone's a women?," she goes back up to the top of the screen to read the text – thought she's already read it - " Antigone, daughter of ..." and confirms "yeah, it's a woman." She asks her partner to help her print it out, saying: "I want the images as well." During the self-confrontation, she mentions the importance of keeping these images because "it [the picture] showed Antigone and Oedipus", because "she [Antigone] is sad" and "to explain the context to him [the teacher]." In these three successive reasons, the pupil appears to show their process of understanding the theme in which the visualisation of this reproduction is one of the key moments. Furthermore, the image not only assists in the selection process but it also tells the teacher what has been understood. The highly social aspect of the image, especially in the case of imposed tasks, is also reproduced among the sixth-form students. In interviews, three of our pairs of six-form student, who, during the information-seeking activity, extracted images they found in web pages and pasted them into their own document or searched for images in Google images, stated that the image is important because in a report "it's more lively", "as a document in its own right (...), it [the image] enhances it", "to give our opinion". The argumentative functions of the image are clearly identified by the sixth-form students and secondary school pupils and they make use of them, including to "give their opinion" without the use of words, about social issues that bother them (case of a pair looking into contested bills).

Use 4 recognising the need for information through the image. One of the remarkable effects of the image is that it can trigger the information-gathering process. A pair of sixth-form students, as part of a semi-imposed task (the pair could choose the search topic as part of a teaching activity imposed on the class), do a search on PACS (a civil union contract under French law[7]).

[7] See http://en.wikipedia.org/wiki/Civil_solidarity_pact

After nothing was selected for almost 30 minutes[8], the repeated queries indicated an unfocused search process. The selection of the various information began late, notably by taking a photograph showing two men kissing during their wedding ceremony and which provoked an emotional response in the pair. After this collection, the queries more clearly related to the theme of homosexuality, one of the aspects of the topic that the pair had chosen to cover. The image that was selected seems not only to have helped in the process of focusing described by Kuhlthau (1991) but also in recognising and accepting their need for information (Chatman, 1996). A source of emotion, the image helped them to resolve their information-seeking problem that was much more difficult to accomplish than the theme defined at the start of the activity suggested.

Image is a really important heuristic in the information-seeking activity of young people. It allows young people to employ a series of information-seeking tactics with highly diverse functions. A number of our observations about the image concern imposed information tasks. However, as a pupil pointed out during the interview, it is highly likely that the image has the same functions in all contexts. The fixed image does not only provoke affects but also effects in the information-seeking process. By considering the role of the self-confrontation method in discovering the uses and multiple functions of the image in the information-seeking process of young people, we can observe the large variety of uses found by directly observing the activity and significantly the variety of their functions, revealed during the self-confrontation interviews, even though the operating methods based on the use of the image cannot be so easily expressed. This is because the image may be perceived by the young people, who are also pupils who know the expectations of their teachers, as having less value than the text. We did not observe any spontaneous mention of the importance of the image in our current interviews (2014). It is clearly used as part of the set of techniques that the young people probably pay little attention to.

Roles of copy and paste in the information-seeking process of youth

We now return to this current common issue. Like the image, copy and paste was not part of our research intentions, as there was no mention in literature citing the link between copy and paste and specific phases of the information-seeking process. McGregor and Streitenberger (2004, 2005), focusing on the phenomenon of plagiarism, showed that it was linked to the low level of engagement of the young information seekers in their information-seeking project. In addition, they noted that banning plagiarism simply shifted the problem, since the pupils showed less understanding of their search topic when they were forbidden from copying and pasting. Pitts (1995) had noted the difficulty the majority of the student participants in her study had in organising information, who merely used the information in the order that they had found it. We have come to a radically different understanding of copying and pasting by identifying the role it plays in carrying out information seeking itself and not by isolating it into a single phase, usually that of the use of information. The starting point for the investigation of copying and pasting is our astonishment at the strictly identical form of the method, which involves simply piling it up in a word processing document which we called the "collection document"[9]. We define copy and paste as a type of information extraction that generates a "collection document" in which all the parts of the documents that have been copied-and-pasted are placed into a word processing document. This information extraction differs from taking handwritten notes or printing an entire document, other extraction methods used in our sessions. In 7 sessions with secondary school pupils and sixth-form students (out of 15) a collection document was created. All types of tasks, imposed and self-generated, led to the creation of a collection document.

Characteristics of the copy and paste process

- An initial analysis shows an information-seeking process that is punctuated by the collection of information. The volume of collections varies according to the session (11, 9, 8, 7, 5, 4, 3 collections). Overall, the number of collections made by each pair can be considered as high for these documentary searches that rarely exceed 1 hour. The rate at which they are taken is fairly regular. Regardless of the task, the collection process begins early and even very early on in the activity (less than 4 minutes). One session shows information being collected late in the process (nearly 30 minutes after the start of the activity) which demonstrates a difficulty in defining the need for information (see above).

- The second observation lies in the fact that the collection document containing the copied and pasted extracts is constructed in the same way: (i) the extracts are stacked up one after the other. There were two identical comments about this system of stacking in 2 sessions, with the pupils from the pair of sixth-form students reassuring their respective classmates about stacking up the extracts: *"Put one after the other"; "go and do the next one"*. The verbalisations during the activity also show that the young people designate a future place in the final document. But during the activity, the pasted extract is simply piled up

[8] In the other sessions observed in the sixth-form college as part of imposed tasks, two instances of information collection began after 4 minutes, one after 6 minutes. In the session described here, the collection started after 28 minutes.

[9] « Document de collecte » in French.

after the previous one; (ii) the formatting of the collection document is put off to the point that separations by line breaks are not automatically done: *"just paste it all in like that and we'll do the layout after (…),"* said this sixth-form student after taking the 6th pasted extract; *"it doesn't look like anything like that,"* was the comment made by a sixth-form student from another pair. *"Yeah, we'll tweak it all in a bit,"* replies her partner; (iii) the information taken is generally small (a few lines, one or two paragraphs and often containing images). The pupils' assessments of the length show that beyond around 3 pages, they start to feel that the document is sufficiently complete. By scrolling down the document, the pairs regularly check the length of the document to validate their decision to either stop or continue searching.

- The third observation relates to the "reviews" of the collection document. The pupils very regularly scroll through the collection document during the activity while going back over out loud the various avenues explored and which led to the information being taken. And beyond this, the systematic match between the content of the extract and that of the preceding query indicates that this isn't just a collection of information by default. But the most notable link between the collection and the query lies in the reformulation that follows the collection. Indeed, collecting information frequently involves a reformulation of the query rather than continuing to look at the website that the extract was just taken from. The study of the queries shows that these reformulations often contain a new concept.

What do the young people say about it?

The verbalisations during the activity and the pupils' explanations during the interviews show that they have incorporated the criticisms made of them with regard to copying and pasting. These criticisms of their copying and pasting activity are a common thread throughout their discussions of this practice. At the same time, they give an account of around 10 reasons which mainly concern their information-seeking process. In this way, the self-confrontation interviews show that copying and pasting is used to check (i) how completely the subject has been covered: *"I am going to look and see if we need anything else,"* said this sixth-form student when going back to the collection document after 30 minutes of activity; (ii) the quality of the information-seeking process: *"To see if I'd say whether it was good or not,"* said a pupil from Year 7 who is explaining why her partner had asked her during the activity to look at her collection document, *" (…) if anything needs to be added,"* she continues; (iii) storing information to continue to the information-seeking activity on the Internet: *"This is why we are going to do a long search because we are going to go back to it again several times,"* said a sixth-form student or, in the opposite way, to continue the activity offline: *"This way we don't stay on the Internet,"* he also went on to say; (iv) reducing information so as not to get lost: *"Ah, I've got an idea! Go into Office (…). It's what I do so I don't get lost,"* said this Year 9 pupil to her partner 8 minutes into the activity; to avoid opening multiple windows: *"I use it [copy and paste] more when I am searching on lots of sites, instead of having lots of windows open,"* explains this Year 13 student during the interview; (v) to manage time: *"What's good about copying and pasting is that you can select everything and then as we don't really have the time on the computer, we can look at it at home later (…),"* said one Year 12 student; (vi) check that it is in line with the task: *"We didn't have everything but for a report in quarter of an hour, we already had a lot of things,"* explains the same student; (vii) to make good use of the information and for reading: *"I had found something interesting to put in Word, after printing it,"* said this sixth-form student. Thus, the reasons linked to the collection document refer to multiple aspects of the information-seeking process much more than the final document which in the case of the imposed task will be given to the teacher.

Copying and pasting between evaluating the information and checking the information-seeking process

Although our sessions didn't all result in a collection document, which reduced the size of our sample all the more (7 pairs), persistent common features from one pair to the next have enabled us to put forward an analysis of this phenomenon. An initial indication of its importance in the information-seeking process is provided by its presence in all tasks, whether imposed or self-generated. The practice of copying and pasting is therefore not strictly linked to the need to provide the teacher who is setting the task with a final document. A second element reinforces our vision of copying and pasting as an important component of the information-seeking process. The collection of extracts from documents takes place early on in the activity and regularly throughout the search. These features are constant in all the sessions. A change to these features such as late or irregular collection indicates a difficulty in the activity. Thus, copying and pasting is a "good sign" in the information-seeking process.

Stacking up the extracts in the order "they were found", which remains constant from one session to the next, is another key feature of this method of collection. Various elements, verbalisations between pupils to ensure the information is stacked, deferral of changes to the page layout, which though are deemed to be essential when read later, show the primacy accorded to continuing the information-seeking process and not the document that is being put together. From the perspective of the information-seeking process, the things they are stacking up are firstly their judgements about their relevance which are given a positive or a partly positive value. The judgements were made dynamically as empirical studies on

relevance attempt to demonstrate (Schamber, 1990, Saracevic, 2007), moving an extract would mean breaking the logic behind the selection made in the process. It is understandable that pupils postpone this reordering, to a second phase, once the information-seeking process is complete. By maintaining the order in which the extracts were pasted, the pupils can use the collection document by consulting it regularly — which they do — after copying and pasting or when searching (quickly going back to the document) to see how well they have met their need for information. The collection document firstly enables a type of monitoring of the information-seeking process. Using this, the secondary school pupils appear to be using a form of managing the information-seeking activity. The practice of copying and pasting would thus suggest that the secondary school pupils are not entirely devoid of metacognitive skills. In this respect, we agree with the conclusions of Bowler (2010) on the existence of metacognitive activities in the information-seeking process. Beyond this, copying and pasting is a way of resolving the information-seeking problem. Without it being systematic, it should be noted that the queries entered after the collection most often contain a new concept. The consequence of copy and paste therefore is not insignificant for the progress of the information-seeking process.

Julien and Barker (2009), when questioning sixth-form students about copying and pasting, point out that they dismiss it by saying that it saves them time. In our self-confrontation interviews, the accounts of the young people clearly highlight the importance of copying and pasting in completing their information-seeking task. The functions that the pupils assign to their copying and pasting refer first and foremost to this need to discard information that is not relevant from the mass of information on the Internet, in a limited time, based on a task and using their knowledge of the search topic. Just as with the images, copying and pasting can be classified as heuristic, methods which are remarkably common to the young people observed. In our current studies (2014) on high school students, based on open-ended interviews, they simply refer to a specific reformulation job, which we will qualify as one of "finishing", involving reworking the style of the information that has been copied and pasted and giving it a less scholarly appearance, so as not to arouse the suspicions of their teachers. In this type of interview, the only data on copying and pasting relates solely to the normative logic of the teachers who have assigned the task.

Conclusion

The cross self-confrontation method whose successive developments we have presented within several disciplines, enables an in-depth observation of the information seeking behavior. It provides a detailed view of the actions that are being carried out without paying attention to it and the system of confrontation between pairs makes these actions intelligible for the interviewees and the researcher. We have tested the method on the youngest people. Combined with a research problem that attempts to understand the logic behind the actions of young information seekers, the method enabled us to identify the importance of images and copying and pasting in the very process of searching for information. It seems that the young people found the resources so as not to be (fully) affected by the "pathologies of information", information overload and information anxiety (Bawden, Robinson, 2009). We are not stating that the young people are skilled information seekers. It is more a question of labelling them "bricoleur"[10] information seekers. More and more disciplines are attempting to use this type of cobbled together knowledge of young people in their outside school practices, regardless of their quality, to develop more formal learning processes. This type of teaching design remains largely untapped in the field of information literacy. In this way, our findings are likely to enrich educational design in this area.

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Curriculum Vitae

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Sixty years of measuring the use of information and its sources: from consultation to application

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Abstract
The historical development of use and user studies is characterized as divided into three "eras": that of the Collection, the Document, and the Chunk. Typical concerns of each era are discussed. It is suggested that underlying the changes in measures was also a quest for measuring "genuine use" of information, that being the ultimate ends to which information found by users was put—what has been variously called the application, outcome, consequence or effects of information. Central to this has been a greater sophistication in methodology, including an increasing reliance on qualitative techniques to achieve greater depth. Results are presented from a recent content analysis of samples of 62 years of information behavior studies, showing a recent growth in measures of information outcomes. Suggestions are made about the further evolution of evidence in the light of the development of new types of measurements, such as those made possible by social media, and the limitations of such data are discussed.

Keywords: outcomes, applications, effects, measures

Introduction

This paper has a historical theme, examining how definitions and research methods have changed, particularly in regards to measuring the outcomes of information use. I begin with some of the earliest attempts to measure use of library collections, and discuss how they have changed over time. Then I touch upon recent investigations that achieve a better measure of some important aspects of information use, namely the applications or outcomes of information by the user. And, to provide continuity between the two themes of the conference, social media is discussed as a current source of data on use and sharing of information.

The measurement of the use of libraries and other channels of information has seen various phases as regards sources of data and objects of study. These phases could be condensed into three periods: the era of the collection, the era of the document, and finally, the era of the "chunk"—the latter being some kind of fact or other selection of information that is smaller than an entire document. Each era built on the methods and data of the one before it, such that earlier types of research never completely disappeared.

After describing the different phases of methods and data, I return to the issue of what we mean by "use," whether of libraries, or of information in general. I argue that throughout almost *all* of these periods, investigators sometimes tried to measure a more restricted sense of use, that is, as what people *do* with received information, how they apply it or what effect it has on them. These attempts to measure information have gradually increased in frequency, from being quite rare 40 years ago, to fairly commonplace today. Measurement of what we could call "outcomes" has required advances in both qualitative and quantitative methods, yet owes more to an effort to increase depth of measurement in general.

The History of Studying Needs, Seeking and Use

In my book, "Looking for Information" (Case, 2012), I say that research on information needs, seeking and use goes back about a century. I could also make the case that a century ago (say, 1914), is either 65 years too late, or 20 years too early, as a starting date for this genre of research. For example, there is an 1849 report to the British Parliament (see Wellard, 1935) that attempts to describe the effects of libraries and reading among English working class in various towns, based on expert testimony. While lacking the consistency and rigor that we would today require of a scholarly study, it is an early example of an attempt to answer the question "what effects do public libraries actually have on the populations they serve?" Yet, as the 1849 report was not a scientific investigation. And even later studies sometimes heralded as the start of serious investigation, such as Charles Eliot's (1902) study of unused library collections, or Ayres and McKinnie's (1916) investigations of children's reading habits, appear to have rather different aims than modern studies, and also to be very superficial in their analyses of data.

In my judgment, serious research on information seeking and use began in the late 1930s, when a few investigators began to more look in depth at what people *did* with documents—a kind of investigation that did not really become common until the 1990s. The division of information behavior studies into three eras, is a simplification that ignores outlying efforts in both directions; i.e., it underemphasizes the early pioneers of more sophisticated methods, as well as those who continue to conduct rather simplistic study designs well past the time they should be used. Yet I think it serves to highlight important shifts in focus over the years.

To foreshadow what is to come, I will summarize the three eras in one sentence, each: The first era studied library collections, particularly what was being circulated, and by whom. The second focused on documents, and could also be called the period of reading research (e.g., see Ward, 1977). Finally, the third and present era is that of the chunk, in which attention turned to units of information smaller than documents, and not always originating from a document either, but also from conversation, mass media, and eventually the Web and social media.

The Era of the Library Collection, 1836-1935

In the beginning, there were circulation records. This single indicator was easy to count, and indeed necessary for the internal administration of the library. As Williams (1991) and Galbi (2007) point out, public library circulation measures were published in the United States at least as far back as 1836. Several other nations, Great Britain, for example, also kept borrowing statistics in the 19th century (Kelly, 1966). Circulation measures were typically broken down by aspects of the user population, time periods and collections, to produce percentages and ratios, such as yearly circulation per capita or by gender and age categories. When used in conjunction with such demographic data, Burns (1978, p. 8) says circulation measures were "the richest source by far of information about the user, items used and use patterns . . . the easiest to gather, and the best available performance measures."

Accordingly, circulation statistics and demographics formed the basis for most investigations of patrons interactions with collections. A late example form this era is McDiarmid's (1935) study of patterns of borrowing in a university library, in which gender and class standing were used to breakdown the numbers and types of books, magazines and newspapers read, based on circulation records and a survey of borrowers. During this period yet other studies approached preferences for books via survey questions, such as those reported in Waples and Tyler's (1931), "What people want to read about"; the superficiality of such findings was sometimes subject to criticism (e.g., Mencken, 1931).

In many respects the era of the collection has never really ended, as can be seen from complex studies of collection usage that took place later in the 20th century (e.g., Fussler & Simon, 1969; Kent, Cohen, et al., 1979). On top of basic circulation data grew a host of other evaluation measures of library facilities and their collections, as the emphasis shifted from what the library does, to what the patron does (Ford, 1977; White, 1980; Zweizig, 1977). Among other patron actions, these included in-house (i.e., non-circulating) consultation of materials, questions asked at reference desks, use of card catalogs (Tagliacozzo & Kochen, 1970) and much later, electronic catalogues and databases. To these measures were added data from surveys of users (what Burns, 1978, calls "preferential data") regarding satisfaction with services, preferences for materials and hours, awareness of services, reasons for nonuse of the library, and so forth (Lancaster, 1977; Powell, 1988). In summary, the key feature of this era is that the library collection, services and building formed the starting point for the investigations, rather than any particular people or units of information outside of the collection.

The Era of the Document, 1936-1958

I choose 1936 as a starting point because this was the year in which a few pioneering studies examined the *outcomes* of document use, rather than simple indicators of the consultation of library collections. In that year two Masters theses in Education at George Peabody College in the U.S. considered the effects of reading. One (Gross, 1936) examined the responses made by seven-year-old children to books they read, using a mix of observations, interviews and borrowing records. The other (Clements, 1936) studied how 11-year-old children made use of magazines, based on interviews and borrowing records. Both studies were concerned with what school libraries could do to promote reading, and both theses were identified in *Library Quarterly* (Waples, 1939) as research in librarianship. While the evidence Gross and Clements collected was modest, each recorded some instances in which a direct effect of reading was observed or reported, e.g., in Gross's study whether a child used the book to copy words or pictures, or whether they shared the book with another child; in Clement's investigation children were observed reading to others the jokes, riddles, poems or stories they liked in a magazine, or used elements of magazine pictures to improve their drawings.

Probably similar studies were undertaken at other universities and in other nations, and some may even predate the two theses I described above. Yet what is interesting about the two Peabody investigations was their incorporation of qualitative methods, such as observation and open-ended interviews. As one evaluation researcher simply puts it, "qualitative data provide depth and detail" (Patton, 1980, p. 22), and afford understanding of phenomena that cannot always be categorized in advance.

However, more typical of this era were studies of reading preferences and habits that did *not* attempt to assess the results of something being read (e.g., Hansford, 1936; Stuart, 1952; Thorne, 1954). Martin Ward's (1977) book, "Readers and library users," summarizes many reading habit surveys among the 126 studies it reviews, 35 (28%) of those investigations taking place from the 1930s through the 1950s. These were typically investigations of what books readers preferred or borrowed or bought, broken out by user demographics—a genre of research that stretches into the present day. Rarely did the conclusions of these studies venture beyond preferences by gender, age, geography or occupation, and the synopsis of key findings sometimes verges on the anecdotal, e.g., "Engineers were the most active readers" (Ward, 1977, p. 45) and "The most books were read by a lorry driver" (p. 31).

In the United States attention was sometimes paid to narrower categories of readers, such as McNeal's (1951) study of the reading interests of rural people, and wider geographical regions, like Campbell and Metzner's (1950) nation-wide sample of United States public library users in 1947; these contrast sharply with the many local British studies from the 1940s and 1950s cited in Ward's (1977) annotated bibliography.

An important turning point is the series of investigations in the 1940s by Bernard Berelson (1949), Robert Leigh (1950) and other researchers at the University of Chicago, which raised important questions about *why* people use libraries. The advance in these studies lay in going beyond mere counts of items borrowed, analyzed by subject categories or types of borrower. They also improved on other popular research goals, such as identifying the unused parts of the collection, crosstabulating the demographic characteristics of those with library cards, or asking users questions about their needs, attitudes or awareness regarding books and libraries. What this new wave of investigations did was to dig deeper into such issues as *why* someone used the library (or another information channel or source), and what effects it had on them as a result. A parallel development lay in investigations of what people cited in their own creative works, such as Swank's (1945) study of sources used in doctoral theses.

The Era of the Chunk, 1959-Present

The next era reflects two related developments: a shift away from focusing on single channels like libraries, and an accompanying interest in "smaller" units of information—e.g., answers to questions. Gradually investigations also moved beyond single channels (e.g., books, radio, or conversation), to consider multiple channels from among which an individual made active choices in pursuit of particular information. An early example of multiple channel research is found in Westley and Barrow's (1959) investigation of student use of magazine, newspapers, radio and television for news — among the first outside of university studies to describe "information seeking" by "information seekers." Westley and Barrow shifted their focus away from the usual concern with attitude change, and towards the *need* for facts about the world in which one lives—"orienting information," as they characterized it. Investigations of scientists and engineers during the 1960s and 1970s also took this approach; for example, Wood (1971) cites Thomas Allen's (1965; Allen & Gerstberger, 1967) "multi-channel" investigations as especially "successful." In each case, recording of specific facts learned from particular sources (a colleague, an article, or radio/TV broadcast) pointed towards another innovation in information seeking research: the chunk.

The second important development was in the increasing focus on some unit of information smaller than a document. Paisley (1965, p. II-49) discusses this idea as introduced in a study of 1375 scientists and engineers by the Auerbach Corporation (1965). In these interviews a "chunk of information" was defined as "the smallest quantity of information required to answer a task-related question." This term was adopted by Taylor (1986, p.11), who described "insertion of a chunk of information in a report." It is possible that all of these authors were influenced by George Miller's discussion of "chunking" of information in his famous essay on memory limits, "the magical number seven" (1956). Other variants of the chunk concept used terms like "ideas" or "solutions" (Allen, 1965), or "notes" or "conversations" (American Psychological Association, 1967, 1968) to characterize a unit of analysis that was less than an entire document.

The interest in answers to specific questions, as sought from multiple sources, was later extended to non-work information needs, such as the information required to address a personal problem or satisfy one's curiosity—the kind of activities described in Savolainen's (1995) Everyday Life Information Seeking (ELIS) model.

The Frontier: Measuring Outcomes

Thus far I have described the development of information seeking research in terms of what kinds of data were collected. Yet there is another, underlying, change in measurement: a gradual progression towards investigations of what have been called "outcomes" of information. To describe what is meant by "outcomes" will again require some historical background.

One of the curiosities of this genre of research is that we have tended to leave some terms rather ambiguous, even while continuing to investigate them in their various forms. One example is the concept of "information" itself, while another is "use." These terms have had varying definitions among scholars, and even more so among laypeople. Kidston (1985), for example, demonstrated

wide differences among a sample of students as to whether the term "use" could apply to such concrete examples as reading a journal from cover to cover, or reading only one section of a book. Ercegovac, (1997) also finds confusion among students regarding the concept of "use."

The more pertinent issue, however, is how use of information has been studied. A number of scholars (among them Brittain, 1970; Fidel, 2012; Kari, 2007; Savolainen, 2009; Taylor, 1986; Todd, 1999; and Vakkari, 1997, 1999, 2008) have noted that nearly all investigations have measured needs, demands, seeking and/or gathering, while relatively few examined how retrieved information is actually applied— what Taylor (1986) refers to as "effects" of information, Paisley (1968) "consequences," Rich (1997) "impacts," and Kari (2007) "outcomes." Brittain (1970, p. 1) may have summed it up best (as well as first) when he wrote that "ambiguity resides in the term 'use' . . . [which typically] refers to the study of the gathering stage of use rather than the use of which information is put."

Whether we called the more restricted meaning of use "effects" or "outcomes," it is clear that it has not been commonly studied. Fidel (2012) judges that "only a few" such studies have been attempted, while Vakkari (1997) similarly describes the incidence as "rare." Undoubtedly his comment was informed by his earlier content analysis of information science literature (Järvelin & Vakkari's, 1993), which estimated the proportion of articles addressing various topics during three years a decade apart. Even combining their two categories "information use" and "use/users of information channels/sources" shows that only about two percent of research articles addressed either of those topics: 2.1% in 1965, 1.7% in 1975 and 2.2% in 1985. And those categories are more inclusive than what the present study counted as an "outcome." Certainly before 1986 investigations of outcomes were "rare," although since 1995 they have become more common.

To estimate just how rare has been the measurement of information effects or outcomes, Case and O'Connor (2014) recently conducted an analysis of measures of "information use," in the more restricted senses discussed above—as how a user applies information, or an effect that information has on a person. By choosing the earliest dates that would allow multiple LIS journals to be sampled together, and interpolating additional dates at regular intervals, the years 1950, 1964, 1979, 1995 and 2011 were chosen as starting points for sampling, such that roughly 13 years (12 to 14 years) passed between each sample. In each of the five periods except the final, three calendar years were sampled. Using these criteria, *American Documentation* (the earlier title of *JASIS*) and the *Journal of Documentation* were sampled during the first two periods; *Library & Information Science Research* was added to these for the third period; and *Information Research* was included in the fourth and fifth samples. All four journals were earlier determined to be those most likely to include information seeking research, based on a content analysis of two large bibliographies on information seeking.

Method of Sampling and Analysis

Editorials, editorial introductions, book reviews, obituaries, news reports, bibliographies, brief communications and letters were excluded from analysis; only articles longer than 2 pages in length were considered for examination. After these criteria were satisfied, it was determined whether or not the eligible articles constituted a "study," which was defined as an empirical investigation of some phenomenon, of a method either qualitative or quantitative, in which observations were taken, then analyzed and/or interpreted; observations could be expressed in the form of numbers, or as a narrative. Literature reviews, conceptual essays, simple descriptions (e.g., of libraries, library collections, classification schemes, indexing languages, devices or computer programs), or articles *solely* about concepts or theories or models, were not counted as investigations. For each journal issue we counted the number of such observation-based studies published in each issue.

Then we recorded the number of empirical studies that could be classified as being a part of the Human Information Behavior (HIB) or "information needs, seeking and uses" research tradition—keeping in mind that the journals sampled publish a wide variety of topics. Taking definitions such as that found in Bates (2010) as a guide, HIB was taken to include studies of phenomena like these (starting with the more general): information needs, information seeking, information gathering, use of or preferences for channels and sources, sharing of information, passive encountering or awareness of information, ignoring or rejection of information, creation of new documents or other objects, utilization of information for a task or for pleasure, browsing, use of libraries, use of documents, searching of indexes and catalogs, searching of databases or websites, information literacy, and studies of reading. We excluded articles that fell into related yet distinct areas, such as the evaluation of information retrieval systems, information system design, systems of classification or indexing, or bibliographic and webmetrics studies.

Next we recorded the number of studies that included measures of information use in the way described below. In a close reading of study results, the text was examined for instances in which investigators tried to measure information use in ways that went beyond mere searching of systems or channels, or of retrieval of documents. We looked for reported outcomes, i.e., application to a task, making of a decision, or effects based on the information received, such as evidence of learning, or deriving some

kind of psychological or emotional benefit. An example of a specific outcome would be a respondent who said "After reading the Merck manual I decided to change my medication." Instances of *projected* use were excluded, as when a respondent merely says how they *intend* to apply information they have received. Hypothetical situations were also excluded, e.g., an experiment based on imposed decisions using hypothetical data and choices.

Without going into details of results by time period or journal, the overall picture is that about 6.1% of all investigations (all of these published within the last 19 years) across the four journals contained measures of outcomes. Vakkari's (1997) comment that such studies are "rare" was written 17 years ago, at a time when measures of the ultimate application of information were just starting to become more common. Looking back from 1997, it would have been fair to say that such investigations were "rare." Overall it is still quite remarkable that investigators in information science so seldom measure the outcomes of seeking and encountering – whether the percentage of studies that do so is six percent or even ten percent.

Table 1. Numbers of Outcome Measures in 5 Samples,

Years of Samples	Number of Full Articles	Number of Empirical Studies	No. & % Measuring Outcomes
1950-1952	124	16	0 (0%)
1964-1966	146	43	0 (0%)
1979-1981	214	139	0 (0%)
1995-1997	338	218	15 (6.9%)
2011-2012	569	499	41 (8.2%)
TOTALS	*1,391*	*915*	*56 (6.1%)*

In considering the evolution of outcome measures we should keep in mind that early researchers were well aware that the utilization and effects of information were important. Sixty-five years ago Bernal (1948) surveyed workers in a variety of universities and research laboratories about what they *did* with papers they received; however, the five response choices were limited to "read carefully once, read carefully more than once," and the like. In those early days the concern of information needs and uses researchers were much more about earlier stages in the communication chain, especially what authors, publishers, conferences and libraries could do to improve the dissemination of research publications. What the intended audience did with this information was a more distant concern.

Bernal's method points to an obvious problem: it is not easy to study the ultimate outcomes of information. It is harder to study the outcomes of information receipt than searching of, or preferences for, channels and sources. Dunn (1983) and Rich (1997) explain the many ways in which information use might be defined, and why it is often difficult to measure. Rich (p. 15-16) notes that we may have initial difficulties in determining exactly what qualifies as "information"; beyond that, there are a series of relevant stages: acquiring or receipt, which does not imply reading; reading, which does not guarantee understanding; understanding, which does not imply further action on that basis; and, finally, an influence, action or other impact. And even in this final stage, the notion of "influence" (meaning "contributed to a decision, an action, or to a way of thinking about a problem") suggests delays in effects that may render the connection between receipt and effect unobservable or otherwise invisible.

There are simply few reliable and ethical methods for observing or recording thoughts, decisions, and applications of information. In many cases it is impossible. We know that self-reports are biased, yet often they are our only option. As discussed by Davenport (2010), one potential approach for eliciting respondent accounts is the critical incident technique, and another is sensemaking (e.g., Dervin, 1992). Using either method an investigator may inquire about the outcomes and aftermath of finding or encountering information. Yet both techniques have been plagued by misuse, as some researchers take shortcuts around checks on reliability (Davenport, 2010). Similarly other qualitative methods are sometimes poorly executed (Sandstrom & Sandstrom, 1999). Clearly, measuring the outcomes of information is challenging, and that may be why many researchers have not attempted to do so.

Conclusions

One of the reasons that there has been a growth in measures of outcomes of information is precisely because of greater applications of qualitative methods. As Tom Wilson pointed out over 30 years ago (1981) qualitative methods are better suited than questionnaire-based surveys for understanding needs, seeking and use. First-person accounts of interactions with information sometimes contain evidence of applications that would otherwise have been missed in simple surveys regarding consultation of channels or sources. A recent example is David Allen's (2011) study that observed police officers deciding whether or not to stop cars for traffic violations, recording the kinds of observations, conversations and information searches that led to a decision.

Yet quantitative measures have not gone away, as can be seen from studies like that of Grad, Pluye et al. (2011), who used hand-held computers to investigate the use and effects of information by family physicians. Their largely statistical results capture yes-no responses to cognitive

impact statements like “I learned something new” or “I was reassured.” The Grad study points to the ease with which the Internet can be used to capture information at point and time of use. As information seeking and sharing becomes ever more electronic via Internet resources and mobile communications, we will have more opportunities to capture outcomes. Imagine, for example, someone who forwards an email or text message or tweet – they have judged the content interesting and passed it on—a recorded instance of sharing information. Electronic information that is both retrieved and applied (e.g., incorporated into new electronic documents or messages) offers an opportunity to capture such use. But of course this too, is sometimes impossible, due to legal and ethical restrictions on the privacy of individuals.

Social media offers us vast amounts of data generated by users in the course of their daily lives and work. Any new data is welcome, and especially when it is not solicited by researchers but rather naturally-occurring—which reduces the bias problems that arise when we ask people questions.

Yet, we need to be cautious about what we glean from social media. In some ways it is like the book circulation data I discussed at the start of this paper: we analyze it because it is there. In that sense it is like the Law of the Hammer—a tool that must be used simply because it exists. A better analogy is the drunk outside the bar late at night, searching for his lost keys under the streetlight, where “the light is better,” rather than in the shadows, where he dropped them. (This analogy is used to great effect by Gary Klein in his 2009 book *Streetlights and shadows*, to discuss common errors in decision-making.) The new data, however innovative, can only tell us so much; it is valid for certain purposes only; it does not replace other data; it has its own biases. We must not let the latest source of data distract us from our original goals and questions—which may require more difficult searching in the “shadows.”

Earlier I mentioned the problem of reactivity. The very social nature of social media means that it can be especially reactive when we intervene in it. An example is the creation of Facebook pages by some academic libraries, in order to connect with students. The very fact that libraries create Facebook pages makes Facebook less “cool” in the eyes of many young people. They see the value of Facebook for interacting with friends, but not necessarily with institutions. By trying to make use of a trend, we change it.

For these and other reasons, I don’t expect social media to answer many questions about the outcomes of information, although it will be helpful in identifying other answers about the use and value of information. Most social media data reflect only the receipt or sharing of electronic information, and not consultation of other channels and sources, nor does it always indicate some kind of outcome. For that we need additional methods or measures. Quantitative measures will answer some questions, but for the more difficult questions, such as establishing the application or effects of information, qualitative methods remain necessary for finding answers. Through measuring the outcomes of information, we can establish the value of the channels, such as libraries, that led to the discovery of the information in the first place.

It could be that progress is only an illusion, however I believe I see some progress in the sophistication of methods applied to information seeking and use. At the same time, there have been technological advances that continue to challenge measurement. We must always look for new ways of, and opportunities for, conceptualizing and measuring the use of information.

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Curriculum Vitae

Donald O. Case holds the PhD in Communication Research from Stanford University (1984) and the MLS from Syracuse University (1977). He has been a Professor in the University of Kentucky College of Communication & Information since 1994, and taught at the University of California, Los Angeles, from 1983 to 1994.

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Proposal for a qualitative study of LIS students' self-assessment of growth and direction using Dervin's sense-making methodology applied to intrapersonal examination of their ongoing eportfolio development

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Abstract

This paper presents ongoing work on the development of a study which will examine the use of Sense-Making Methodology applied to the intrapersonal consideration of personal electronic portfolios to assess growth and direction in a graduate level academic program. Brenda Dervin's Sense-Making Methodology has been applied to a myriad of situations in multiple contexts with a wide spectrum of people. It is applicable in contexts including intrapersonal, interpersonal, small group, mediated, organizational, and societal (Dervin et al, 2011). In this study it will be applied via intrapersonal self-interview to clarify direction in a graduate program through student examination of his or her eportfolio.

Keywords: sense-making methodology, eportfolios, reflection, self-assessment

Introduction

This paper presents ongoing work on the development of a study which will examine the use of Sense-Making Methodology applied to the intrapersonal consideration of personal electronic portfolios to assess growth and direction in a graduate level academic program. Many graduate level programs require students to complete a culminating course in which they create a project or thesis to demonstrate the knowledge they have acquired and their ability to apply what they know to a scholarly investigation or real life problem. A project of this nature - one that encompasses an entire term (sometimes longer) is a major undertaking. Ideally, a commitment of this nature is undertaken not simply to complete a program requirement but to further the personal and professional growth of the student. All students at the Queens College Graduate School of Library and Information Studies are required to complete such a culminating research course in which they design, either alone or working with a partner, a project that has been carefully researched and constructed under the supervision of the course instructor. The projects are substantial and a great many hours and much effort go into their creation. It is desirable for students to have some idea of what they would like to investigate fairly early in the term so that they might proceed with their project. This should be something that will be meaningful to the student researcher and, hopefully, support interests that have developed and/or matured during their course of study. Student understanding of the discipline and of their own interests and direction may change substantially during their course of study. Thus, an exercise in which the student reflects on what they have done, what they have liked and not liked, how things may or may not have changed for them, may be of great help in selecting the research topic for their culminating project. In the proposed study, graduate level students will administer a self-interview in conjunction with a review of their eportfolio. It is hoped that thoughtful review of the contents of their eportfolio and reflection via responses to the interview questions posed in the spirit of Sense-Making Methodology will highlight participants' interests and strengths, both enduring and developing, and give participants a better sense of direction and purpose as they move forward to their culminating project.

Eportfolios

Concrete portfolios have long been implemented in academic programs (Rhodes, 2011), especially, for example, in the fields of education and art, in order to collect/compile the works of an individual to demonstrate competence, talent, growth, direction. Concrete portfolios have largely been used by instructors and/or potential employers to assess the work of the creator of the portfolio. More recently, electronic portfolios, or eportfolios, have gained popularity for their ease of use and versatility. Lorenzo & Ittelson (2005) define an eportfolio as "a digitized collection of artifacts, including demonstrations, resources, and accomplishments that can represent an individual, group, community, organization. The collection can be comprised of text-based, graphic, or multimedia elements... (p. 2)."

Various aspects of eportfolios make them more convenient, flexible, and multi-faceted, and thus are considered by some to be a superior mode/format of

portfolio. Therefore, many schools have begun to implement the use of electronic portfolios and numerous case studies are available (Jafari & Kaufman, 2006). Rhodes (2011) and Lorenzo & Ittelson (2005) link to examples of eportfolios and examples of student eportfolios can also be found at LaGuardia Community College (http://www.eportfolio.lagcc.cuny.edu/). Schools also may maintain support pages with tutorials and links to assist students in building their eportfolios such as the one found at the Queens College Center for Teaching and Learning (http://ctl.qc.cuny.edu/learn/qportfolio/).

According to Buzzetto-More (2010), eportfolios are a valid way to show student progress and encourage student participation in learning. Eportfolios help students understand goals, think about what they have learned, and reflect on the skills and knowledge they have acquired (ibid). Chang, Liang, & Chen (2013) examined self-assessment of their eportfolios by high school seniors and found that student self-assessments were consistent with those of their teachers and also in keeping with end of term exam results, therefore, indicating that self-assessment can be both valid and reliable as a method of assessment. In addition to using eportfolios for student assessment, evaluation of student eportfolios across a program can be used by administration for curriculum and program assessment (Buzzetto-More, 2010; Reardon & Hartley, 2007). Assignments or artifacts deposited by all students in a program in their eportfolios can be reviewed to determine if there is evidence that department objectives and student learning objectives are supported by course objectives.

Learning is a constructive process (Vygotsky,1978) in which new information is assimilated into each individual learner's prior knowledge. Learners experience new information, reflect on it, and in doing so construct their own understandings and meanings - ways to make sense. Eportfolios provide a excellent venue for learners to piece together new and old information to construct personal understandings. Eportfolio achievement has been found to be positively correlated with higher order thinking skills i.e. critical thinking, metacognitive control strategies, self-regulation, and collaborative learning (Cheng & Chau, 2013; Alexiou & Paraskeva, 2010). Electronic versions of portfolios are better at prompting reflection on the part of students and students voluntarily spend more time on them (Tochel et al, 2009). Additionally, eportfolios have been shown to be a substantial tool in supporting student reflection by emphasizing both process and product in learning (Cheng & Chau, 2013). Thus, the eportfolio supports both formative and summative assessment.

Pragmatic issues related to the implementation of eportfolios include user buy in (both faculty and student), platform selection, financial support, tech support, training and user support. The proposal presented in this paper, however, addresses student reflection and self-assessment of direction and growth using their eportfolios together with Sense-Making Methodology. Thus coverage of pragmatic issues related to implementation are left to another examination. Interested readers may wish to look at Launching e-portfolios: An organic process (Andrade, 2013) as well as the information available at Educause (http://www.educause.edu/).

Sense-Making Methodology

Brenda Dervin's Sense-Making Methodology (SMM) was "developed to study the making of sense that people do in their everyday experiences" (1992, p. 61). SMM is, thus, a constructive process on the part of the information seeker. Sense-Making describes our movement from point to point in everyday life and our attempt to make sense of our situation which changes from moment to moment. Dervin sees this movement as a series of "step-takings that human beings undertake to construct sense of their worlds" (ibid. p. 65). The information or sense that the person is seeking may not be a set answer to a question or problem - the "situation foci may not be goal-oriented in the usual sense" (ibid. p. 70). So, for example, in the proposed project, participants will not be seeking a specific answer to a question but rather insight into their next steps in their course of study. Information is not something that exists apart from people but rather it is constructed by what each person understands during each moment of their behavior.

At the core of SMM is discontinuity. With each step we take in our everyday experience, our reality/our situation changes a bit. The person who is moving through his or her experience thus must conceptualize information moment by moment because of this discontinuity. When an individual comes to a spot and does not know which step to take next, he or she has come to a "gap." When a person comes to a gap - a situation that they cannot negotiate - their "internal sense has 'run out'...the person must create a new sense" (Dervin & Nilan, 1986, p. 21). "A person in a moment defines that moment as a particular kind of gap, constructs a particular strategy for facing the moment, and implements that strategy with a particular tactic" (Dervin, 1992, p.82). The person/sense-maker needs a bridge to traverse the gap so that his or her journey may continue. "The sense-maker is seen as potentially making some kind of use of whatever bridge is built across the "gap" the user faces" (Dervin & Nilan, 1986, p.21). In the proposed project, it is hoped that students' eportfolios will help to bridge a particular gap.

In order to support the sense-maker in their gap bridging, Dervin has proposed interview queries posed so that the sense-maker is the focus of the query rather than any particular system. For example, rather than ask "What information can I get for you from our library?" a question might be "What has brought you here?" The first question predicates a solution that is supplied by the library system. The second question focuses on the information seeker. SMM questions also attempt to understand the information

seeker's situation by asking about helps, hindrances, muddles, and feelings that the information seeker has experienced. Dervin makes use of what she terms "verbing" as opposed to "nouning" to emphasize the notion of discontinuity and constant change. "In simple terms, a nouning approach implies that we have come to a fixed understanding of a problem and its solution, whereas a verbing approach implies that we pay attention to how people are making and unmaking sense in the context of their lives" (Dervin & Frenette, 2003, p.236). The use of nouns solidifies ideas and sense. Focusing on verbs in Sense-Making reminds us that sense is constantly changing. Savolainen (2006) notes that "the designing of information (or fodder for Sense-Making) may be defined as a specific example of verbing" (p.1123). Student eportfolios are designed information uniquely constructed by each student over a period of time, constantly changing, and, thus, represent individual efforts at Sense-Making. And while the eportfolio of each participant in this project will contain a standardized rubric, Dervin (1992) notes that "[t]he standards humans use for personal as well as collective conduct are themselves constructed and created in interaction. From a Sense-Making perspective, the use of a standard is itself a constructing" (p.63). That is, each student has constructed the contents of the rubric according to their own understanding - that which makes sense to them.

SMM has been used in a wide spectrum of areas including but not limited to mass communication, political campaigns, journalism, religion and spirituality, popular culture, and library and information science. It is applicable in contexts including intrapersonal, interpersonal, small group, mediated, organizational, and societal (Dervin et al, 2011). In the proposed study it will be applied via student participant self-interview to clarify direction in a graduate program through student examination of his or her eportfolio. The application of Sense-Making Methodology to intrapersonal contexts has been described in several earlier efforts including Diggs & Clark (2002), Dervin (2008), and Dervin et al (2011).

Rationale

Sense-Making Methodology and learning via eportfolios both embrace constructivist ideals, value reflection and self-guided direction. The eportfolio is constantly changing and reshaping as is the student experience as interpreted by SMM. SMM is a means to study the constructing that people do to make sense of their experiences (Dervin, 1992). Eportfolio construction is a means to gather and arrange experiences/information to organize it and make sense of it, both for self and for others. Dervin (1992) describes the Sense-Making Triangle of situation - gap - help/use. In this instance, the situation may be construed as the movement of the student through their program of study. The gap is the point at which the student needs to decide on a culminating project and may need assistance crossing that gap. The bridge allowing the student to cross the gap will be the SMM questions applied to the student's experience as reflected upon and represented in their eportfolio. The eportfolio constructed over time in the program will assist the student in recalling past activities, interests, successes, failures, likes and dislikes. Dervin notes that Sense-Making is not necessarily a linear process and, indeed, examination of their eportfolio may cause a student to reconsider a path previously assumed and change direction. Because SMM focuses on behavior changes over time, pairing SMM with the eportfolio reflection may be a means to help connect the discontinuity to a point where sense is made and a gap can be bridged. The pairing of these two tools for this project to support students' Sense-Making, thus, seems reasonable.

Methodology

Background

During the years 2008 and 2009, faculty members from the Graduate School of Library and Information Studies (GSLIS), Queens College, CUNY and the Queens College Department of Education participated in Making Connections: An ePortfolio Mini-Grant & Seminar Program, Years I (Cooper et al., 2008) and II (Cooper et al., 2009) As part of this grant, we participated in collaborative sessions, held approximately once a month, with other educators from a wide geographic area. During these sessions we learned how electronic portfolios had been successfully implemented at LaGuardia Community College and other schools and worked together to plan similar initiatives in our own schools. We shared what we had learned with the Queens College Center for Teaching and Learning to support an eportfolio initiative at our own college. On the department level, we began giving workshops for students in how to construct and maintain their own eportfolios. In the early stages of our eportfolio development, students constructed their eportfolios using a template designed by one of our faculty members. It became apparent that a common platform would be more workable for the students. This would allow them to focus on the content and personal presentation that would support their growth rather than wrestle with technical issues. Additionally, it would allow for all student portfolios to be reviewed, and, in the future, assessed, more easily by faculty. Working together with the Queens College Center for Teaching and Learning and constituents across campus, a decision was made regarding the eportfolio platform that best suited the needs of all constituents.

Participants

The Library Media Specialist (LMS) program at GSLIS is a graduate level teacher education program leading to state teacher certification as a school/teacher librarian. Students in this program are working adults, most with jobs and families. We are a commuter school and students travel to

class once or twice a week, usually after work. Approximately half of the students in our LMS program are already certified teachers in some other area. The other half of our LMS students are working toward their first teacher certification.

Eportfolios were first implemented on a regular basis in GSLIS in the LMS focus area. The program coordinator for this area was one of the faculty participating in the original eportfolio grant described above. An eportfolio became a requirement in the first course in the sequence for this focus area. LMS students were required to construct an eportfolio using the platform selected earlier by GSLIS and the Center for Teaching and Learning. This eportfolio was to contain a Learning Matrix configured by the program coordinator to reflect which assignments, both in this course and other LMS focus classes, met the standards for the American Association of School Librarians (AASL). Students needed to reflect upon their work and the AASL standards and then place each assignment or artifact in the matrix cell corresponding with the standard or standards they thought it supported. Additionally, students could opt to place work they were most proud of in a special "Showcase" area of the portfolio. These LMS students were encouraged to maintain their eportfolios throughout their course of study in the department. Assignment articulations of other courses in the LMS focus sequence reminded students to place their work in their AASL Learning Matrix. Thus, at the end of the LMS sequence, these students should have an easily visible record of their work throughout the sequence. Because of these things, LMS students were chosen as potential participants for this proposed study.

Participants for the study will be self-selected and solicited via a posting to the general student list serve directed to the attention of LMS students who have both maintained their eportfolio AASL Learning Matrix throughout their course of study and plan to take the culminating research course during one of the following two terms. Results of this study will, of course, reflect only the thoughts of the participating students as interpreted by the researcher and cannot be construed to represent a wider population.

The interview questions

The self-interview questions designed for this study were constructed in the spirit of Dervin's (2008) core questions to be used in Sense-Making Methodology interviews. Their articulation was influenced by the questions posed by Diggs & Clark (2002) in an SMM self-interview. Examples of several self-interviews are also referenced by Dervin (1983). Dervin's core questions were originally referred to as neutral questions (Dervin & Dewdney, 1986), however, they have been renamed by Dervin as SMM questions or SMM-questioning (Dervin, 2008). These questions attempt to focus on a person's movement through time and space by querying situations, gaps, bridges, outcomes, struggles, evaluations, and helps. In a more genuine SMM interview session, each event queried would be broken down into many more questions about that particular event so that the participant would need to more deeply examine thoughts, emotions, questions, confusions. Questions would be recursive in that they would focus, surround or triangulate around each issue to get at the core of each response. In this first attempt at designing SMM questions, a modified approach as per Diggs & Clark (2002) was taken. While each of the questions posed to participants can be directly linked with Dervin's core questions, in this iteration of the study, triangulation to focus more deeply on each question will not be undertaken. This is done partly to simplify the process this first time and partly because of time constraints. A full SMM interview might take up to 4 hours (Dervin, 1983). In the following section, after each question to be posed, related core SMM question area are suggested in italics and in parenthesis. These parenthetical points are broadly stated so that the reader might see the relationship to Dervin's SMM Questions and is done for purposes of demonstration in this paper. These parenthetical points will not be included in the questions presented to participants.

Self-interview session

When participants arrive to complete their self-interview, they will be conducted to a room with a computer on which they can view their eportfolio. Participants may use their own laptops if preferred. The prompt and questions will be as follows:

Dear Student,

Thank you for your participation in this study!

Please DO NOT write your name on this questionaire. Responses to this questionaire may be used as data to support research in the area of Sense-Making as well as to improve overall program and curriculum development at GSLIS. All contributions are voluntary and anonymous. By contributing and submitting your anonymous reflections you are agreeing to its use to support this research.

This exercise is meant to help you toward a better sense of your direction and focus as you move to begin your course 709 Research in Library and Information Studies. This will also help me understand your needs better and reflect on my own purposes and approaches as we interact.

Please do your best to respond to the following self-interview. There are no right answers and the purpose is to assist you in digging deeply into your recollections, thoughts, questions, and feelings. Please review all parts of your eportfolio, especially the Learning Matrix which

notes the assignments you have entered, to assist in recalling aspects of your progress through this program, both helps and hindrances, *before* you respond to these questions.

- What led you to enter study in library and information science? Think here not only of events and experiences but also struggles, questions, and conclusions. *(This question queries, for example, situation, struggles, gaps, bridges.)*
- What did you hope to accomplish...what were your interests at the time you decided to enter LIS study? *(This question queries, for example, outcomes sought.)*
- As you moved through your studies, what were the big things that helped you and how did each help you? *(This question queries, for example, bridges that helped to cross gaps.)*
- What did you like doing the most in your LIS studies? What do you think explains your liking? *(This question queries, for example, outcomes sought or obtained.)*
- As you moved through your studies, what were the big things that hindered you and how did each hinder you? *(This question queries, for example situation and gaps.)*
- What did you like doing the least in your LIS studies? What do you think explains your disliking? *(This question queries, for example, struggles and situation.)*
- Thinking about your LIS studies, would you say there were experiences from your life before coming to LIS that impacted you during your studies? What were these and how did each impact you? If more than several, can you choose one or two that stand out the most in your mind? *(This question queries, for example, situation and outcomes.)*
- Thinking again about your LIS studies, would you say there were current life experiences that impacted you during your studies? What were these and how did each impact you? *(This question queries, for example, situations and outcomes.)*
- Now, towards the end of your studies for an MLS, how does your outlook or destination differ (if at all) from your sense of these at the beginning of your studies? If you see things as having changed, how did they change? What do you see as accounting for the change? *(This question queries, for example, evaluation.)*
- At this time, what is your sense of what you would like to do in your culminating project? How do you see this as potentially helping you -- serving your needs and interests? *(This question queries, for example, outcomes sought.)*

The researcher will not be in the room during the self-interview. Participants will self-interview by reading the questions and writing their response below each question. Question response sheets will be anonymous. Completed sheets will be deposited in a common envelope so that question response sheets will not be associated with any particular participant.In exchange for completing and submitting the Sense-Making Methodology reflection and accompanying questions, participating students will receive a gift card from a book store or cafe worth $15. Participation is expected to take approximately 30 minutes.

Planned Analysis and follow-up

This inquiry is intended to be a grounded attempt (Glaser & Strauss, 1967). The plan at this point is to examine responses for broad concepts emerging from the data, although this plan may change depending on the situation. Concepts emerging from the data will be placed into groups having a commonality as noted by the researcher. Groups will be examined for insights into participant experience, growth, and perceptions and any other attributes of interest.

One idea under consideration for follow-up is to invite participants to respond to a second group of questions regarding what they learned, if anything, from participating in the SMM study (Dervin, 1983). It would be of interest to know if participation in this study affected participants' choice of topic for their culminating project and/or the way they approached that project and future endeavors. The SMM experience may affect participants' outlook and/or self-knowledge in other ways. It would be of additional interest to know how, if at all, construction and reflection of their eportfolios affected participants in their studies and elsewhere. Finally, the researcher would like to include Dervin's 'magic wand' question: " If you had a magic wand, what would you like to happen?" (Cheuk & Dervin, 2011, p. 10).

It is hoped, that reflection at this point in their studies may support participants in more informed decisions as they move towards their culminating project. It is further hoped that pairing SMM with participant reflection of their eportfolio in this instance may lead to wider application within the department. Additionally, data collected from these SMM reflections may inform the department regarding improvements that can be made in overall program and curriculum.

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Curriculum Vitae

Dr. Linda Z. Cooper is Associate Professor and Coordinator of the Library Media Specialist Programs at the Graduate School of Library and Information Studies in the City University of New York. She received her Ph.D. from the School of Communication, Information and Library Studies at Rutgers University. Her background encompasses study in information and library science, education, and art. These, together with her work as a teacher with children in school libraries and with adults at the graduate level, has informed her research and is reflected in her areas of interest which include how people understand, cognitive categories for information, the information behavior of children, visual information, and learning.

Library service capital: the case for measuring and managing intangible assets

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Abstract

Introduction. **Libraries are continually evolving their services and assessment methods, but need a new lens to understand their position. Library assessment has evolved from operational statistics to strategic management systems using quantitative and qualitative methods from business and social research, Literature suggests intellectual capital theory could assist libraries to develop new, improved measures of performance and value for the network world, particularly for staff capability and relationship management, as a gap in current systems.**

Purpose. **The study investigates intangible assets that academic libraries are exploiting to compete in the digital age and methods that libraries can use to assess intangible assets.**

Theoretical framework. **We use two paradigms: the resource-based view that recognizes organizational assets as strategic resources whose value, durability, rarity, inimitability, and non-substitutability represent competitive advantage; and the intellectual capital perspective, which regards human, structural, and customer/relational capital as long-term investments enabling value creation for stakeholders, similar to other capital assets.**

Methods. **The study re-used data from prior survey and case study research, supplemented by evidence from the literature. The Organization for Economic Co-operation and Development's categorization of intellectual assets was chosen as an analytical framework.**

Results. **Academic libraries have developed significant human, structural, and relational assets that are enabling them to respond to environmental challenges.**

Conclusions. **An intellectual capital lens can enable libraries to recognize their intangible assets as distinctive competencies with current relevance and enduring value. Libraries need to extend their assessment systems to evaluate their human, structural, and relational assets.**

Keywords: intangible assets; intellectual capital; library assessment; performance measurement.

Introduction

Library resources and services are continually evolving with social, technological, economic, and political developments in the information environment. Technology is a key driver of change for the profession that has transformed every area of library practice, from collections and cataloging to space and services (Dempsey, 2012; Latimer, 2011; Lewis, 2013; Mathews, 2014). Commentators stress the need for librarians to think and act differently, develop new skills, design new environments, deliver new services, and adopt new models. Mathews (2014, p. 22) concludes that librarians need to explore, develop, and implement "new models, new skills and attitudes, new metrics, new ways of looking at old problems, and new approaches for new problems." He asserts that that the profession is arguably now in the *relationship business;* Town and Kyrillidou (2013, p. 12) similarly observe that "Libraries are fundamentally relationship organizations."

Library Service Developments

The work of library and information professionals is becoming more specialized in the complex digital environment as they aim to integrate resources and services into the processes, workflows, and "lifeflows" of users (Brophy, 2008; Cox & Corrall, 2013; Vaughan et al., 2013; Weaver, 2013). Existing roles are evolving and new hybrid, *blended,* and *embedded* roles are emerging on the boundaries of established positions and professions (Carlson & Neale, 2011; Sinclair, 2009), requiring expanded skill sets that overlap the core competencies of other domains, notably research, education, and technology (Cox & Corrall, 2013; Iivonen & Huotari, 2007). Information literacy education has been a key focus of library service development that is now been joined by research data management, as an example of boundary-spanning activity (Carlson & Neale, 2011; Cox & Corrall, 2013; Vaughan et al., 2013; Weaver, 2013).

Library Assessment Trends

Library assessment has evolved from an operational and service provider perspective on resource inputs, process throughputs, and product or service outputs as performance

metrics, to more strategic approaches aimed at identifying specific and general outcomes, and the higher-order effects or impacts of libraries, from the perspective of service users, in relation to the missions and goals of their parent organizations. The focus on outcomes and impacts is a significant trend, requiring fuller understanding of the context of library and information use (Town, 2011; Matthews, 2013). One indicator of strategic engagement with assessment is the growth in specialist "assessment librarian" positions (Oakleaf, 2013).

Libraries have adopted and adapted frameworks from the business arena, such as the PZB SERVQUAL gap model of service quality assessment (Parasuraman, Zeithaml & Berry, 1985), and the library version, LibQUAL+™, which was developed in the US, but has been taken up internationally, in Europe and farther afield (Kachoka & Hoskins, 2009; McCaffrey, 2013; Voorbij, 2012). Libraries in several countries have used Kaplan and Norton's (1992; 1996) Balanced Scorecard, which combines traditional financial and internal process measures with customer and innovation/learning/growth indicators to promote a balanced view of organizational performance (Chew & Aspinall, 2011; Krarup, 2004; Mackenzie, 2012; Melo, Pires & Taveira, 2008; Pienaar & Penzhorn, 2000).

A key feature of the Balanced Scorecard is that it balances internal and external perspectives, and also combines retrospective with prospective views of the organization, supplementing traditional evaluation of past performance with assessment of future potential through the learning and growth component as a measure of capacity for innovation and development. Libraries have also used Kaplan and Norton's (2000; 2001a) more comprehensive strategy map tool, which enables managers to articulate cause-and-effect relationships between goals associated with the four perspectives of the balanced scorecard. Examples have been reported worldwide (Cribb, 2005; Düren, 2010; Hammes, 2010; Kettunen, 2007; Kim, 2010; Leong, 2005; Lewis, Hiller, Mengel & Tolson, 2013; Taylor, 2012).

In addition to these holistic frameworks, libraries have been exploring more specific methods of evaluating their contributions to their communities. Return on investment (ROI) studies, using contingent valuation method and other quantitative techniques have become a notable trend in academic, public and national libraries around the world (Grzeschik, 2010; Hider, 2008; Ko, Shim, Pyo & Chang, 2012; Kwak & Yoo, 2012; McIntosh, 2013; Tenopir, King, Mays, Wu & Baer, 2010). At the other end of the methodological spectrum, there has also been a surge of interest in qualitative methods, including narrative techniques and ethnographical/ethnological studies. Usherwood (2002, p. 120) argues that "qualitative assessments of outcomes are often a more meaningful way of demonstrating, the value and impact of a service and its achievements", showing how quality audits, social auditing and social accounting techniques can be used to examine the success or failure of services, and identify qualities that are *intangible* or indirect.

Brophy (2007; 2008) argues that narrative-based methods are particularly appropriate for assessing the contribution of services embedded in user communities, and communicating service outcomes and impacts in a richer, more meaningful way than quantitative data can do alone, providing needed context and interpretation. Khoo, Rozaklis, and Hall (2012) confirm substantial growth in library use of ethnography, with more than 40 studies published in the period 2006-2011. An interesting related trend is the appointment of "library anthropologists" to conduct such studies (Carlson, 2007; Wu & Lanclos, 2011).

One specific theme in the academic and practitioner discussion of evaluation methodologies is a resurgence of interest in examining the *intangible assets* (IAs) of library and information services (LIS), especially to prove the worth of library and information workers (an area of investment that is particularly vulnerable as a result of the global economic downturn). Several commentators propose that assessment of library value in the knowledge economy should include consideration of intangible (knowledge-based) assets to give a fuller picture of value for stakeholders (Corrall & Sriborisutsakul; 2010; Kostagiolas & Asonitis, 2009; 2011; Town, 2011; Van Deventer & Snyman, 2004; White; 2007a). Town (2011, p. 123) asserts:

> "The assessment of intangible value added will be key to developing a compelling story around our overall value proposition. The established threefold approach to the measurement of knowledge/ intangible assets is likely to be a good starting point for recognizing areas for developing new measures or, in some cases, revitalizing older ones".

White (2007a, pp. 81-82) identifies three potential benefits for libraries engaging in IA assessment and management:

- increased scope and capability to report effectiveness to stakeholders
- better alignment of library resources and efforts with strategic responses required by stakeholders
- more effective utilization of IAs to achieve tangible and intangible strategic responses and impacts.

White (2007b; 2007c) emphasizes the importance of *human capital* valuation, noting the massive investment represented by library expenditure on staffing, which typically accounts for 50-70 percent of library budgets; the 50 percent figure is confirmed by Town and Kyrillidou (2013). White (2007b) argues that traditional activity-based quantitative metrics for library staff need to be complemented by assessment of performance quality and value. Town (2011, p. 119) similarly observes that there is value in "what has been built by the library in terms of its

staff capability and capacity" that is generally not measured by current frameworks. Town and Kyrllidou (2013, p. 13) also observe that "Libraries have a large body of corporate knowledge tied up in their organisation and its processes and methods." The importance of professional networks and relationships with users, suppliers and others also points in this direction (Kostagiolas & Asonitis, 2009; Town & Kyrillidou, 2013; Van Deventer & Snyman, 2004; White, 2007a).

Research Questions and Purpose

The purpose of the study is to explore intangible asset evaluation as a library assessment strategy for the digital age, by identifying IAs that libraries are exploiting to compete in the digital world and investigating methods to articulate their value. The research questions are:

- What intangible assets are academic libraries exploiting to compete in the digital age?
- What methods can academic libraries use to evaluate their intangible assets?

Two strategic management paradigms are used to frame the study: the resource-based view and intellectual capital theory. Emergent library practice in research data management services is used as a case study.

Theoretical Framework and Literature

The resource-based view (RBV) of the firm recognizes tangible and intangible assets as strategic resources whose value in terms of durability, rarity, inimitability, and non-substitutability represent competitive advantage (Barney, 1991; Grant, 1991; Meso & Smith, 2000). Grant (1991, p. 119) identifes financial, physical, human, technological, reputational, and organizational resources as six major categories. A key tenet of RBV is that resources exist as bundles and are interdependent (Marr, 2005). The theory has its origins in economics and has been hugely influential in strategic management research since the 1990s. Its focus on internal resources is often contrasted with external environmental or market-based explanations of superior performance, although the two approaches are often brought together in strengths-weaknesses-opportunities-threats (SWOT) analysis. Other terms often used interchangeably with "resources" include "capabilities," "competencies," and "knowledge" (Barney, 1991; Barney & Clark, 2007), though these terms can also be used more precisely, e.g., Grant (1991, p. 120) explains that a firm's *capabilities* are "what it can do as a result of teams of resources working together."

Within the RBV paradigm, the intellectual capital (IC) perspective regards human, structural, and customer/relational capital as long-term investments enabling value creation for stakeholders, alongside other forms of capital, such as physical and monetary assets (Marr, 2005; Stewart, 1997). The economist John Kenneth Galbraith is generally recognized as introducing the term "intellectual capital" in 1969 (Snyder & Pierce, 2002; Stewart, 1997), and business and management thinker Thomas A. Stewart is frequently credited with establishing the concept in the business world through his 1997 book and series of related articles in *Fortune* magazine (Koenig, 1997; Snyder & Pierce, 2002). Stewart's (1997, pp. ix-x) definition of IC is widely quoted, in which he defines the concept as the "sum of everything everybody in a company knows that gives it a competitive edge" and "intellectual material – knowledge, information, intellectual property, experience – that can be put to use to create wealth."

As explained by Snyder and Pierce (2002, p. 475) , IC can be both the *means* (or input) and the *end* (or output) of organizational activity: "IC can be both the end result of a knowledge transformation process and the knowledge itself that is transformed into intellectual property or assets". An "asset" here "can be thought of as a prior cost that has a future benefit" (Snyder & Pierce, 2002, p. 469).

The Intellectual Capital Concept

The thinking behind the IC concept extends beyond economics to both the accounting and strategy domains of business and management. Figure 1 shows how Roos, Roos, Dragonetti and Edvinsson (1997, p. 15) have depicted the conceptual origins of IC as evolving from a range of related ideas and practices, including the learning organization knowledge management, core competencies, invisible assets and balanced scorecards.

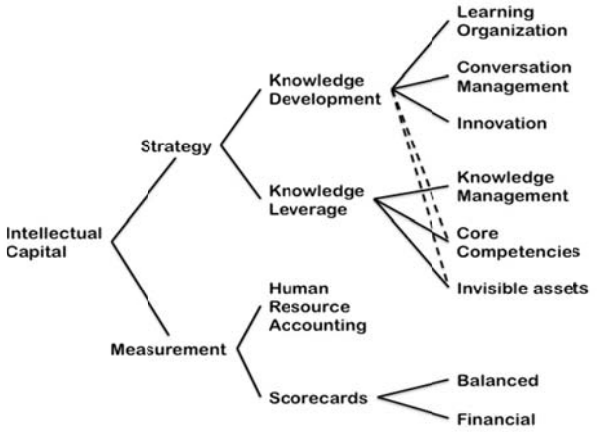

Figure 1. Conceptual roots of intellectual capital (Roos et al., 1997)

The terms "intangible assets" and "invisible assets" are often used interchangeably with IC – along with "intellectual assets," "knowledge assets," "knowledge-based resources" and "knowledge capital" – although some scholars define these terms more precisely and put them in a hierarchy. The Organisation for Economic Co-operation and Development (OECD, 2006, p. 9), has noted the

"proliferation of definitions, classifications and measurement techniques" in the field, but has adopted the term *intellectual assets* "to maintain symmetry with the term "physical" or "tangible" assets" without making a distinction between intellectual and intangible assets, recognizing their synonymous use within the field of IC and knowledge management. OECD (2006, p. 9) asserts that despite the multiplicity of definitions, "they refer to the same reality: "a non-physical asset with a potential stream of future benefits," which the report then identifies with "three core characteristics:

i) they are sources of probable future economic profits;
ii) lack physical substance; and
iii) to some extent, they can be retained and traded by a firm."

The notion of intellectual capital/assets has evolved from a narrow focus on intellectual property, such as patents, trademarks, and software, to a broader conception that typically includes "human resources and capabilities, organisational competencies (databases, technology, routines and culture) and "relational" capital including organisational designs and processes, and customer and supplier networks" (OECD, 2006, p. 9). Significantly from a library and information science viewpoint, descriptions of intellectual/intangible assets now tend to include "dynamic business attributes such as knowledge-creating capability, rights of access to technology, the ability to use information, operating procedures and processes, management capability to execute strategy, and innovativeness" – which OECD (2006, p. 9) perceives as confusing the assets themselves with their "value drivers", represented by management ability to generate value from the assets.

Classifications of Intellectual Capital

There are many different conceptualizations of IAs: Choong (2008, pp. 618-619) lists 36 attempts by researchers, professions and other organizations to categorize IC, and suggests that lack of consensus on the precise definition and systematic classification of IAs encourages development of broad categorizations. Despite variation in the terminology and complexity of the models, from the outset there has been a striking convergence of thinking on the broad categories or main components of IC. Table 1 shows the breakdowns used by prominent American, British, and Swedish writers from the early period of IC research and development.

Table 1. Early classifications of intellectual capital

Brooking (1996)	**Roos & Roos (1997)**	**Stewart (1997)**	**Sveiby (1997)**
Market assets	Customer and relationship capital	Customer capital	External structure
Infrastructure assets	Organizational capital: Business process capital; Business renewal and development capital	Structural capital	Internal structure
Intellectual property assets			
Human centred assets	Human capital	Human capital	Employee competence

The examples illustrated confirm the basic tripartite model described by OECD (2006) of human, organizational (or structural), and relational (or customer/market) capital, but with an element of divergence in the subdivision of structural/organizational capital in two cases into its *process* and *product* dimensions, in effect acknowledging the OECD (2006) distinction between valuable assets and their value drivers. There have also been significant developments in thinking around the relational component of IC, with scholars arguing for broader and more nuanced interpretations incorporating *social capital*, reflecting renewed interest in the concept from the 1990s, in the context of economic development, corporate responsibility, and civic engagement (Bueno, Salmador & Rodríguez, 2004; Putnam, 1995).

Evaluation of Intangible Assets

There is similar proliferation in the methods proposed for measuring and reporting IAs, but again some convergence, in that "Most reporting frameworks developed to date favour a qualitative approach where intangibles are reported in a narrative format, to complement financial reporting" (OECD, 2012, p. 7). The key point here is that IAs are *strategic resources*, so evaluation must be directly linked to the strategic objectives of the organization, as explained by Roos et al. (1997, p. vi):

> "A comprehensive system of capturing and measuring intellectual capital must be deeply rooted in the strategy or the mission of the company. Strategy has to guide the search for the appropriate indicators simply because it is the goals and direction of the company set out in the strategy, that signify which intellectual capital forms are important".

OECD (2012, pp. 25-28) lists 39 different approaches developed between 1989 and 2009, but notes that despite "active interest" in evaluating intangibles, only five of the 34 member countries have introduced national recommendations or guidelines for reporting, with limited adoption of intangible asset disclosure frameworks by companies. The various methods have been broadly categorized as direct (monetary) valuation, market capitalization, return-on-assets, and scorecards (OECD, 2012; Tan, Plowman & Hancock, 2008).

Despite continuing research and development in the field, the four best known measurement models all come from the late 1990s: Brooking's (1996) Technology Broker IC Audit, Edvinsson's (1997) Skandia Navigator, Roos et al.'s (1997) IC-Index, and Sveiby's (1997) Intangible

Assets Monitor (IAM), with the Skandia Navigator and IAM the most prominent examples (Pierce & Snyder, 2003; Tan et al., 2008). The IAM has similarities with the Balanced Scorecard in its strategic focus and advice on limiting the number of indicators selected to a manageable quantity – "one or at most two indicators" for each of the nine subheadings/cells (Sveiby, 1997, p. 78). Table 2 shows the basic model.

Table 2. The Intangible Assets Monitor (Sveiby, 1997)

Intangible Assets Monitor		
External Structure	**Internal Structure**	**Competence**
Indicators of Growth/Renewal	Indicators of Growth/Renewal	Indicators of Growth/Renewal
Indicators of Efficiency	Indicators of Efficiency	Indicators of Efficiency
Indicators of Stability	Indicators of Stability	Indicators of Stability

Data Sources and Methods

The study re-used data from prior work (Corrall, 2012; Corrall, Kennan & Afzal, 2013; Cox & Corrall, 2013), which was supplemented with additional evidence from the literature.

Library literature on IC was reviewed to establish thinking and practice in the field. Survey and case study data on library engagement with research data management were analyzed to identify factors helping or hindering service development. The OECD's (2006; 2008) categorization of IAs was chosen as an analytical framework on the basis of its international standing and its evident applicability to LIS. Table 3 shows the three broad categories specified with the brief descriptions and examples/keywords set out in the OECD (2008) synthesis report.

Table 3. OECD classification of intellectual assets

IC Category	**Brief description**	**Examples/ keywords**
Human capital	Knowledge, skills, and know-how that staff "take with them when they leave at night"	Innovation capacity, creativity, know-how, previous experience, teamwork capacity, employee flexibility, tolerance for ambiguity, motivation, satisfaction, learning capacity, loyalty, formal training, education.
Relational capital	External relationships with customers, suppliers, and R&D partners	Stakeholder relations: image, customer loyalty, customer satisfaction, links with suppliers, commercial power, negotiating capacity with financial entities.
Structural capital	Knowledge that stays with the firm "after the staff leaves at night"	Organizational routines, procedures, systems, cultures, databases: organizational flexibility, documentation service, knowledge center, information technologies, organizational learning capacities.

Findings and Discussion

Library engagement with IC has progressed from theoretical discussion to real-world application and the development of frameworks that can support professional practice in identifying, measuring, and managing library service assets and liabilities for strategic advantage. In the context of research services in the digital world, analysis of the evidence indicates that libraries have important structural and relational assets that should be taken into account alongside their widely recognized human assets when evaluating their capacity to manage research data. The IC/IA models developed within the LIS community also contribute to our understanding of significant interactions among different classes of IAs.

Library applications of intellectual capital

Library interest in IAs and IC can be traced back to the period when the concepts gained prominence in the management literature during the late 1990s (Barron, 1995; Corrall, 1998; Dakers, 1998; Koenig, 1997; 1998a; 1998b). Early discussion in the library and information science literature was mostly about the potential involvement of library and information professionals in managing and measuring IC as knowledge resources on behalf of their parent organizations (Corrall, 1998; Koenig, 1997; 1998a; 1998b; Snyder & Pierce, 2002) and not concerned specifically with managing the knowledge capital of libraries, or only in the context of its impact on organizational IC (Huotari & Iivonen, 2005; Iivonen & Huorai, 2007). However, Barron (1995) used the concept of IC to argue for investment in the education of library workers and creation of learning communities for rural public libraries in the US, and Dakers (1998, p. 235) used the term "living intellectual capital" to distinguish the human-centred IC produced by library staff from the capital represented in its stock of books and other materials in her report of a skills audit conducted for the British Library's consultancy service.

More substantive empirical investigations of IA evaluation were conducted in LIS during the following

decade (Asonitis & Kostagiolas, 2010; Corrall & Sriborisutsakul, 2010; Van Deventer, 2002), along with some smaller-scale studies dealing with particular components of IC (Cribb, 2005; Mushi, 2009), and a continuing flow of contributions to the development of conceptual understanding in the LIS sector (Huotari & Iivonen, 2005; Iivonen & Huotari, 2007; Kostagiolas, 2012; 2013; Kostagiolas & Asonitis, 2009; 2011; Pierce & Snyder, 2003; Town & Kyrillidou, 2013; White 2007a; 2007b; 2007c). There is a also a growing strand of work investigating the related area of *social* capital in public libraries (*see, for example*, Ferguson, 2012; Griffis & Johnson, 2014; Svendsen, 2013; and Vårheim, 2011).

The literature demonstrates global interest in the topic among the academic and practitioner communities, but with significantly more contributions from Europe than America: empirical work includes case studies of university libraries in Tanzania and Thailand; surveys of public libraries in Denmark and Greece; and a case study of a specialist LIS in South Africa; there are also conceptual contributions from Finland, Greece, the UK and US.

The empirical research typically uses mixed methods, with interviews, questionnaires and documents as the primary data sources; two studies used the Delphi technique, but only one used only quantitative techniques. Scorecard approaches have emerged as a common strategy for assessing library intangibles (Corrall & Sriborisutsakul, 2010; Cribb, 2005; Town & Kyrillidou, 2013; Van Deventer & Snyman, 2004).

Findings from some studies of organizational learning and knowledge sharing within particular communities are mostly of local interest (e.g., Dakers, 1998; Mushi, 2009). However, other empirical investigations of the application of IC concepts and techniques in particular LIS have produced frameworks, maps, and models of value beyond the immediate context that contribute to our conceptual understanding and/or offer process guidelines; notably the public library investigations by Asonitis and Kostagiolas (2010) and Svendsen, 2013, and especially the doctoral studies by Sriborisutsakul (2010) in academic libraries and Van Deventer (2002) in a special LIS. Conceptual papers and review articles have made useful contributions in identifying and categorizing library examples of knowledge processes/IAs (Huotari & Iivonen, 2005; Iivonen & Huotari, 2007; Kostagiolas & Asonitis, 2009; 2011) and have also offered purpose-designed frameworks for managing and measuring library IAs (Kostagiolas, 2013; Kostagiolas & Asonitis, 2009), or proposed adaptations of business tools for LIS (Pierce & Snyder, 2003; Town & Kyrillidou, 2013).

Library classifications of intangible assets

Library literature usually adopts the standard threefold categorization of IC into human, structural or organizational, and relational capital, but with some variations in terminology; in a few cases scholars propose new or significantly expanded elements, notably for relationship assets. Kostagiolas (2012; 2013) suggests the Intellectus public sector IC model (Ramírez, 2010, p. 254), which subdivides the structural component into Organizational, Technological, and Social capital, to aid understanding of the social value created by (public) libraries.

Svendsen (2013, pp. 58, 67) draws on the work of Putnam (2000) to define different forms of *micro-* and *meso-level* social capital (Bonding, Bridging, Institutional) created by public libraries in Denmark; his classification of different types of networks/relationships has potential application in other LIS settings, particularly academic libraries (e.g., supporting interdisciplinary research communities). Figure 2 displays the different types of social/network assets identified by Svendsen (2013, p. 67).

Town and Kyrllidou (2013, pp. 12-14) suggest several novel intangible elements, to be used alongside the standard balanced scorecard: they subdivide Relational capital into Relational and *Competitive Position* capital (reputation); add a *Meta-Assets* element to define *intangible* value added to *tangible* assets; and introduce a *social* capital component with their Library Virtue dimension (in which "proofs of library impact will be delivered") and a Library Momentum dimension, to track the *pace* of innovation, as a final "critical organizational asset". Their framework is not yet a working tool, but is an interesting attempt to broaden and elevate the scope of library assessment to measure "the full value of academic research libraries" (Town & Kyrillidou, 2013, p. 7).

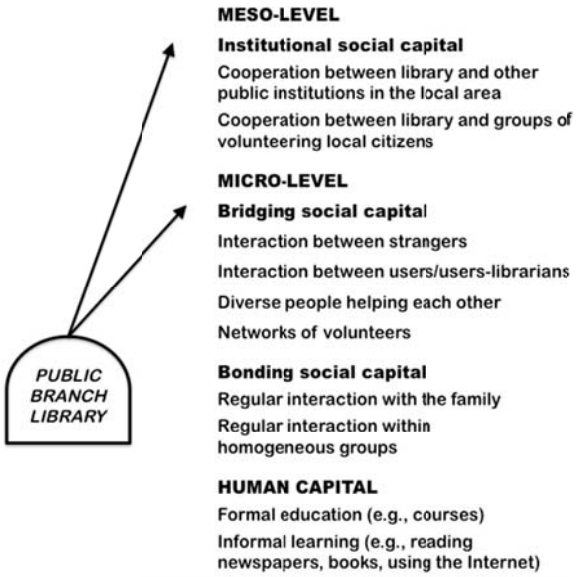

Figure 2. Intangible assets for rural public libraries (Svendsen, 2013)

Research in academic libraries in Thailand produced a taxonomy of IAs that proposes a library-specific fourth category of *Collection and Service assets*, as "the end-products of core knowledge-based processes in libraries", which are "derived from a combination of human, structural and relationship assets" (Corrall & Sriborisutsakul, 2010, p. 283). Figure 3 shows Sriborisutsakul's (2010, p. 213) categorization of library IAs (with examples found in Thai university libraries).

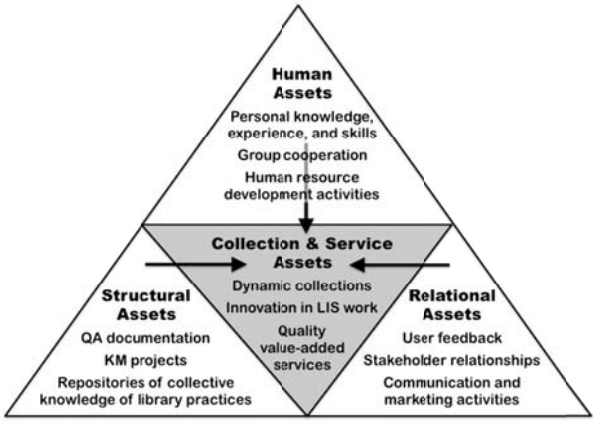

Figure 3. Classification of library intellectual assets (Sborisutsakul, 2010)

Resource-based theories of the firm emphasize that organizations gain advantage from distinctive complex *bundles* of resources, whose use in combination is hard to imitate and replace. The value of such "super-assets" is thus more than the sum of their components, and therefore worth assessing and reporting. These combinations of assets in use are also more visible and more meaningful to library stakeholders than individual assets used to create them. Libraries consequently need to define their distinctive collection and service assets, and then expose and explain the hidden assets on which they depend to their stakeholders.

Library Examples of Intangible Assets

Library competence to manage research data has been questioned in the literature and studies have identified skills gaps and shortages, notably technical knowledge for data curation, advanced information technology skills, subject domain knowledge, research processes and methods, and metadata schemas for specific disciplines (Corrall et al., 2013; Cox & Corrall, 2013). However, the literature also highlights previous library experience and know-how; existing collaborations and partnerships; and organizational structures, systems and procedures, which constitute intangible assets that are enabling academic libraries to initiate research data services (Corrall, 2012).

Human assets include:

- expertise in collection development and external datasets that can be transferred to data collections
- experience in repository development and management that can be extended to data repositories
- skills in conducting reference interviews that can be applied to data interviews.

Practitioner case studies also report creative use of their literature search know-how by library professionals to select the most appropriate metadata schema for projects (Bracke, 2011; Hasman, Berryman & McIntosh, 2013).

Relational assets include:

- library-faculty partnerships for information literacy that can be exploited to promote data literacy, data curation, data management planning, etc.
- library-technology collaborations on digital services that can facilitate development of data storage and infrastructure services
- library professional networks that enable sharing of best practices via conferences, email, social media, etc.

Bracke (2011, p. 67) explains how librarians can exploit their *reputation* as trusted professionals to engage with data curation, noting they have "established themselves as trusted stewards and educators." She describes how a data repository task force at Purdue University partnered with subject librarians "to leverage their relationships with researchers," and then mentions the positive *image* of the subject librarian and the opportunities arising:

> "Faculty viewed the librarian as a go-to resource for many of their research and teaching needs. The librarian received many word-of-mouth recommendations and took advantage of her social capital to develop more and deeper relationships."

Structural assets include:

- organizational structures facilitating service development and innovation
- proven systems and procedures with potential for extension or repurposing
- tools available within the professional community.

The value of the subject liaison librarian structure used in many libraries is evident (Bracke, 2011). Such systems enable the discipline-sensitive approach to services needed for RDM, but are now often complemented by teams of functional specialists in RDM and other areas, who provide coordination, guidance and support to frontline liaisons in a hybrid model of specialization (Covert-Vail & Collard, 2012; Jaguszewski & Williams, 2013). Specialist committees and task forces at library and institutional levels are another structural device used to develop services and promote involvement of the library in new areas, which also creates relational capital.

Established systems and processes facilitating RDM service development include institutional repositories, reference interviews, and LibGuides, which have been used to provide advice on data management planning, digital curation, scientific data repositories, etc. Community tools

that libraries can exploit in research data services include the data management planning tools produced by the Digital Curation Centre and California Digital Library, and the Data Curation Profiles Toolkit produced by Purdue (Bracke, 2011; Corrall, 2012).

Library Models for Asset Evaluation

Scorecards have emerged as the approach most often used by libraries for evaluation of IAs, but the specific methods and particular tools deployed vary within this general framework. Methods frequently used in LIS to identify IAs are document analysis (e.g., strategy documents, organization charts); interviews (e.g., library managers, information specialists, service stakeholders); and questionnaires (e.g., staff skills audits and user experience/satisfaction surveys).

Library IC investigations typically use multiple sources of data, including data primarily collected for other purposes; for example, Cribb (2005, p. 11) notes that "The staff perception survey conducted every two years helps library management understand the cultural readiness of the staff". LIS researchers have also used ready-made instruments from the business world: Van Deventer (2002) adapted Sveiby's (2001, p. 353) knowledge strategy questions for the LIS context, expanding the question set from nine to 16. Dakers (1998, pp. 239-242) designed her own questionnaire tool, "tell us about your talents", for "auditing the people assets" at The British Library, and appended her draft instrument, offering potential for re-use by other LIS.

Several researchers have developed (and later refined) frameworks to guide the process of evaluating and managing IAs in academic, public and special LIS (Kostagiolas & Asonitis, 2009; Kostagiolas, 2013; Sriborisutsakul, 2010; Van Deventer & Snyman, 2004). Some are high-level models, which include financial/ tangible assets alongside intangibles for completeness (e.g., Kostagiolas, 2013; Van Deventer & Snyman, 2004). Sriborisutsakul (2010, p. 220) provides a process model based on real-world experience of developing performance indicators and operational measures at university libraries in Thailand. It is not context-specific and could be used in other sectors and in other countries. Figures 4 shows the basic steps of the process from identifying IAs to implementing performance indicators.

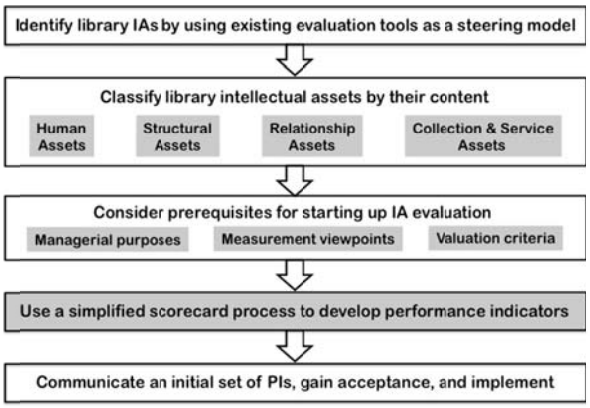

Figure 4. Systematic indicator development process (Sborisutsakul, 2010)

Figure 5 shows Sriborisutsakul's (2010) adaptation of the scorecard approach to develop performance indicators for IAs, which starts by identifying IAs supporting the strategic priorities for the library.

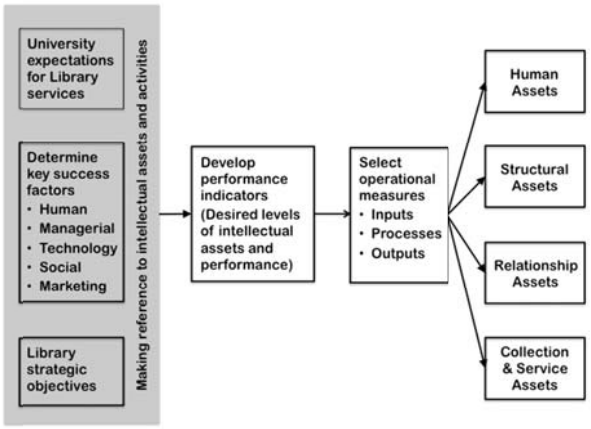

Figure 5. Simplified scorecard approach (Sborisutsakul, 2010)

Conclusions

Libraries need to extend their measurement and assessment systems to provide a fuller picture of their contribution and impact on individuals and communities. An IC perspective can enable library practitioners to evaluate their human, structural, and relational assets, and recognize their IAs as distinctive competencies with current relevance and enduring value. The RBV enables us to understand more fully how particular combinations of diverse assets enable libraries to create dynamic knowledge resources and create value for their members and stakeholders. Future research could explore and test the applicability of additional evaluation frameworks, including public sector models of social capital.

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Curriculum Vitae

Sheila Corrall is Professor and Chair of the Library & Information Science Program at the University of Pittsburgh, USA. She moved to the USA in 2012 after eight years at the University of Sheffield, UK, where she was Head of the Information School for four years. Her professional experience includes serving as director of library and information services at three UK universities and ten years as a manager at The British Library. Corrall teaches courses on Academic Libraries and Research Methods. Her research areas include strategic management of information services, collection development in the digital world, and the evolving roles and skillsets of librarians and information specialists.

The Impact of Public Libraries on Small Rural Communities: Challenges to Conducting Research

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Abstract

In small rural communities public libraries play a special role. They are often the only information and cultural centres, and one of the rare community meeting places. Therefore, they have to respond to diverse needs of their patrons which vary from homework help to information about weather and new agricultural products to adults. Obviously, public libraries have a great potential in such communities and it is necessary to make their (actual and potential) contributions explicit to local government (i.e. library funders) and the general public.

This paper is based on data and experiences collected in the study of public library impact in two Croatian insular rural communities, Sali (Dugi Otok) and Kolan (Pag). While the central interest of this study was to understand the relationship between the community and the library and to investigate what impact does a public library have on such a small and isolated community, author also tested research models, methods and techniques. Research strategy used in this study was a case study, while the research tools used were document analysis, interviews, focus groups and a survey (triangulation). The study was conducted in 2012 with three large groups of respondents: local residents, decision-makers and library experts. In this paper the author will discuss research challenges relating to the employed qualitative methods such as changes in research steps, use and interpretation of "unexpected" information (e.g. casual conversation), changes of respondents, research objectivity etc.

Keywords: rural community, public libraries, impact, qualitative methods, research challenges

Introduction

Since their inception, the importance and influence of public libraries has been a matter of debate, first in professional, and later, in scientific circles. There are several reasons for this, all originating from different points of vantage: the necessity of their existence is something that requires justification, as well as the possibilities of their influence on an individual and/or particular group. Contemporary research primarily investigates the influence that libraries have on the various aspects of the individual or a community: these include how an individual is to spend his or her free time, constant improvement in a profession, personal development, personal advantage (Goulding, 2006), as well as questions concerning what might influence an increase in the economic strength of a community and its development as a democracy. In the 21st century, public libraries are a sociological and cultural phenomenon which deserves systematic research and consideration. The majority of the research on the importance of public libraries in rural communities has been conducted by the American scholar Bernard Vavrek (1995). His key propositions concern the particularities of library services in communities with a very specific way of life, and the means their further exclusion is to be avoided. Yet the works of research concerning island libraries show that most of them have researched pacific, African and similar communities (Jackson, 1989, Evan, 1992). The focus of this paper will be on the evaluation of the influence of libraries on island communities, especially on their influence on the community of which these libraries form a part, their influence on skills and their influence on the local economy.

About of the study

In our work we have attempted to delve further into the conclusions of those studies whose method is based upon a sound approach, and also attract enough curiosity for further research. One of the studies most often cited was that undertaken by Rebecca Linley and Bob Usherwood (1998): 'New Measures for the New Library: a Social Audit of Public Libraries'. This research is important due to its systematic method which formed the template for much later research. The authors here had also elaborated some of the tools which are of use when measuring societal influences on library services as pertaining to the aims of the library itself. They also investigated the role of societal and economic influences on public libraries.

When taking some of the problems concerning public libraries in rural communities into consideration, we must also take note that the journal Library Trends in 1995 focused on this particular topic (Rural libraries and

information services). There were papers about social and economic changes that have a particular impact on American rural communities. These include: the need for information in the rural community, how libraries are financed, services for children and youth, the possibilities of cooperation between institutions, the availability of telecommunications and development trends.

Croatia has been lacking the research which could provide an analysis of impact of public libraries on the wider community. Throughout the years there have been have various studies into the opinions of patrons concerning the library in general, but there have been no research of wider scope. Because of this, an idea had arisen about a research, that would focus on island communities in the county of Zadar as an example, and which might prove useful in understanding the role of the library on the wider community.

We expected that the questions would offer us answers concerning the role of libraries for the rural island population, and particularly what makes island life specific, their working methods and management. What also interested us was to see if this specific situation had any effect on library services on these islands, and the ways in which these libraries participate in the cultural life of these communities. We were also interested in investigating the tasks decision makers recognize when considering libraries in rural and island communities, have the statistical methods that have been used thus far been of any assistance to decision makers in maintaining the library, as well as the role of the library in such communities and the way they are financed, as well as which methods are appropriate when evaluating the influence of the library on a community.

What was expected of the proposed model for the evaluation of the influence of the library on the community was that it will answer questions as to how the library influences a community and the role of the library in a community. Our method of research was based on that of Rebecca Linley and Bob Usherwood (1998), both of whom we mentioned earlier. Anči Leburić (2001) assisted us in or choice of method, as she insists that for research into island communities an integration of qualitative and quantitative methods is best.

Another aim of our research was to contribute to the valorization of a critical theoretical and methodical approach to the research of the influence of the library on a community (especially as how this relates to rural and island communities) and to the consideration and formation of a suitable theoretical and methodical approach to the research of the influence of the library on rural and island communities. This should also lead to the systematization of the quantitative and qualitative analysis of Croatian public libraries, especially in rural communities.

The questions that this research proposed were the following:

- What is the role of the library in the life of a rural island community?
- Do the particularities of an island community influence the specifics of libraries work methods the management of the library and how it offers its services?
- How do libraries participate in the cultural life of the community?
- Have the methods until now of collecting data on the management of libraries been of any assistance to the decision makers (at the local and national level) when confirming the role of the library in these communities and how they are financed?
- What are the suitable methods and models for the evaluation of the influence of the library on a community?

The method of research

What is most often found in qualitative research of a deliberate sample because one wants to gain insight into a particular situation, context and period of time (Gray, 2009, p.180). 'The relevance to a research' is the main criteria for one's choice of samples, and not a selection based on chance. The majority of samples were determined by the questions of this research. When discussing samples in qualitative research, Powell and Connaway (2004, p.190) emphasize the 'first sample' which does not exist in quantitative research. The characteristic of the first proposed sample is that this sample can, in time, add to, change and adjust the aims of research. For the requirements of our research our method of sampling was the 'snow ball' method.

For the requirements of our research our selection of examinees was based on those singled out by Usherwood and Linely (1998) as the most important for our research on influence. Although Usherwood and Linely did not use a questionnaire, we did as we believed that it would allow us to compare the extent and value of the data for a research into the influence of the library on a community.

These were the methods chosen for our research: the research of documents, semi-structured interviews, focus groups and questionnaires. The basis of the strategy of our research was formed on the model proposed by Roberta K. Yin (2007), and we thus selected the following public libraries – the library in Sali on the island of Dugi Otok and the library in Kolan on the island of Pag. Geographical characteristics (rural) formed the basis of our selection, socio-economic characteristics and a similarity in work methods (librarians working alone), with a plan to carry out our research on two levels: an analysis of the community and on the level of the examination of the key interest groups.

Semi-structured interviews were used in order to investigate groups of decision makers and the representatives of the more important local cultural, social and spiritual institutions (headmasters of schools, representatives of the clergy, representatives of non-profit organizations etc). It is for certain that the samples in our qualitative research were selected deliberately and with a definite goal as they would allow us to gain greater insight and knowledge, and not a mere empirical generalization. The following stakeholders were encompassed by our research: decision makers at both the local and national levels - representatives on county and municipal government, representatives of the Ministry of Culture, representatives of the Library Institution, library chairmen, and representatives of the more important local cultural, social and spiritual institutions and bodies.

There were two methods implemented for those who used library services: focus groups and questionnaires. IFLA formed the basis of our questionnaire in order to investigate the effect of the library on the community.

In this paper, we would like to single out several methods of research and the reasons and aims of our research.

The aim of our interviews with decision makers at the local, county and national level was to gain insight into the relationship between decision makers and public libraries as well as to gain and understanding of the importance and evaluation for the assessment of the working methods of the library in order to make strategic decisions.

The aim of our interviews with the local population was to gain greater insight into the opinions of the local population on the importance of the role of the library in the community. These interviews different groups of the population – from 'everyday people' to people that have a specific role (people who are connected to culture, education, and representatives of the clergy, and others in important positions)

Focus groups in the local population were directed towards parents and the young, and our aim was to gather the opinion of examinees on the role, influence and potential of the public library for the local community.

Questionnaires for those who used library services provided us with insight into the habits of library users and the position of the library in the community (this only encompassed examinees in Sali; there were definite reasons why a questionnaire could not be carried out in Kolan).

This research was carried out in May, June, July and September of 2011 as well as in March and April of 2012.

We would draw your attention to the fact that in Kolan we didn't conduct a survey for objective reasons. During the implementation of the research, library suddenly - closed because the librarian went to another job! From the position of researcher that situation was more than inspiring and interesting. We had the opportunity to talk with residents about the existing library program and about the position that library has in the community, as well as to hear their thoughts about the current situation when they were confronted with the loss of the library.

Table 1. Local population encompassed by this research

Table	Sali	Kolan
interviews	6 (3 women, 3 men)	2 (1 woman, 1 man)
focus groups	1 group of parents (4) 1 group of young people (5)	1 group of parents (4)
group interviews		with teachers with children
questionnaire	57 respondents	0

Conclusion of the research

On the basis of this data we can single out several important conclusions:

1. Decision makers recognize the library as a part of the community

2. Decision makers recognize the library as a vital part of the island community

3. Decision makers recognize the library as the cultural centre of the local community

4. Decision makers recognize the library as an aid to development

5. Decision makers do not use the results of research in order to access funds and make decisions

6. There is no consensus between decision makers and experts in the field of library studies regarding the institution responsible for the development of libraries in smaller communities (like islands), nether as regarding the means (documents, strategy, concrete action) by which development is to be encouraged

7. Research into the influence of libraries is recognized by experts as important and necessary

8. Something has been lacking in the way in which data on public libraries has been gathered, on the basis of this data it is not possible to make a justified premise on the success of a libraries work methods

9. Island and rural libraries do not have a coherent development strategy

10. Adequate space, educated staff, funding and the number of staff are some of the key problems of the strategic development of island libraries

11. The work methods of island libraries are specific due to their immediate environment and some of the things that determine this is their isolation, social distance, specific networks of communication, and a particular sense of dependence (one needs to lower one's expectations on an island as some things are lacking, and, as research has shown, some of these things add to the quality of life)

12. The role of a library in a rural community is manifold – a meeting place, a place to learn, a place of leisure and one in which one can use leisure one's time constructively, a place for information: these roles cannot be separated as services intertwine here, and the means of service also differ from those in an urban environment (an immediate availability of services, an available librarian etc.)

13. The library is the only cultural institution in smaller communities

14. The library is the only public space open to the entire population

15. The most numerous and steadfast users of island libraries are children

16. The library participates as the motivator and promoter of cultural activities in the cultural life of the community

17. Applicable methods of the evaluation of the influence of the library on a community are mixed methods.

The primary interest of this study was to recognize the relationship between the library and the community in which it is active and to investigate the kind of influence it has on the community. The contribution of the library to the community manifests itself as a place of togetherness, a place in which social interaction can occur. The work methods of an island library are specific due to their immediate environment. On the basis of the responses of our examinees, we can conclude that the existence of libraries is important for the following reasons: libraries ensure that one can use one's leisure time usefully, they aid the process of learning and they ensure public interaction among people. The habits of those who use the library are of importance should one establish a library in a smaller community or if a library attempts to change its work methods.

In order to understand the importance of the library for a rural island community it is important to have knowledge of the problems, advantages and disadvantages of life in such an environment. The answers provided by our examinees affirm the theoretical premises we proposed earlier that life on an island is ultimately bound by its geographical location and that the rhythms of island life are specific. As far as rural life is concerned, our examinees were aware of the advantages and disadvantages of rural life. Having taken the plans for the strategic development of islands into consideration (and we gained information on this during the course of our research), we became interested in the role that culture played in island life, the main priorities for island life and the institutions which were important. Our examinees were aware that culture is one of the segments of life, but cited that economic development was of greater importance. Culture must be seen as one of the resources that should add to the quality of life, so that, besides the purely material, the quality of education and personal and cultural expression should also be taken into account (Cassier, 1981, p. 58). Islands are specific locations that have difficult access to quality and diverse cultural content and entertainment (Babić, Lajić, Podgorelec, 2004, p.122), and this was also stated by our respondents.

The library is also a place that encourages the development of the identity of the community, and for those who do not use it for its services in Sali and Kolan the library has a symbolic value and this is something that Usherwood noted in his research (Usherwood, 2002, p.8). The librarians in both places and a portion of the local population influenced the long term influence of the library on the community and on those who use its services. Seeing that the majority of those who use the library's services are children and the young, use of the library becomes a habit which also forms the base for its continuous use at a later age.

The data collected in interviews and focus groups from the local population in Sali indicates that its library is in a stable position. From the Mayor of Sali to the young people who use its services, all agree that the library form a major part of the community without which Sali would not be what it is today. The respondents all use the library space and its services differently, most often to borrow books for reading assignments, computer services to write seminar papers and essays, the use of the internet and to participate in the cultural and other activities offered by the library. The library is, foremost, perceived as a space, and not as a service. The library is a meeting place for various social groups, a place for informal socializing and an institution that one enters „in passing". This is all an indication of the high degree of the library's involvement in the community. The use of other library services like borrowing books and reading newspapers and other periodicals is what naturally follows after socializing and other activities. On the basis of the analysis of this data that the library in Sali has a great influence on the cultural activities of the community seeing that it is the only cultural institution that exists there, an institution that promotes various activities, but also that the activities that it organizes are of equal value to those of other local institutions, like those of the local tourist board and others. Its influence can be seen not only in Sali: it has spread over the entire island (the non-institution service of the library bus). Its librarian has noted the following groups of people as important – youth for whom it must be ensured that activities are organized which will keep them occupied and provide them with direction, children for whom it must be ensured that activities will meet their needs and age, and

the older population for whom, according to the librarian, services can be provided such as reading at home. All respondents emphasized the importance of the library in the lives of children and the young.

In discussion and focus groups, children and youth pointed out the lack of quality content for leisure time on islands and smaller communities. Seeing that we paid attention to certain documents for the requirements of our dissertation which paid to the strategic development of islands and rural communities in Croatia, it must be noted that there was a lack of understanding of the importance of culture for such communities. When mentioning culture, it is not just the preservation of heritage that we have in mind, but also the creation of 'new cultures'. This was one of the problems we encountered in our conversations with decision makers. All agree that the library can contribute to the cultural identity of a community and its cultural program, yet we did not have the opportunity to elaborate the concept of 'culture' during our interviews with them. Culture is a concept of wide scope, as mentioned in the introduction to our dissertation, and what is meant by it is often under dispute. Automatically equating the library with culture within an island context evokes a sense of caution in us as we are unsure whether or not we can explain the wide range of meanings of the term 'culture' to all parties. Much engagement in the cultural life of the community is what is expected of libraries on islands and smaller communities: this means that whoever works in library here must have certain prerequisites such as an understanding of the communities cultural roots, knowledge of cultural events on other parts of the island, knowledge of cultural events on the local and national level, the skill required to organize events and present them to the general public etc.

The participants in the focus group in Kolan expected that the library organize extra events for children and parents, and what was expected in Sali was more space and social games. We believe that it is a good thing that the local population can express what it expects of the library, which means that their understanding of the concept of the library includes more than what the traditional library had to offer. Our opinion is that, based on the documents pertaining to both libraries, it is necessary to put extra activities into effect who expect extra cultural events like poetry readings, services for those with special needs, as well as computer services. The librarian in Sali is on this path as he mentioned that he would like to establish a local periodical.

Concerning the relationship between decision makers and experts, our analysis showed that there was no consensus on the potential development of island and rural libraries. Founders of libraries are those responsible for a libraries work methods, yet lack the funds to evaluate this and improve it. What we have in mind here is an increase in staff, and in the case of Sali, renovating and enlarging its space. It is difficult to finance cultural and other programs due to the small budgets allotted to the cultural sector. It is not our intention to put all the responsibility on municipal and national institutions, yet it is evident that there must be change in how certain local institutions are funded. We must also note that all respondents affirmatively expressed the possibility of applying for an EU project. Yet on the basis of our field work that a large number of small libraries would apply, as they have neither the knowledge nor the time to learn the process of applying for projects as there is much bureaucratic wrangling involved.

As mentioned earlier, work methods of libraries in smaller rural communities are specific. The information gathered by experts, especially that gathered by the head of the General registry of public libraries in the Library institute, led us to the conclusion that it is necessary to revise the existing Standards for public libraries as soon as possible and direct these changes to the particularities of libraries in rural communities. Besides this, there is also the need to elaborate the Strategy of development particularly sensitive to the specifics of Croatian regions (number of counties, villages, the situation in rural communities, and the library network in rural parts of Croatia) and the polyvalent tasks of public libraries in such communities.

The results of our research corresponded to the questions proposed in the abstract at the beginning of our research. Seeing that one of the aims of our research was to explore the applicability of a model for the evaluation of the influence of the library on a community, we will now turn to the model which was applied to our research. In their research Usherwood and Linely emphasized that it was not possible to make generalizations on the basis of qualitative data and that these results were only applicable to the locations in which research was carried out, yet that it is possible to use the same research tools when investigating the influence of the library on a community using their methods. The intention of our research was to show procedures and methods of research which could be applied to libraries in Croatia. We tested this model on libraries in a specific environment, an island environment, as we concluded that this research unit was a good choice which would point toward the possibilities and problems of investigating the influence of the library on a community.

This research has confirmed our thesis that when investigating the influence of libraries it is best to use a combination of research methods, although qualitative methods should be primary, such as interviews and close observation. Interviews were one of the key tools for our research of the influence of the library on a community. Case studies are the most appropriate method for the research of the library in a community. The questionnaire which we used in our research, based on the IFLA template for studies of the influence of libraries (this questionnaire was developed within the project "Global Statistics" which was carried out by IFLA, ISO and UNESCO and is used in agreement with its original author R. Poll, although it has never been put into

practice) confirmed the statements we made earlier that quantitative methods cannot provide answers to questions concerning the influence of the library on a community. In order to understand this complex question it is necessary to form a well-rounded picture that the results of a purely quantitative method cannot provide.

We believe that our research has shown that there should be more emphasis on both qualitative and qualitative methods in the field of library studies. As Crawford states, qualitative methods are compatible to the social nature of libraries as they provide us with the answers for „how“ and „why“.

The protocol of our research could not foresee some of the information we gathered and several of the occurrences which we encountered. A situation in the immediate environment will certainly affect the progress of a research, which is also a characteristic of qualitative research. Changes in the choice of respondents, interviews turning out differently, unplanned observations and information gathered from informal conversations are just some of the situations we encountered. When we began our research we were acquainted with the techniques of field work and the problems that might arise during the course of our research. Yet it was also important that we control our relationship with the local population or the theme of an interview and focus group. After analyzing the data, after a day of field work, it appeared that we did not keep sufficient distance during several interviews and lost sight of the main theme during interviews. An example of this when a discussion began on raising children in small communities and the role of the institutions responsible for an islands development; such discussions led our investigators to empathize with the local population. As our research continued, we took heed of this in order that it does not influence the answers of our respondents.

It is also useful to add, that while we were conducting our research and conducting interviews decision makers and the local population, that we noticed that there were respondents who had not given much consideration to the importance of the library for themselves, their families and their community. After this, we continued this discussion with them. Because of this our research also helped to promote an awareness of the importance of the library in the community.

The scope of our research was a problem, seeing that there was only one person to work on it. A research of this kind requires a team, stable finances and much time, i.e working hours to conduct the research.

An understanding of the context in which the library operates was the most important instance when taking the rather complex problem of the influence of the library into consideration. We can safely conclude that a holistic approach to this problem demands an analysis of the community.

Conclusion

The affirmative stance towards public libraries, which can be noticed in this research, is based on the premise that libraries are important for the individual and for the communities in which they operate as well. Yet the value and importance of libraries is not entirely recognized; it may be recognized but this knowledge is not represented adequately neither to those who make the decisions concerning public libraries nor to the general public. The importance of the public library for a community cannot be denied, and the works of several authors, who in their theoretical or investigative work try to answer why a library is of importance to a community, are a witness to this; they also showed the positive influence that a library can have on a community.

The theory proposed by three Scandinavian authors, Jochumsena, Hvenegaarda and Skot-Hansen (2012), described the public library as a place where the individual fulfils four needs – to experience, investigate, participate and elaborate. According to this theory the library covers four branches of human activity: they are places for inspiration, education, socializing and performing. Furthermore, the library is a place which promotes the following aims: to gain experience, to make active participation possible, to strengthen the personality and encourage innovation. On the basis of sociological discussions of theoreticians in the field of library studies, and the model proposed by Jochumsen, Hvenegaard i Skot-Hansen (ibid), we began our research of the premise that this model is paramount when positioning the library in society. Should libraries fulfill their social mission, communities will surely notice them and seek them. This formed the basis of our research questions which we attempted to answer during the course of our research in order to demonstrate how a library influences the community in which it operates.

Research into the problems of rural libraries in Croatia is rare. In the Draft of the Strategic development of public libraries in Croatia until 2010 rural libraries are counted as one of the priorities, yet there are also other aims directly tied to rural libraries (access to ICT etc.). Among the measures in the national strategy for development of public libraries rural libraries have a special place. Yet, the Strategy has failed to acknowledge that some libraries are different and that this is important. Taking into consideration that there is a large percentage of libraries in the Republic of Croatia, it is clear that the Strategy for public libraries, as well as the Strategy for island development, does pay sufficient attention to what sociology has to say; how to approach rural and island communities with an awareness of what makes them special.

Having proposed our research and having read documents on public libraries in Croatia, we came to the conclusion that there are great problems for public libraries at the local level, as well as in the county of Zadar; there is no clear social strategy nor understanding of the concept of 'culture' and 'cultural politics' as one of the prerequisites of their development. The interviews conducted during our research in Sali (Dugi otok) and Kolan (Pag) confirm Holt's opinion that „a library is exactly what the local community wants it to be". Sali and Kolan are examples in which the local government recognized the importance of the library for the community and in which cooperation with the librarian contributes to the services of the library. Skračić (p. 499), in 1994, wrote of the need to establish an Office (agency) in Zadar which would take care of the cultural programs on the islands of the Zadar archipelago. A future research should keep track of how (when Croatia becomes part of the European Union), islands in the Zadar archipelago access the possibilities of applying for projects and the extent to which cultural institutions on these islands (including libraries) will use these resources for their development.

This research confirmed our opinion that a combination of research is best in order to investigate the influence of the library, with an emphasis on qualitative methods, such as interviews and close observation, being primary. Interviews were one of our key tools here. Case studies are also a particularly apt method. The questionnaire which we used only confirmed what we had expected; that quantitative methods are not enough for an research of this topic. One needed to gain a well-rounded picture in order to understand what was at hand so that quantitative methods are simply not enough.

An understanding of the context in which a library operates showed itself as the most important instance when investigating the influence of the library on a community. For an analysis of this, one must understand the characteristics of a community, a libraries work methods, the relationship between founder and librarian, between founder and decision makers.

The contribution of the library to the community is made manifest in the perception of it as a meeting place, a place for social interaction. The answers provided by our respondents confirmed our premises on the specifics of island life. The respondents showed an awareness of culture as being a segment of island life, yet singled out those institutions and development plans of an economic nature: they did not fail to mention that, besides this economic side, education and the potential for individual cultural expression were also important for the quality of life (Cassirer, 1981, p. 55). Our respondents also noted that it was difficult for them to gain access to a greater wealth of quality cultural content.

The public library has a strong influence on the cultural life of the community and this is seen in a greater awareness of culture and the greater possibilities of quality content for leisure time. The library is recognized as a place which encourages the identity of the community, and for those who use the library in Sali and Kolan, the library has a symbolic value and this was also noted by Usherwood (ibid) in his research. The librarians in both places expressed the opinion that the library will have a long term influence on those who use it and the community as a whole.

The results of our research proved to be of value. Seeing that one part of our research was to demonstrate the applicability of a certain model, we have concluded that this model is certainly applicable. As Usherwood and Linely emphasized in their research, qualitative data does not allow a generalizations and the results only apply to those place under research. In our research we demonstrated that there research model can be applied to libraries in Croatia. We tested this model on libraries in a specific environment: an island environment and the results confirmed our opening premise that a combination of research methods is best, but with an emphasis on qualitative methods. Interviews were a key, with case studies being particularly applicable.

The scope of our research posed a problem, as this research was conducted by one person. This requires teamwork, stable finances and more time, i.e. working hours to conduct the research.

In conclusion, this research confirmed that the very often library is the only cultural institution in small communities, the only public space open to its entire population, and that children are the most numerous and steadfast among those who use an island's library.

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Curriculum Vitae

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A specialisation of the Europeana Data Model for the representation of manuscripts: the DM2E model

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Abstract

The RDF-based Europeana Data Model (EDM) (EDM Primer, 2013) is used by Europeana, the European Digital Library, for representing heterogeneous data coming from museums, libraries, archives and galleries. The model combines various standards and existing ontologies and is very generic to suit many different cases. In order to represent rich metadata, the EDM can be specialised for specific domains as done by the Digitised Manuscripts to Europeana (DM2E) project for the domain of handwritten manuscripts with the DM2E model.

Before creating the DM2E model, decisions on a general modelling approach had to be made including the method of reusing external resources (Dröge, Iwanowa et al., 2013), decisions on the granularity of the specialisation and instruments of documentation. Model-related research questions are: What is the best way for creating a shared ontology for representing manuscripts in a digital library and how can diverse ontology requirements be combined without leading to a model which is too general? The first step in the model creation was to analyse the metadata about manuscripts coming from different data providers and in different formats like TEI, METS/MODS, MARC21 or provider-specific schemas. Furthermore, it was investigated if the data meets the mandatory requirements of the EDM. Additional properties, classes, resource definitions, restrictions and recommendations were added to the EDM which resulted in the DM2E model. The first operational version of the model was created in April 2013 and since then iteratively refined. New functions of the model include the representation of uncertain timespans and hierarchical objects.

The DM2E model will be discussed in its current representation. First mappings from provided data to the model will be analysed. Data mapped to the DM2E model is dereferenceable and will not only be delivered to Europeana but also be available via a LOD access point (Heath & Bizer, 2011).

Keywords: DM2E Model, Europeana Data Model, Linked Data, Ontology Development, Digital Libraries.

Introduction

Europeana[1] is the European digital library which provides a unified access to the cultural heritage of Europe. More than 30 million library, archive, museum and audio-visual objects from 36 countries are represented in Europeana[2]. These objects are delivered to Europeana by

[1] Europeana website: http://www.europeana.eu/ [30.03.2014].

[2] Numbers as of November 2013. Europeana Professional website: http://www.pro.europeana.eu/web/guest/content [24.03.2014].

content providers via national aggregators like the German digital library (*Deutsche Digitale Bibliothek*, DDB)[3] or domain aggregators like the *Digitised Manuscripts to Europeana* project (DM2E)[4]. One of the major challenges for Europeana lays in finding a way to integrate the heterogeneity of objects provided and the metadata schemas describing these diverse objects. The current model used by Europeana to represent the provided data is the *Europeana Data Model* (EDM). This model was specialised by DM2E for the domain of manuscripts in order to enable rich mappings of the provided data. The specialisation, called the *DM2E model*, will be presented in the scope of this paper.

The paper is structured as follows: First, the data models currently used in Europeana, EDM and ESE, are presented. This section is followed by specialisations of the EDM in general and the detailed description of the DM2E model as a specialisation of the EDM for manuscripts in particular including the modelling approach, the reuse strategy and detailed insights on the build-up. The paper concludes with a first insight in the evaluation of the DM2E model and a brief look on future work.

Data representation in Europeana

The first principle solution in finding a way to integrate the diverse objects into Europeana was the creation of a common and simple schema, the *Europeana Semantic Elements* (ESE). The ESE represents the lowest common denominator in terms of semantics found in various metadata schemas which are used for the description of cultural heritage objects (ESE Specification, 2013). The schema provides a simple and flat representation for cultural heritage objects (often abbreviated as CHOs) based on the Dublin Core Elements Set[5]. As all data providers contributing to Europeana had to convert their metadata into this common schema, the previously existing interoperability problem was initially solved.

Although this approach worked well, there were also some serious drawbacks. Most importantly, the model was not easily extensible and did not provide sufficient semantics for describing many important details from the various metadata schemas, including the proper modelling of hierarchical or complex objects. Furthermore, since the ESE is based on XML, there is no easy way of linking objects to other objects or to other terminological sources.

The EDM has been developed as the successor of the ESE and as a response of its aforementioned shortcomings (Hennicke, Dröge et al., 2014). The EDM is similarly to the ESE a generic representation of the semantics in the cultural heritage domain (EDM Primer, 2013). However, it uses a different approach to data modelling and is much more expressive and flexible in terms of integration with other knowledge sources and semantic extensions.

The *Resource Description Framework* (RDF)[6] is the representation language of the EDM. Information is no longer conceptualised in a tree-based way with attributes and literal values but in a graph structure with mostly explicit entities connected through meaningful relations. In this graph structure, information is broken down into statements in the form of triples which consist of a subject, the entity the statement is about, a predicate, the property connecting two entities, and the object, the value of the statement. An element in the triple may represent any imaginable entity which includes not only things on the Web, like websites, images or files, but also things outside the Web, like people, buildings and books, or even abstract concepts, like eras, ideas or terms. Subjects and predicates in triples must be resources; objects can be resources or literals. A resource is identified by a *Uniform Resource Identifier* (URI)[7] which is unique. This allows to connect and to integrate distributed information rather easily. The *Resource Description Framework Schema* (RDFS)[8] is used to define the actual ontology schema consisting of classes and properties.

The central classes of the EDM (see figure 1) are *edm:ProvidedCHO*, the class for the described cultural heritage object, *ore:Aggreation*, the class representing the metadata record provided for the described object and *edm:WebResource* which includes views of the described object like a thumbnail. Additional classes like *edm:Agent*, *edm:TimeSpan*, *edm:Place* or *skos:Concept* allow to represent contextual resources related to the described object. The properties provided by the EDM allow to describe how these things relate to each other, for example, by relating a book to a title with the property *dc:title* or to its creator with the property *dc:creator*.

[3] DDB website: https://www.deutsche-digitale-bibliothek.de/ [11.04.2014].

[4] DM2E website: http://www.dm2e.eu [11.04.2014].

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[7] Uniform Resource Identifiers (URI): Generic Syntax: http://www.ietf.org/rfc/rfc2396.txt [30.03.2014].

[8] RDF Schema 1.1. W3C recommendation: http://www.w3.org/TR/rdf-schema/ [30.03.2014].

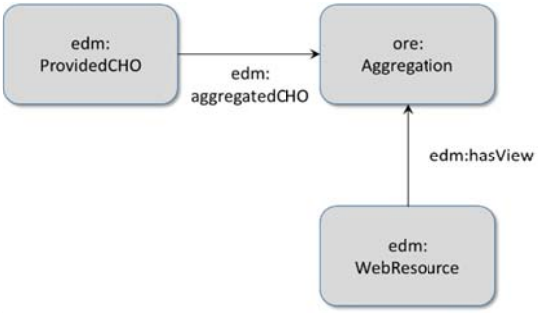

Figure 1: The EDM main classes: *edm:ProvidedCHO*, *ore:Aggregation* and *edm:WebResource*.

The EDM extensively reuses external vocabularies[9] like Dublin Core (elements and terms), OAI-ORE, SKOS and FOAF. Properties build the largest part of the model and are used to give detailed descriptions of the objects like its creator, contributors, a title or a description or of the metadata. A list and description of all elements in the EDM can be found in the latest Definition of the Europeana Data Model (2013).

Specialising the Europeana Data Model

An important feature of the EDM is the possibility to create specialisations (extensions and refinements) of the model. Specialisations are created by many projects in the context of Europeana, like the EDM refinement of *Europeana Libraries*[10] and the EDM extensions of *Europeana Creative*[11] or the specialisation of the DM2E-project, the DM2E model (Charles & Olensky, 2014). Not only Europeana projects but also institutions outside of the Europeana network take the EDM as a base for their data representations and specialise it. Two examples here are again the DDB and the *Digital Public Library of America* (DPLA)[12]. The DDB uses the EDM as base for facetted search in their portal and to deliver data to Europeana. The *DPLA metadata profile* (DPLA MAP) reuses diverse EDM resources but also resources from other vocabularies. The central build-up of the metadata profile resembles the one of the EDM: the core classes in the DPLA MAP are *ore:Aggregation*, *edm:WebResource* and *dpla:SourceResource*, which is a subclass of *edm:ProvidedCHO* (Digital Public Library of America Metadata Application Profile, 2013).

Specialisations, especially in form of refinements, allow the mapping of more specific semantics from other metadata schemas to EDM. The EDM represents the common generic layer of semantics through which all data is connected and the specialisations represent a semantically more expressive layer which allows the representation of more detailed information to the user, granular search and retrieval operations and more opportunities for external applications that may build on EDM data.

As the EDM unions various different vocabularies, an extension of the model has to consider how to handle the reuse of external vocabularies as well. Reusing can be done in different ways. Four possibilities were identified in Dröge, Iwanowa et al., 2013:

1. Direct adoption of external resources with their original URI in the current ontology.
2. Integration of external resources where URIs are adjusted to the namespace of the current ontology.
3. Indirect adoption of external resource with their original URI as a specialised subclass or subproperty of resources in the current ontology.
4. Direct adoption of external resources into the current namespace and pointing to the original resources via *owl:equivalentClass* or *owl:equivalentProperty*.

Currently, all four ways can be found in existing vocabularies. The EDM reuses external resources by directly mixing and matching them (option 1) and provides additional definitions and mapping instructions for reused elements. During the initial modelling process in DM2E the third option was chosen. This seemed to be a cleaner way of reusing resources but led to an unnecessary complex model: not only demands this option the creation of many unwanted DM2E resources but also does the EDM part of the model have a different structure than the DM2E specialisations. In order to have a homogenous model, the approach was changed and the DM2E model now follows a similar reuse method as the EDM. A small difference is that a new property *dm2e:scopeNote* was introduced in the DM2E model to give detailed explanations for the usage of classes and resources in the scope of DM2E instead of reusing existing annotation properties for that purpose. This approach was chosen to avoid the multiple usage of popular properties like *skos:note* which may lead to conflicting descriptions of the same resource (real-world examples for conflicting descriptions and labels can be found in Dröge, Iwanowa et al., 2013).

Specialisations of the EDM are in cases of refinements also called application profiles (Charles & Olensky, 2014). An application profile mixes and matches existing resources from one or more namespaces for a specific local application (Heery & Patel, 2000). This includes the reuse practice. The goal of the recently started RDF Application Profile working group[13] is to establish definitions and

[9] Links to the specifications of the vocabularies can be found in table 2, section "Description of the DM2E model".

[10] Europeana libraries website: http://www.europeana-libraries.eu/web/ [11.04.2014].

[11] Europeana creative website: http://www.europeanacreative.eu/ [11.04.2014].

[12] DPLA website: http://dp.la/ [11.04.2014].

[13] Wiki of the RDF Application Profiles working group: http://wiki.dublincore.org/index.php/RDF-Application-Profiles [11.04.2014].

creation principles for RDF Application Profiles including best practices for publishing them as Linked Data. Specialisations of EDM like the DM2E model and the DPLA MAP are presented as use cases and will profit from the group's results.

Modelling approach in DM2E

The DM2E model is a specialisation of the EDM for the domain of manuscripts. The DM2E understanding of the term manuscript is very broad and therefore, the model covers the representation of medieval handwritten manuscripts but also typed books, like Ludwig Wittgenstein's *Brown Book*[14], or journals, like the 18th to 19th century *Polytechnische Journal*[15]. The model has been developed bottom-up based on the needs of the project's data providers. The first step of the specialisation process was to identify and analyse the requirements of the content providers. Simultaneously, the concordance between these requirements and the mandatory EDM elements was discovered. The EDM has only few mandatory elements but these are needed in order to provide a minimal representation of a cultural heritage object in Europeana. Mandatory elements are a Web representation of the object, metadata rights, the data provider and the aggregator, a type, subject, temporal or spatial characteristics of the provided object, a title or description of the object and the language in case of textual objects (EDM Mapping Guidelines, 2013). In order to check if the minimal requirements are fulfilled, the data providers in DM2E delivered sample data that was intellectually analysed. These datasets included metadata and object data about medieval manuscripts, manuscripts from philosophers, letters, journals and books including drawings. The sample data was represented in a large variety of metadata formats. Two surveys on the provided data were answered by the data providers and the metadata formats were collected and described in the project's Wiki. As it turned out, almost all content providers already worked with standardised metadata formats, like the interlibrary exchange formats MAB2[16] and MARC21[17], the archival standard format EAD[18], the full text encoding format TEI[19] and the METS/MODS[20] format for descriptive, administrative and structural metadata. Provider-specific formats based on individual database schemas did also occur and were processed with the D2R tool (Bizer & Cyganiak, 2006) to get RDF data. One of the main challenges the project is facing is to map these diverse datasets into a unified model without losing the richness and depth of the original metadata in order to enable rich functionalities on top of the data.

In addition to the surveys, the provided data was analysed based on intellectual mappings to the EDM. This has been done during mapping workshops attended by both, data providers and EDM experts. The aim of the preliminary mappings was to collect missing classes and properties that are needed in a later specialisation of the EDM and to check the completeness of the data regarding the EDM requirements. The results of the surveys and the mapping workshops have clearly shown that the current version of the EDM is, on the one hand, in principle able to accommodate all provided sample data but, on the other hand, has to be specialised in order to retain most of the provided information of the source data. One of the goals of the project was to enable mappings representing the original semantics of the provided metadata as closely as possible. This is important as the provided data is not only needed to display objects on Europeana but to create and provide rich Linked Data resources.

Figure 2 shows an excerpt of an exemplarily intellectual mapping from a metadata record provided by the Max Planck Institute for the History of Science which was created with the Visual Understanding Environment (VUE) by the Tufts University. Circles represent resources, boxes represent literals. Unmarked properties are part of the EDM but not mandatory (e.g. *dc:publisher*) whereas properties marked with plus are required by the EDM (e.g. *dc:title*). Properties marked with asterisk are needed in addition to EDM properties in order to provide clear and specialised mappings (e.g. *bibo:numPages*). To retain the backwards compatibility to EDM, requested extensions have been added whenever possible as subproperties or subclasses of existing EDM elements (see e.g. *dm2e:callNumber* as a proposed subproperty of *dc:identifier*).

[14] Wittgenstein's Brown Book is only at Wittgenstein source: http://www.wittgensteinsource.org/ [14.05.2014].

[15] Polytechnisches Journal website: http://www.polytechnischesjournal.de/ [14.05.2014].

[16] Specification of MAB2: http://www.ubka.uni-karlsruhe.de/hylib/mab/mab2.html [14.04.2014].

[17] Specification of MARC 21:http://www.loc.gov/ standards /marcxml [14.04.2014].

[18] Definition of the EAD Schema: http://www.loc.gov/ead/eadschema.html [14.04.2014].

[19] Definition of the TEI guidelines: http://www.tei-c.org/Guidelines/P5/ [14.04.2014].

[20] Specification of METS/MODS: http://www.loc.gov/standards/mods/ [14.04.2014].

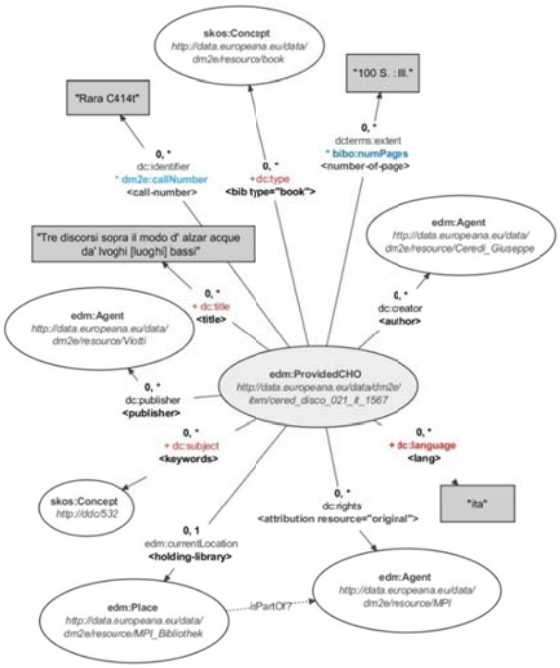

Figure 2: Excerpt of a conceptual mapping based on a record from the Max Planck Institute for the History of Science produced to analyse the provided data and to identify which specialisations of the EDM are needed.

Sample mappings as shown in figure 2 have been created for all provided datasets. Based on these mappings and the results of the metadata questionnaires, the first specialisation of the EDM has been drafted. To capture the full wealth of semantics in the provided sample data, subclasses were included that extend the EDM classes e.g. for indicating the type of the described objects such as book, journal or page. In the same way, the relationship between the provided CHO, contextual resources and Web representations have been defined in a more specific way. Linked Open Data repositories like LOV[21] and DataHub[22] were used to search for resources that could be reused in DM2E. However, not all resources that can possibly be used in the DM2E model were yet found as many vocabularies and many different search possibilities exist.

Reused and new resources are described via *dm2e:scopeNote* which holds a description for the use of external properties or classes in the context of DM2E. For example, it was decided to add new classes for book, cover and page as subclasses of *edm:PhysicalThing*. It was discovered that equivalents for book and cover could be reused from FaBiO, the FRBR-aligned Bibliographic Ontology, and Bibo, the Bibliographic Ontology, but not for page. In the next step, the classes *bibo:Book* and *fabio:Cover* were added as subclasses of *edm:PhysicalThing* and described in the DM2E context via the *dm2e:scopeNote* annotation property if an extra description is needed (see table 1). As the original definition is still valid, it is also shown in the DM2E model specification (Dröge, Iwanowa et al., 2014). Resources that are in the DM2E namespace, like the new subclass *dm2e:Page*, are also described via *dm2e:scopeNote* without having another original description

Table 1. Example of specialising classes in the DM2E model which are described with *dm2e:scopeNote* if needed and the original description if they are reused.

Class	DM2E scope note	Original definition
bibo: Book	cf. original scope note	A written or printed work of fiction or nonfiction, usually on sheets of paper fastened or bound together within covers.
fabio: Cover	ProvidedCHO of type cover. Can be part of another CHO, e.g. a book.	A protective covering used to bind together the pages of a document or the first, informative, page of a digital document.
dm2e: Page	ProvidedCHO of type page. A sheet of paper. Can be part of another CHO, e.g. dm2e: Manuscript.	-

After the first mappings of the data, the DM2E model was continuously refined based on the provider's feedback. The current version of the model, DM2E model 1.1, serves as base for the final content integration and includes most of the collected data provider's requirements as well as the requirements of the transformation, annotation and search components of the DM2E infrastructure.

The DM2E model schema

The DM2E model makes use of different namespaces for the schema, i.e. classes and properties, and the provided data, i.e. instances, to make a clear difference between the provided metadata and the way it is represented. The schema namespace is http://onto.dm2e.eu/schemas/dm2e/. Instances are stored in the data namespace http://data.dm2e.eu/data/. In former model versions, the schema namespace was versioned. The information about the model version and revision used for a mapping is provided during the data ingestion in the DM2E triple store and no longer part of the namespace URI since version 1.0.

[21] Linked Open Vocabularies (LOV) website: http://lov.okfn.org/dataset/lov/ [16.04.2014].

[22] The DataHub website: http://datahub.io/ [16.04.2014].

The DM2E model specialises the EDM mainly via subclasses and subproperties of existing EDM classes and properties, e.g. by adding the subproperty *pro:author* to the existing property *dc:creator*. However, the model also offers a few additional options that are not specialising EDM resources. This is the case when the DM2E model covers functions that are not offered by, e.g. the property *dm2e:hasAnnotatableContent* which points to an annotatable object that is needed for the semantic annotation tool Pundit[23] (Grassi, Morbidoni et al., 2013). As opposed to the EDM, the DM2E model makes use of named graphs instead of proxies for data provenance.

Overview

The main motivations in the DM2E project are not only to deliver data to Europeana but to create *Linked Open Data* (LOD) and to build new LOD-based tools. Linked Data is described by Berners-Lee in the Linked Data Design Issues as data that is made available on the Web, that can be accessed by human users and tools, is linked to other data and dereferencable via stable identifiers (Berners-Lee, 2006; Heath & Bizer, 2011). Ideally, LOD is represented in RDF.

The third Linked Data principle, linking to other data, is fulfilled by reusing resources. Resources in DM2E originate from diverse vocabularies, like Dublin Core, Bibo, FaBiO or the OAI-ORE specification. External vocabularies, from which resources were reused, are listed in Table 2. A large amount was already used in EDM.

Table 2. External vocabularies that are reused in the DM2E model in alphabetical order of the vocabulary prefixes.

Prefix	**Namespace**
bibo	http://purl.org/ontology/bibo/
crm	http://www.cidoc-crm.org/cidoc-crm/
dc	http://purl.org/dc/elements/1.1/
dcterms	http://purl.org/dc/terms/
edm	http://www.europeana.eu/schemas/edm/
fabio	http://purl.org/spar/fabio/
foaf	http://xmlns.com/foaf/0.1/
ore	http://www.openarchives.org/ore/terms/
pro	http://purl.org/spar/pro/
rdaGr2	http://rdvocab.info/ElementsGr2/
skos	http://www.w3.org/2004/02/skos/core#
vivo	http://vivoweb.org/ontology/core#
void	http://rdfs.org/ns/void#
wgs84_pos	http://www.w3.org/2003/01/geo/wgs84_pos#

Altogether, 103 new resources, 79 properties and 24 classes, were introduced in the DM2E model (see Table 3). The numbers of resources that are in the DM2E namespace indicate that there may still be resources left that could already be described by another vocabulary and reused. During the modelling process, it was decided, to integrate all properties and classes of the data providers that were needed to represent their objects, even if they are on different levels of granularity. If a later evaluation of the model identifies many unused resources some of them will be excluded from the model to reduce its complexity.

Table 3. Number of new resources in the DM2E model. The numbers on the left side of the slashes are resources in the DM2E namespace whereas resources on the right side were reused.

Class	**New Properties DM2E/Other**	**New Classes DM2E/Other**
ore: Aggregation	2 /5	-
edm:Provided CHO	39 /19	-
edm:Physical Thing		4 /5
edm:Agent	0 /2	0 /2
foaf:Person	2 /0	-
foaf: Organization	-	1 /3
edm:NonInformationResource	-	2 /1
skos:Concept	0 /2	3 /3
edm:Place	0 /1	-
edm:TimeSpan	0 /2	-

Most of the new properties, 58 out of 79, are added to the class *edm:ProvidedCHO*. Other properties were added to the classes *ore:Aggregation*, *edm:Agent* and *foaf:Person*[24], *skos:Concept*, *edm:Place* and *edm:Timespan*. The most broadly specialised classes are *edm:PhysicalThing* and *skos:Concept* for the further description of CHOs.

[23] Pundit website: https://thepund.it/ [20.04.2014].

[24] *foaf:Person* and *foaf:Organization* are not part of the EDM but of the DM2E model. However, the EDM offers properties that should only be used with either persons or organisations. In the DM2E model, these properties have the domain of the new subclasses *foaf:Person* and *foaf:Organization*.

Like the EDM, the DM2E model includes some mandatory elements that are the minimal requirement for a valid mapping. Mandatory elements are needed on the one hand to fulfil the requirements of the EDM and thus to produce a valid EDM mapping and on the other hand to meet the requirements that tools offering further functionalities based on DM2E data have, like search and browse or text annotation functions. Additional mandatory properties in the DM2E model are *dm2e:displayLevel*, *dc:type* that points to a subclass of *edm:PhysicalThing* or *skos:Concept*, *dc:format* for annotatable resources and *skos:prefLabel* for *edm:Agent*, *skos:Concept*, *edm:Place*, *edm:TimeSpan* and *edm:Event*. The provided metadata is very diverse, so mandatory elements were not often used. Resources that increase the quality of a mapping a lot were marked as "highly recommended" instead.

Upper level of the model

Both, the EDM as well as the DM2E model, are used by different providers that may describe the same resources (e.g. the same CHO or the same creator). In order to allow several statements about the same resource, which can even be contrary, the EDM has introduced the class *ore:Proxy*. *ore:Proxy* is used to make statements on the provided content. The DM2E model also aims at providing this possibility, but has chosen another way to do that. By introducing *Named Graphs* (Carroll, Bizer et al., 2005), in which a fourth position is added to a statement, an RDF triple can be further described. By making a quadruple out of a triple, one can gather triples and make additional statements about them. Named Graphs allow us thus to make statements about statements or descriptions. RDF graphs created from the input data of a provided collection are identified by an URI and belong to the class *void:Dataset*. They are not mapped by the provider but automatically added in the data ingestion process.

Not only the provided data but the whole DM2E infrastructure is based on Linked Data principles.

> "Linked Data is the paradigm that drives the whole DM2E infrastructure. The DM2E model reflects this by explicitly defining classes for datasets and published data resources. This way, the meta-level of resource descriptions becomes a first-class member of the data model and can be used for annotations and provenance tracking."
> (Dröge, Iwanowa et al., 2014: 12)

When a provider ingests data into the project's triple store, additional RDF is produced in this process. Interactions of providers inside the ingestion platform, like uploading files or creating workflows, are also represented in RDF but described with additional vocabularies and not with the DM2E model (Eckert, Ritze et al., 2014)

Specialised classes and properties

Properties and classes, which are represented in more detail in the sample data, as well as properties and classes from which was assumed that they should have a more detailed representation in the manuscript domain, have been specialised. Most of the introduced specialisations are used in a similar way in well-established standards like those provided to the project. An example: the DM2E model introduces the property *dm2e:incipit* which is used for representing the opening words of a manuscript. This property is similar to the MAB field 661 and a mapping can easily be made between both representations.

Some properties and classes are specialised in more detail than others. Properties with many new subproperties are e.g. *dc:creator*, for different types of creators of the CHO (see figure 3), and the very general property *edm:hasMet* which points to agents, events, places, timespans or concepts.

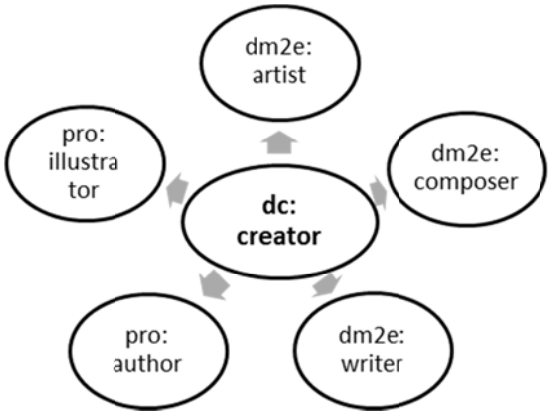

Figure 3: Specialised properties for *dc:creator*.

Classes in the DM2E model are used to further distinguish the type of physical objects and of agents. Every CHO in DM2E must indicate the object's type via *dc:type*. The property points in the scope of DM2E to a subclass of *edm:PhysicalThing* or *skos:Concept*. Physical things are objects or parts of an object like a book, a manuscript or a page. Concepts are conceptual units of an object, like a chapter or a paragraph. These resources are needed to compare or distinguish CHOs. The example in figure 4 shows extended classes that are defined as subclasses of *edm:PhysicalThing*. The dark grey ovals illustrate the new classes which were added to the model. The figure shows where they are semantically meaningful integrated based on the DM2E-specific needs. The same way the *edm:Agent* class was further specialised via subclasses in order to enable the distinction between persons or organisations as agents.

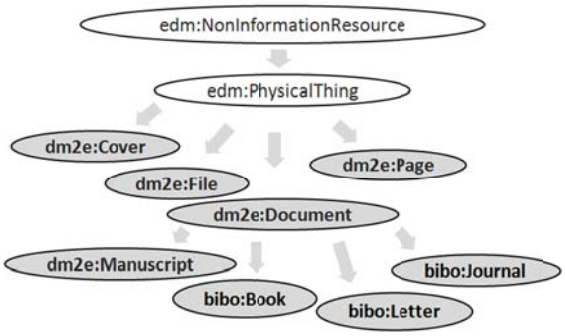

Figure 4: Subclasses of *edm:PhysicalThing* in the DM2E model.

In summary, many new resources were needed to describe agents (especially persons) more detailed, e.g. agents who created or contributed to the CHO or who are mentioned or are related to the CHO or its aggregation in a different way than those supported by the EDM. As it was the aim to have a specialisation for the EDM that has a similar build-up, the DM2E model mainly makes use of properties instead of classes to further describe resources.

Properties for additional functionalities

Some properties that are introduced in the DM2E model are not added as subproperties to existing EDM properties. These properties were primarily needed for additional technical functionalities that the EDM does not cover and are less content-related. Examples are properties for search functionalities for hierarchical objects, the property *dm2e:scopeNote* for additional comments on a resource and the property *dm2e:hasAnnotatableContent* that is needed for annotations with Pundit. Not only data providers but also developers responsible for search functionalities or for the annotation tools suggested additions to the DM2E model. Additional search functionalities in the project were needed as Europeana cannot display the granularity of the mapped objects on small levels like pages. Furthermore, it is not yet possible to display extensions of the EDM in the portal. Therefore, it was decided to provide additional search functionalities next to Europeana for not only providing Linked Data via a SPARQL endpoint which is mainly for developers but to make the data easy accessible and browsable for the casual user. For having an entry point to the data and to not overstrain users with several thousand pages of the same author in a search result list, *dm2e:displayLevel* was introduced. The property enables a selective view for hierarchical objects in the search and browse interface. Only CHOs marked with *true* are displayed as a browsing entry point into the whole collection. This leads to higher performance of the search engine and to better usability for the end user. The property *dm2e:hasAnnotatableContent* requires a specific type of CHO representation that can be annotated with Pundit. Annotatable content can be a specific type of image, like PNG or JPEG, or text. Whenever the property is used, the type of content should be indicated by using one of the permitted mime-types. In order to represent uncertainty in time spans, the properties *crm:P79F.beginning_is_qualified_by* and *crm:P80F.end_is_qualified_by* from CIDOC-CRM were reused. The values "uncertainty_data" or "uncertainty_granularity" can be added with these properties to indicate whether a time span was estimated or the exact limitations of a time span are unknown.

Model documentation

In order to make it easier for others to reuse the DM2E model, it was important to properly document the model. During the iterative development phase and specialisation process, the documentation of all intermediate versions was updated continuously. The documentation of the DM2E model is currently available in three different formats. The textual description of the model helps providers for their mappings. It can be found on Europeana Pro[25], in the project's Wiki[26] or on the DM2E website. Individual classes and properties defined in the DM2E namespace are made accessible through the vocabulary publishing platform Neologism[27] via the schema namespace of the model and the individual class and property URIs. The full model including reused resources can be seen and downloaded as an OWL file via an account on GitHub[28]. Specific recommendations for the representation of DM2E metadata to support content providers in creating concrete RDF representations of metadata mapped to the DM2E model have been also published. The recommendations include specific guidelines for encoding certain aspects of the data such as time information, URI design or representation of subject terms and hierarchies.

Evaluation of the DM2E model

An evaluation of the DM2E model based on a mapping analysis has recently started in order to reduce the models complexity and to make it less detailed where the current level of granularity is not needed. A first step in the evaluation was to figure how often classes and properties are used in the provider mappings. Although the evaluation is still ongoing, it could already be seen that there are classes and properties in the DM2E model that are never used. These are not only new properties or classes introduced by DM2E but also resources defined in EDM.

Nine datasets from seven different data providers including 61 million RDF statements were examined. Only

[25] Europeana Pro website: http://pro.europeana.eu/ [04.05.2014].

[26] DM2E Wiki: http://wiki.dm2e.eu/Main_Page [16.04.2014].

[27] Neologism website: http://neologism.deri.ie/ [04.05.2014].

[28] OWL-files of the DM2E model on GitHub: https://github.com/DM2E/dm2e-ontologies/tree/master/src/main/resources/dm2e-model [16.04.2014].

about half of the classes that the DM2E model offers were used during the mappings in at least one dataset. Classes that were often used are the core classes *edm:WebResource*, *edm:ProvidedCHO* and *ore:Aggregation*, *dm2e:Page* and *skos:Concept*. Not used are subclasses of *foaf:Organization*, *edm:Event* and some specific CHO types like *dm2e:Document*, *dm2e:File* or *fabio:Chapter*. The properties and classes that were used to describe individuals as well as the way they are represented vary between datasets. There are a lot of differences in the mapped datasets which have to be further analysed. The analysis of the properties showed that about a third of them are not mapped in any dataset. A consequence for the DM2E model is that the unused resources will be removed from the model if it can be assumed that they will also not be used for other mappings in the manuscript domain. This will hopefully reduce the complexity of the model without prohibiting the providers from creating rich mappings. Further analyses based on the mappings are ongoing work.

Outlook and conclusion

The DM2E model has been built as a specialisation of the EDM in order to represent rich manuscript metadata on Europeana and to be published as Linked Open Data. The build-up approach was bottom up. Whenever feasible, external resources were reused. Provider feedback, mappings to the model as well as a first evaluation of the model based on the mappings have shown that the DM2E model covers the provided manuscript metadata sufficiently. Nevertheless, the model can still be improved: the evaluation has shown that many resources, classes as well as properties, were not used in the mappings. Additionally, data represented by the archival format EAD was not yet analysed and included into the model. Thus, the focus of further developments of the model will mainly lie on extending it regarding the requirements for the EAD format, on further linking to other vocabularies, on reducing the model's complexity by removing unused resources and on improving the model to meet potentially additionally upcoming results of the evaluation.

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Curriculum Vitae

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Exploration of academic information seeking and library use of the blind and visually impaired students in Croatia

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Abstract

The study presented in this paper explores the educational experiences of blind and visually impaired students in Croatia, with particular emphasis on their academic information behavior and access to and uses of library services.

In-depth interviews were conducted with six blind and three visually impaired undergraduate and graduate students across country in September 2013. Interviews were conducted in person and via Skype. Initial findings reveal that academic libraries used by respondents only sporadically respond to their needs and that blind and visually impaired students, when looking for information and materials for academic purposes, rely most often on interpersonal sources and the Internet. In seeking and using information respondents put more value on information quality and reliability than the level of effort and time needed to find it (and adapt for reading). The preferred format for this specific user group is not the Braille, but electronic document. The assistive technologies play major role in their educational experiences. Overall, they are struggling with time-constraints, lack of independence and lack of understanding of others and limited access to electronic materials and 'clear' print documents which can be 'read' by the blind and visually impaired if equipped with adequate technological solutions. Interestingly, students' determination proved to be very important factor enhancing their information behavior.

While the findings of this study can not be generalised, valuabe insights have been gained into the information behavior and library use of blind and visually impaired students, a user group that has been largely understudied in library literature.

In conclusion authors discuss possible improvements to the library services which would facilitate information behavior and contribute to the successful educational experience of blind and visually impaired students at Croatian universities.

Keywords: blind and visually impaired students, information behavior, academic library use, interviews, Croatia

Introduction

Education and school/university attendance are regarded as essential factors of social participation for all citizens. However, people with disabilities (including the blind and visually impaired) face numerous barriers (personal, social, technological, institutional etc.) in exercising their rights (Council of Europe, 2003). Available data shows that the portion of visually impaired students is relatively low, in the total population of the visually impaired. For example, in 2002 only 2,85 of the visually impaired persons registered in Zagreb, capital of Croatia, were enroled in post-secondary studies, while this percentage for the "normal" population involved in post-secondary education is estimated at almost 5%. This is the result not only of the fact that majority of people who are blind or vision impaired tend to be older people, but also of the fact that many visually impaired persons decide not to continue their schooling at university level because they faced (too) many difficulties in their primary and secondary education (Butorac, 2002: 1).

Since they cannot use the traditional print materials and must use alternative means of accessing academic information (Braille, audio books and electronic documents) which in most cases are not readily available, the blind and visually impaired students can be regarded as marginalized in their information seeking (Saumure & Given, 2004: 26). People differ in the ways they seek and use information, as a result of different contexts, demographic characteristics, motivations, source preferences and so forth. The information behavior and library use of the blind and visually impaired students are (or should be) therefore of particular interest to librarians and information professionals because the number of

people with this disability can not be disregarded. According to the World Health Organization, there are 285 million visually impaired people worldwide, and almost 18000 in Croatia (2013).

Athough national and international guidelines for library and information services for visually impaired persons have been drafted (Machell, 1996; Kavanagh & Christensen Sköld, 2005), academic libraries services for visually impaired students are being investigated (Harris & Oppenheim, 2003; Babalola & Haliso, 2011; Eskay & Chima, 2013) and academic library websites and databases are being analyzed for accessibility to people with visual disabilities (Byerley & Chambers, 2002; Power & LeBeau, 2009;), the empirical studies of information needs, information behavior and library use of blind and visually impaired persons (and students in particular) are still very rare (Williamson, Schauder & Bow, 2000; Davies, 2007). Although the information behavior of visually impaired persons, especially in the context of their everyday life information behavior, has been studied by a number of information professionals and scholars, a literature search revealed the paucity of studies of the information needs and information-seeking behaviour of visually impaired students.

For example, Smale studied the needs of visually impaired students in Australia while in the library but did not explore how do these students seek and locate information (Smale, 1992). Schuyler explored the library experience of visually impaired students and their use of library services and described the approaches to the process of setting up library computers for the visually impaired (1999). Saumure and Given examined the information behavior of visually impaired students in Canada, with special emphasis on the adaptive technology (2004). The use of assistive technology by visually impaired students in their academic work and information seeking has been studied by several authors who found out that technology plays an important role in the information behavior of visually impaired persons (Corn & Wall, 2002; Abner & Lahm, 2002).

Although development of adaptive technology and the rise of information in electronic format (and Internet in particular) has largely improved their independence and increased the opportunities of the visually impaired persons to locate and use information, more studies are needed to gain deeper understanding of how students with visual impairment locate and access academic information. Results of such studies can and should be used by information professionals for the improvement of their services and facilitiation of academic information use by the blind and visually impaired patrons.

In order to contribute to the general knowledge of academic information behavior of blind and visually imapired students and to gain insight into the experiences and perceptions of visually impaired students in Croatia a pilot study was launched in 2013. In the study, authors set off to answer the following research questions:

1. How are blind and visually impaired students accessing and using academic material?
2. What factors enhance/impede their successful information behavior (finding and using academic information)?
3. How can academic libraries better serve the needs of this specific user group?

The major findings of that study, which explored the educational experiences of blind and visually impaired students in Croatia, with particular emphasis on their academic information behavior and access to and uses of academic library services, are presented in this paper.

Study

In order to obtain answers to the above mentioned research questions the qualitative study was conducted in September 2013. Participants in the study were identified and recruited with the help of university support offices for students with disabilities and over a dozen of relevant non-government organizations that cater for the needs of people and students with disabilities in Croatia. Since university offices for students with disabilities have not yet been set up at all Croatian state universities, and those that are active do not have official data on the number of students with specific disabilities, the number of students with visual impairment was extremely difficult to established. Finally, on the basis of available data from a number of sources it has been calculated that in 2013 there were around 30 blind or visually impaired students enrolled in undergraduate and graduate studies at Croatian universities.

In-depth interviews were conducted with nine students enrolled in the university studies at Croatian state universities who were unable to read conventional print resources. Two students were interviewed in person and seven via Skype. Skype was chosen as a prefered communication channel (instead of the telephone) by those respondents from across the country with whom the personal interview could not be arranged due to time or financial constraints.

Semi-structured interviews were conducted using a variety of open-ended questions which focused on general demographic data (including information on their disability), educational experience, academic information search processes and use of academic libraries. Interviews lasted from 30 to 90 minutes Following the transcription, a qualitative thematic analysis was done.

In conducting the study, researchers paid special attention to ethical considerations and respected the dignity, autonomy, equality and diversity of participants in the research (National Disability Authority, 2009). All interviewees consented verbally to participate in the study and agreed for their conversations to be recorded. Also,

interviewees were reminded of their right to withdraw from the study at any time. The research was carried out in a respectful and private manner, with a clearly communicated goal. During the study, researchers observed that participants appreciated such an approach and perceived that the results of the study might benefit them and were glad to have taken part.

Results

General demographic data

Interviews were conducted with six blind and three visually impaired students who could not read conventional print material. Out of nine respondents, six indicated that they were born with their disability. Six interviewees were female and three male. Three respondents were older than 25, and six fall in the age range 20-25. Although a call for participation in the study was sent to all known members of this population through designated offices at all seven Croatian state universities, the participants were in the end recruited from only three universities: University of Osijek, University of Split and University of Zagreb. All participants studied social sciences and humanities: Croatian language and linguistics, history, and philosophy, psychology, library science and museology, law and journalism. Three interviewees were undergraduate and six graduate students. All but one respondent indicated that they had no breaks in their studies, they successfully moved from one academic year to another. Majority of respondents indicated that their GPA was above 3,5 which means that they are academically very good students.

As far as their living conditions are concerned, only three students were enroled in the studies in the place where they live and six had to move to another town to be able to study. As a result, majority of participants in the study indicated that they lived independently (in an apartment or in the student house), and only one lived with his parents. Two interviewees owned a trained dog to help them move around.

Living with visual impairment

Following the collection of basic demographic data, interviewees were asked to describe their general experience of living and studying with the visual impairment. Majority of participants thought that their disability influenced somewhat their level of independence. They explained that their position in the community did not depend that much on society itself but on themselves, because they are the minority and they have to adjust to the society. One of the respondents elaborated that the inaccessability of public buildings and transport, is a result of the uncaring society but he also explained that the blind and visually impaired should fight for their rights. Majority of students included in the study believes that the society discriminates them only if they allow it, but also points out that the situation has immensely changed for the last couple of years and that the coomunity is more sensitive to people with disabilties now. One respondent remembered how he was asked, as a child, how does he have a bath, since he can not see.

"Our position in the society is such as we make it. If I approch a person and ask for help, for example, tomorrow that person might notice me and say hi; he will tell me something about himself and we might become friends. But if I just stand and wait for somebody to approach me first, they will not. Why would they? Especially not at university where we are all grown up." (R6)

"We have to be aware of the fact that we are creators of our destiny… We have to do something, try to animate the community, and change something." (R2)

However, they also say that the position of the blind and visually impaired in the society still largely depends on their or their parents' financial possibilities and that the situation with the education and employment possibilities of blind and visually impaired persons is still very difficult.

"Imagine that you are an employer and have to chose between a blind person and a person with no visual impairment. Would you think about the options or employ the latter person because with such a person your company might be more successful. Employers are not humanitarians…" (R5)

One interviewee noted that often people with visual disability who have a university degree end up with some kind of manual work (e.g. as masseurs). Yet another student stated that people in general seem to get quite excited if they see that a visually impaired person studies or has a job, as if they were less competent and everything is too complicated for them.

Assistive technology, different house appliances (such as color detector, thermometer, scale) and their trained dogs were noted by all interviewees as a major living facilitators. They described that their family and friends provided them with necessary support needed to start and continue studying. They also noted that if a visually impaired person wants to "leave the house" and study it needs to have certain personal characteristics such as; be open, communicative, hard-working and above all persistent. Several participants also noted the importance of local and national non-governement organizations for the blind in different aspects of their life: they provide a forum for communication with other people/students with similar disabilities, they provide a financial support (acquisition of necessary computer technology and other equipment, scholarship), they help them access the needed academic resources and digitize study materials etc. One of the respondents described the importance of such associations in the following way:

"If a blind or visually impaired person in Croatia wants to exercise any of the rights he or she is entitled to, he has to

be a member of some non-government association for the blind." (R5)

Studying with visual impairment

After looking into everyday lives of persons with visual impairment, we wanted to learn about their perceptions of educational experiences of the blind and visually impaired students. All students included in this study agreed that they were not equal because unlike the sighted students they have to invest more time, effort and financies into their education, in particular the adaptation and use of teaching and reading materials. They described that they need more time and effort to complete even simple assignments and prepare for exams, and in most cases need an intermediary. Also, they identified a major drawback in the fact that blind and visually impaired students have to work almost exclusively at home and plan their time and obligations carefully and well in advance. For example, they can not study in the library between classes, as sighted students, because library does not have the necessary equipment.

They also indicated several other important problems in the lives of a visually impaired students such as the longer period of getting to know the new city (in which they study), the problem of finding out that the class was cancelled last minute or that the room in which it will take place has been changed. Also, they noted that they cannot participate in different extracurricular activities, student exchange programs or conferences if they do not provide special arrangements for people with special needs. And rarely they do.

Lastly, some interviewees experienced it as a major personal problem the fact that due to the low number of visualy impaired students at universities and the unpreparedness of the university (buildings, teaching practices, available information resources, library policies and so forth) for the needs of the visually impaired, they seemed to be constantly "fighting" for their rights to education. Also, they noted that they disliked the feeling that they were perceived as "special" either by some teachers or colleagues, and that they were always asking for some kind of special treatment.

"Technical problems can always be solved and once you learn how to deal with them they are no more a problem. But prejudices, misunderstanding and labeling is something that, in my opinion, is moch harder to deal with." (R1)

Information access and use

Overall, students felt that their information behavior differed from the experience of the "normal" or sighted students in relation to the process of locating and searching for academic information. They explained that for them the acquisition of textbooks and other study materials is time intensive and is not as straightforward as for the sighted students: they cannot just go to the library and check out a textbook. In most cases they depend on another person (e.g. librarian) to find the book or download the article from the library database. Then they have to scan and translate the material into the accessible format, most often at home (if they are allowed to check it out) with their own technology. Only than can they read it. This supports Saumure and Given's point that information-seeking process of visually impaired students involves additional time and intermediaries for material selection and location (Saumure and Given, 2004: 31).

Students noted that they faced many challenges in their efforts to locate and find the needed material: many academic websites are not accesible to the visually impaired, it is difficult to obtain a clean copy of the textbook in the library which is a prerequisite for a successful scanning process etc. However, the students who were interviewed believed that they were fully equal to their sighted peers when it came to the use and understanding of the acquired information, either in the form of the textbook, class notes or PowerPoint presentation.

"In interpreting the information a blind person can be just as good as, sometimes even better than the sighted student." (R5)

It is worth mentioning that in seeking and using information students included in this study put more value on information quality and its reliability than the level of effort and time needed to find it (and adapt for usage).

When describing their process of searching for academic information and its usage, students indicated a number of barriers they face. First and the most important barrier seems to be the nonexistence of the textbooks and reading material in an electronic format. Already in 1998 Edwards and Lewis stated that the access to the printed word is a significant barrier to the integration of visually impaired individuals into school and work environments (1998: 302). Students preferred electronic materials and explained that if the material was not in the electronic format it was practically inaccessible to them (without the additional help of somebody else who would in the first place locate the material). Preference for electronic material was also supported by similar studies, such as the one conducted in Canada by Saumure and Given (2004). Students explained that print material demanded a time-consuming process of transformation into the appropriate adapted format (e.g. scanning). Also, they explained that library copies of the textbooks often were not clean copies (large sections and paragraphs are often underlined) and this fact presented a major problem in their adaptation. Print textbooks, in addition, are often written in undersized or difficult to read font, they use italics, inadequate contrast between the color of the words and the background etc. all of which impedes their transformation into an accessible format. Students also emphasized that their access to (print) academic

information was made further difficult by strict and unflexible library loan policies: some materials could not be checked out and the check out period for library books in general was too short for the blind and visually impaired students.

As far as electronic texts were concerned, interviewees stated that these also presented them with unsurmountable problems if they are saved in PDF format, if documents contain text embedded in pictures, if electronic documents are scanned as pictures or if they are refered to web pages with many hyperlinks. Interviewees often experienced these and similar difficulties when reading teaching materials prepared by unaware course instructors.

Although students obviously faced many barriers in locating and accessing the academic information it was interesting to find out that interviewees almost never abandoned their quest for information. One interviewee described that he once scanned an over 100 pages long textbook by himself and returned it to the library only to find out later on that he made a mistake and nothing was scanned properly. He went back to the library, checked out the textbook again and scanned it all over again. Obviously, they do not let barriers stand in their way and fight them successfully. The importance of determination for students with visual impairment, in the information seeking processes and educational experiences in general has been noted by several other studies as well (Saumure and Givens, 2004; Corn and Wall, 2002; Roy and MacKay, 2002).

The most important thing that facilitates students' searching and using of academic information is adaptive technology. Students use the technology in a number of ways to locate and access (digital) information and adapt it for use: they scan print materials, enlarge text/magnify screen, translate documents into audio forms, access information on the Internet with the help of speech synthesizers etc. All interviewees stated that they possess the technology (personal computers with speech synthesizers/screen readers, scanners etc.) and that they could not imagine living/studying without it. However, they indicated that the price of this equipment is relatively high and that many students with disabilities cannot afford it. The findings about the intensive and versatile use of adaptive technology by visually impaired students supports the Saumure and Given's study who concluded that adaptive technologies are essential to the successful academic experience of the blind and partially sighted post-secondary students (Saumure and Given, 2004: 30).

Students in this study also noted that they obtain a substaintial help and support in their educational experiences and information searching processes, from their colleagues, teachers and librarians. In most cases, teachers provide them with (teaching) materials in electronic format, they arrange for them to take the exams in the time and in the form that suits them best (e.g. they are given more time to complete tests, they can take oral exam instead of the written one or they enlarge the font of the text in the exam etc.). Only two interviewees indicated that they had negative experiences with their teachers: on one occasion the teacher refused to provide the visually impaired student with access to an electronic version of his own textbook which was on the reading list and on the other the teacher refused to adjust the format of the exam to the visually impaired student. Students also stressed that their colleagues help them a lot in accessing academic information by providing them with notes from the classes in the electronic format, copying their notes in enlarged format, and helping them adapt the reading material. Only one student, unfortunately, said that his studying and searching for academic information was facilitated by librarians. In this one case, the librarian helps a student to acquire the needed materials. Students involved in the already mentioned Canadian study also emphasized the importance of interpersonal contact in academic information location and adaptation. However, they indicated that librarians play a significant role in their information seeking experience and serve as key facilitiators in disabled students' information seeking (Saumure & Given, 2004: 31, 34).

Library use

Students indicated that most often they obtain the materials needed for their studies over Internet and through their colleagues and teachers. In most cases, they visit the library only if they cannot find the material in any other way. One student said that the library was his first choice, and one indicated that he never goes to the library. Interviewees noted that they rarely used library's virtual services as well. However, when asked about how they felt while visiting their academic library, students described that they felt good and accepted, thanks to the kind and professional staff. Two respondents indicated that they do not feel well in their academic library because they feel that everybody is looking strangely at them (especially when they for example use their magnifier) but also because of the long and complex procedure to obtain the needed library materials.

Students who occasionaly use the library do it in most cases to check out some library materials. Since their academic libraries do not have adaptive technology, interviewees almost never use them for studying purposes. A couple of students, however, explained that in their academic library they can check out non-circulating material, that they can keep books for longer periods. Librarians also make effort to find clean copies of library books that can be scanned. One interviewee said that a librarian at his academic library if very helpful and that she regularly locates and scans material for him. Students in short indicated the following as major barriers to their library use: big, noisy and crowded spaces; inaccessible

(print) library literature, rigid library policies which do not take into account specific needs of students with special needs, underlined books and lack of adaptive technology.

As far as librarians are concerned, students said that they treated them with respect and did not discriminate them in any way. They are open, helpful (within their possibilities) and in most cases available to spare some extra time for them. A couple of interviewees indicated that librarians had problems in understanding their needs, lacked skills to use adaptive technology and were relatively rigid in respect to general library rules (would not allow them to negotiate special check-out periods if these were not provided by the library policy).

In the end students gave suggestions for the improvement of academic library services, in relation to the needs of blind and visually impaired students. Interviewees recommended the acquisition of the adaptive technology by the academic/university libraries – at least one computer with speech unit, speech synthesizer/reader software and scanner. They also pointed out that libraries should try to negotiate the special arrangement between the teachers and academics (textbook authors) and publishers regarding the establishment of the digital repository of adapted materials which would be accessible only to students with special needs. They recommended closer cooperation of academic libraries and universities in general with non-government organizations for the blind and visually impaired, and the education/training of librarians for the use of adaptive technology and working with people with special needs in general.

Interviewees pointed out also that they would use academic libraries more often if they observed less rigid policies regarding material use. Finally, in relation to library architecture, they suggested the improvements to the lighting and the organization of the library spaces. In most cases students concluded their brainstorming about possible improvement to library service for visually impaired students by commenting on the overall responsibility of the universities and their currently inadequate role in securing and promoting inclusive education and equal educational opportunities for all.

Conclusion

This exploratory study has produced valuabe insights into the information seeking processes and library use of blind and visually impaired students at Croatian universities, a user group that has been largely understudied in library literature in general. While the results of this study can not be generalised, and additional research is needed to explore these findings further, it is interesting to note that they have confirmed the main findings of similar studies conducted worldwide by pointing out to the adaptive technology and personal determination as major factors influencing the success of blind and visually impaired students in their search and use of academic information, and academic success in general. It also identified the main challenges that students with visual impairment meet on daily basis in their educational efforts: lack of academic information/materials in accessible format, dependence on intermediaries and time-consuming processes of material adaptation.

Croatian academic libraries, according to the findings of this study, seem to be largely underused by the blind and visually impaired students. Students included in this study, in most cases, visited libraries only after all other options have been exhausted because their experience has taught them that their academic libraries did not possess adequate technology and resources needed for their studies. However, within their limited possibilities, librarians seem to be responsive to the needs of this specific user group.

In order to better cater for the needs of the students with visual impairment, and improve their educational opportunities, Croatian universities and academic libraries should make several small but important steps. Firstly, at faculties where visually impaired students have been enroled, academic libraries should acquire adaptive technology and train at least one member of the staff in their use. For these purchases and staff training universities could apply for both local and international grants. Library staff should also be trained for the work with different patrons with special needs, including the visually impaired. If possible, libraries should offer the service of scanning and adaptation of library materials for visually impaired students. This service could be offered in collaboration with LIS or Computer Departments at universities and students volunteers. Furthermore, they should maintain archives or repositories of scanned/adapted material (for reuse) and if possible establish collaboration (either in the form of inter library loan or even joint repository) with other academic libraries in the country, and abroad. Collaboration with international academic libraries is encouraged as well because exam literature and reading assignments at Croatian universities are often in English.

Librarians should also pay more attention to the patrons' handling of the library materials to make sure that they do not underline textbooks and thus make them impossible for adaptation into accessible format for the visually impaired students. Also, libraries should revise their policies and introduce special provisons for students with special needs such as extended check out periods and borrowing of non-circulating materials. Finally, universities should produce minimal guidelines for the design of educational websites and teaching materials so that information produced by teachers and librarians is accessible to all students.

If these steps are taken, visually impaired students at Croatian universities will be in much better position to exercise their right to education and enjoy their academic experience. The availability of adaptive technology and

accessible (academic) information would increase their independence and boost their confidence. They already have the needed determination and positive work habits.

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Curriculum Vitae

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Expected usage and perceived usage, photography as a methodological tool: the case of a learning centre in France

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Abstract

Photography beyond simple proof, became full research material (Bateson & Mead, 1942). It remains less investigated as a methodology in information and Communication Science (SIC) and particularly for the study of library use. However, the photography is a method of gathering information on the lived space that involves elements that tend to complicate the analysis. Therefore we can ask if photography is a medium, in the sense of support, of scientific data collection (Tardy, 2007), if it allows us to account, to signify the semiotic meaning (Barthes, 1980), of the actors expression.

Our paper proposes to think on this methodological tool for data collection. It is based on a study of the "learnings centers" in France. This study analyzes the use of these new models of libraries in connection with the enounciation proposed by theses devices as a "work of reconciliation and confrontation of saying pictures" (Bonaccorsi, 2013). A focus on the occupation of spaces and movement of professionals and users will realize the trace of uses and intentions. The collected data furnish "a space waiting for configuration of the pictures by researcher [...] ephemeral support work and always in change [...] that offer an instrument for reflexivity [...] by linking meaningful shapes to practice who gives them status and quality" (Bonaccorsi, 2013). Face to methodological difficulties in use observation, photography can indeed be a means of investigation that serves two objectives - one on the variety of tools for collecting traces and another on taking into account different representations. The sensitive approach to qualitative methods that we specify gradually, built the empirical receptivity of the researcher involved in the process of "significance" (Leleu - Merviel, 2008).

Keywords*:* photography, documentary space, learning centre, qualitative method

Introduction and key question

Beyond providing a simple visual record, photography has become research material in its own right. Yet, it remains little investigated as a methodology in the Information and Communication Sciences (ICS) particularly in the study of library usage. Indeed, the use of libraries or documentation centres is evolving in line with changes in the ease of access to information and the forms of mediation seeking to adapt to these changes in order to meet new needs. But, perhaps paradoxically, this adjustment to needs is not straightforward as it is not easy to record the changes in usage which are often merely representations or projections. However, although photography constitutes a method for collecting information on space as it is experienced, bringing complex elements into play, it may be questioned whether photography, a record of scientific data (Tardy, 2007), allows us to demonstrate, to signify in the semeiological sense (Barthes, 1980), the expression of the actors.

The changes occurring in libraries and documentation centres are beginning to be implemented along the lines of the « learning centre » concept (Jouguelet 2009, Maury, 2011). This puts the focus on learning thereby seeking to realign library services, traditionally based on accessing information, towards offering learning support through a critical approach to knowledge reception and acquisition. Whereas these developments in library usage appear to be confirmed by different studies, there is still a lot to be done to clarify the way in which users in schools and universities occupy these spaces. No longer solely dedicated to storing, in particular, scientific and technical information, libraries have become learning and living environments in which information, at least in a physical or paper format, does not necessarily take centre stage.

Our paper proposes a reflection on this methodological data collection tool based on an exploratory study of “learning centres” in France. Our aim is to analyse the usage of these new library models in connection with what these systems enunciate, by working on “relating and confronting images” (Bonaccorsi, 2013). By focusing on the occupation of the spaces and how the users and staff circulate within them, it will be possible to chart their usage

and intentions. The data collected in this way constitutes "a space waiting for the researcher to configure it through images […] an ephemeral support to work with, constantly evolving […] which provides a tool for reflexivity […] relating signifying forms to practice which gives them status and quality" (Bonaccorsi, 2013). Faced with the methodological difficulties of observing usage, photography may indeed constitute a means of investigation that serves two purposes – the purpose of varying the tools used for collecting evidence and that of considering representations in a different way. The sensory approach to the qualitative methods that we gradually specify, builds the empiric receptivity of the researcher who participates in the process of "signification" (Leleu-Merviel, Useille, 2008).

How can photography contribute to gathering data on the link between the expected and perceived usage of a particular learning centre organisation?

What are the new uses anticipated by the professionals orienting this new organization? Which features are emphasized? What new relationships to information and to documents are emerging from these foreseen uses?

We present, firstly, our theoretical approach concerning photography as a sensory approach to representations, secondly the use made of the spaces and finally the links between information and learning. Based on these theoretical choices, we present the methodology used to set up a system of data collection and subsequently present some of the results which we analyse and discuss in the third section.

Theoretical approach

The sensory approach and use of images

The sensory approach refers to the question of sense. "Sense" designates both the faculty to perceive the impressions made by objects and each receptor system that makes perception and sensation possible. It involves the relationship between the perceptible object, which evokes an alternative reality to itself (a sign), and what it refers to. According to The Historical Dictionary of the French Language, "sense" is derived from *"sensible"* which describes in particular that which can be perceived by the senses. The adjective acquired a passive value in the 17th century when it meant "clear, obvious". Sensory realities in Aristotle's philosophy designate the qualities that can be or seem to be perceptible to one or more of the senses. In general usage sensitive and sensory may be synonymous. "Sensitivity" designates, in particular, the quality of being sensitive to something. In the 18th century, the word designated the quality of feeling and conveying emotions, then later came to denote a character capable of producing a sensation. "Sensory" concerns sensation, the action of perceiving, of feeling, of understanding.

Photography is not only a specific act between an observer and the object photographed, it is an intermediary record which can be used to elaborate scientific material. In this respect, it is similar to the interview technique which is a reasoned process leading to the construction of representations. Photography is a tool, like any other, which portrays reality as it is captured by an observer. It cannot be reduced to a creative act or to a support more subjective than any other collection of data (Tardy, 2012). It allows us to record what is real and can supplement a data collection method such as the interview. "This method provides a way in which the interview can move from the concrete (as represented by the literal objects in the image) to the socially abstract (what the objects in the photograph mean to the individual being interviewed)" (Briden, 2007).

Photography can also be considered alongside drawings done pre or post interview. The shift to a graphic portrayal, understood as with photography as the sensory approach from the actors' point of view (Fabre, Veyrac, 2008), gives the interviewees the opportunity to bring their representations to light in a different way. This includes capturing the complexity of a system through a collection of representations then using it to analyse the library spaces and the usage expected of them.

Space and how it is used

Space implies a passage between an exterior and an interior. We do not penetrate a heterotopia (Foucault, 1967) by chance. We enter it by way of a material or symbolic area which marks the space as being "different" in that it is separate from the common space. Within it, we gain access to a different area where we can experience something. It is in this other location offered by the library space, that the user will occupy this freedom zone. The user acts differently depending on how he experiences the space, between wanting to use it and constraint.

The library space can also be considered as a potential space linking transitional objects. Between harmony and illusion, the library space, thought out and organized by the practitioner, sometimes goes beyond the simple mediation of documents because it presents itself as a "potential space, a place in which to experience something" (Belin, 2002). For this to happen, the conditions of autonomy have to have been conceived and organized beforehand. The "transitional space" (Winnicott, 1975) is an area which will play an essential role in the processes of representation and symbolization and which will allow an initial step towards independence. The transitional space makes it possible to symbolize the world by distancing oneself from it. It is a halfway zone where a cultural experience can occur.

Thus, the library space, as we have defined it (Fabre, 2012), contains an element of symbolism which places it in the imagination of those who design it and also of those who "use" it. Considering library space in terms of knowledge mediation confers upon it a role of relay, of intermediary in the same way that considering it in terms of its uses relates it to a process of assimilation and learning.

Professionals in the field of information develop the space based on how they predict or presume it will be used. In this sense we can say that it is a space determined by the intentions of its developer, intentions which will be confronted with several ways of doing and experiencing things. It therefore becomes a space determined by multiple attributions which will only be perceived fragmentarily in so far as the intended uses continue to have a strong influence on the designer's imagination.

In other words, if the documentation centres designed by teacher librarians with the intention of making processed and organized information available, give the impression they are above all else places to access information which, in order to become places "of knowledge" must receive some support to work on assimilating the information, the way students use the library space can orient this vision by transforming the initial intention.

Notwithstanding, the library space can only become a learning space if this transformation is based on a form of mediation which takes into account the actual uses of the space; only then will it be possible to go beyond these uses towards knowledge construction.

Information and learning

The definition of information given by at least some schools of thought in the information and communication sciences, positions it within a process of dissemination-construction of knowledge. In other words, we could say that this process is akin to a process of transmission-acquisition i.e. learning.

The significant proportion of information made available inside and outside the school sphere but that escapes traditional mediation by the teacher, has made it crucial for students to acquire information literacy skills. Indeed, this involves moving from the phase of accessing information to a phase which enables the student to locate, sort, and use effectively the information he needs to learn and therefore build new knowledge. In order to achieve this, there has been a transition from a situation where it was primarily the teacher who mediated the knowledge in the classroom to a situation in which teacher librarians also have this role. This specific mediation, qualified as documentary mediation, has materialised, on the one hand, as an established system (the CDI) which has organized knowledge and made it available in the form of processed and disseminated information and, and on the other hand, in the form of information education or guidance on how to handle information.

In other words, the general question of learning has never been absent either from the design of documentation centres or from the professional practices of teacher librarians; on the contrary, it has always been central to work on knowledge mediation which requires communicated and communicable knowledge (Meyriat, 1983). That is to say, knowledge mediation includes working with, on and about information.

We are moving, therefore, towards a form of mediation that could be described as a collective form of knowledge mediation. This form of mediation is centered on the question of learning with, on and about information in systems whose denomination has signified, until now, work on information-documentation but that now proposes to include the question of learning more explicitly. This semantic shift could be accepted if, as we see it, learning clearly refers to the transition from an organisation of knowledge to knowledge communicated via information, towards suitable information for constructing new knowledge. Do the current learning centres reflect this collective mediation?

Methodological choices and data collection

Description of the context

This study concerns a secondary school of 300 students and 30 teachers partially assigned to the school. There are 3 first form classes, 3 second form classes, 3 third form classes and 4 fourth form classes. The population has decreased drastically in the surrounding geographical area. Formerly a town centre school, it now has to cater to the needs of students with serious learning difficulties who come from a wide variety of social backgrounds. The teachers have had to change the way they work: to function more as a team to cope with difficult classes, to adapt their teaching methods, to consider how to provide a different kind of support for students. The digital work environment facilitates learning partly by providing the possibility of putting homework exercises on-line, but also by making it possible for students, who have no Internet connection at home, to benefit from supervision and support when they come to work in the CDI.

Following on from this, the « learning centre » spirit has imposed itself almost surreptitiously upon this specific teaching team. Its materialisation was enhanced by the juxtaposition of several rooms: the chief educational adviser's office which is adjacent to the school administration office, which leads into the CDI, which opens into both the supervised study area and a study room.

It became known as a "Learning centre" after a school inspector's visit. The inspector made them realize that the development of these spaces and the student guidance methods used within them corresponded to the concept of "Learning centre"; a concept which is defined by the educational support and supervision available to students outside the classroom.

The method chosen

Our protocol is based on a mixed method combining observation on-site by the researcher and four interviews with the staff concerned with and involved in the « learning-centre » activities (a teacher librarian, a principal educational adviser and two educational assistants).

The observation took place over several days during which the researcher made notes (kept a logbook), took photographs, made recordings and collected graphic depictions. The questions in the interview guide focused on the background to the project, how the actors perceived the project, support for the project, their vision of team work etc. Their representations of the space and its uses were also captured as drawings and photographs portraying the way they viewed this space. We chose to complete the interviews using alternative ways of representing reality because, in other field work, we had already seen the relevance of using drawings and photographs to communicate about usage or about a particular practice. Below is the sketch drawn by the researcher during the on-site observation which we used as a standard for analysing the drawings of the different actors.

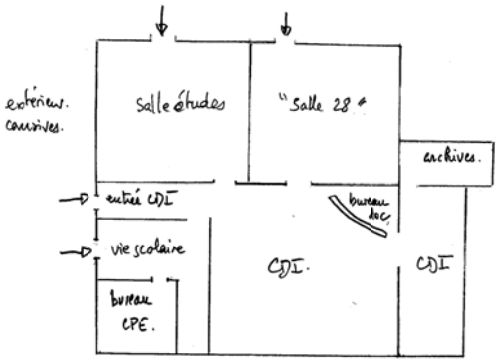

Figure 1: Standard drawing

Results and analysis

The outcome of the interviews shows the need to qualify the formalization of the "Learning centre" by specifying the context of the project. Thus, the actors describe it as a humble approach to the reflection on a "learning centre" (LC) which resulted from the combination of several factors:

- a profound change in the student population transforming the elitist "town centre" school into a school catering to an increasingly disadvantaged and vulnerable population;

- an outdated documentation and information centre (CDI) in 2005 when the teacher librarian arrived;

- a pre-existing layout making it easier to connect the different rooms. They are all on the same floor, there are no corridors, or schoolyard to cross, just a separating door which made it easier for the students to circulate.

-a desire to work together shared by the teacher librarian and the chief educational adviser

For the principal educational adviser and the teacher librarian, the key words to describe the project are accommodating students, using the space as a real study area for the students, supervising and offering support to students working individually. For one of them, the specificity of the CDI is that "the different people and work spaces are close together" and for the other "the proximity of the different work spaces" and "the good atmosphere within the team".

Beyond this initial approach to the LC and its uses, we go on to present the results and our analysis of them focusing on two main aspects; on one hand the relationship between space and the way the staff organise their work and, on the other hand, space in relation to resource materials.

Space and the way the staff organise their work

In order to bring out the salient points, the results are presented thematically and as a collection of verbatim accounts taken from the interviews, drawings and photographs. To distinguish between the different material, we indicate AE1 and AE2 when referring to the accounts given by educational assistants we interviewed, D for the teacher librarian and CPE for the principal educational adviser.

Physical and symbolic boundaries

The first striking feature seems to us to be the delimitation of the spaces and what they symbolise. The project materialised from a rethinking of the enclosed space of the CDI together with the other adjacent enclosed spaces which were trigger components of the new project. This is how the educational assistants describe the boundaries between the spaces:

AE1 : « when the teacher librarian is with a group of students, she takes the first formers for documentation classes, we are in our supervised study period so we close the door and are with our students in the study room, keeping them as quiet as possible and helping them if necessary. So that means they don't have access to the CDI".

AE2 : « the door between the school administration office and the CDI is closed when we are discussing things that the students mustn't hear, we shut the door and open it again automatically afterwards".

AE2 : « if my colleague is supervising the study period, with a large group of students, if we are in the school administration office and my colleague is having problems handling seventy students or the students are being a real pain, the fact that all these doors are open means we can get up and help her out for ten minutes".

AE1 : « thanks to this we can hear and see what's going on… »

AE2 : « all working together… »

In the photograph, one of the assistants has chosen to portray the space by way of the partitions and doors that divide it up.

Figure 2: AE2's photo
View taken from the school administration office, of the open door to the supervised study room through the CDI.

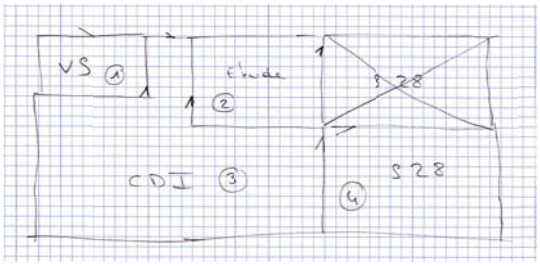

Figure 3: AE2's drawing
In the drawing the educational assistant has clearly indicated the doors between the different spaces with a bold line

The drawings show both the boundaries and how to get from one space to another.

AE2 : "by closing the door we also get a break (sigh) because some weeks are long and occasionally our patience is sorely tested"

The principal educational adviser's drawing seems to go along with this although compared to the very angular depiction shown in the first drawing, she has added a slightly different perspective because the circles soften the boundaries.

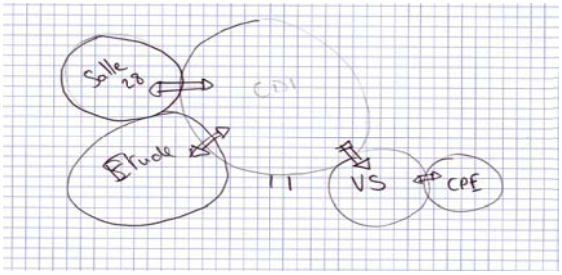

Figure 4: CPE's drawing

CPE : « To draw what the LC represents for me …I, I have to split the different spaces up but which in the end …so here is the CDI […] room 28 which I use a lot err…here's room 28 which I often use cos thanks to this um, sort of multi purpose room, we have a different space to put students where we can split up the groups, integrate a class which, like this morning, doesn't have lessons and well, without having to put them in the big supervised study room where we handle the day to day running of things. So, there, the study room, there it is and here's the school admin office and my office, that's the CPE's office, and the school admin office and actually it's that, it's the, the fact that there are doors but that they are never closed. Whereas when I started working here they were shut […] that's it. So that's really, with the exit here to the schoolyard. […] this set of doors has really been a fundamental element.

It is surprising to note the perpetual oscillation, in the verbatim accounts, between, on the one hand the desire for a global space without boundaries and on the other the chronic allusion to the different areas using the name of each subspace. This tends to divide rather than unify the space; just as if each actor were subconsciously seeking to conserve the specifities linked to his role within this shared space. For example, the denomination "Room 28" thus, remains, in some respect, both inside and outside the LC project. We find here the heterotopia developed by Foucault which locates spatial boundaries inside a collective imagination.

Circulation

The second striking feature in the results concerns the circulation of students (especially between the areas called the "documentation centre", the "supervised study room", and the "school administration office") during a supervised study activity, which is generally considered to be difficult to manage in schools. We can see here that this problem is tackled in such a way that it becomes a crucial factor for developing the spaces in relation to student support.

AE1 : « As soon as the students arrive for supervised study we tell them the CDI is closed for the hour. So, they know that they will have to work with our support as they won't have access to the books or the computers in the CDI".

AE2 : « There is another thing we haven't mentioned, that is, thanks to this room (room 28), with the sliding door, if we stand up between the two spaces (study area and room 28), we can handle more students: once because a teacher was absent, the supervised study room was full, we sent some students to the CDI and we put a whole class in room 28, next door".

Figure 5: D's photo
Room 28, adaptable as required

The photo taken by the teacher librarian shows how the modularity has allowed them to open up the space to accommodate the activity.

AE1 : « the three doors were open and there were students everywhere. The CPE, our immediate superior, was close by. If we find ourselves in a particularly delicate situation with a student, she'll help us out with the punishments or just with the discussion if we are having a hard time.

Managing the flow of students within the different areas relates here to the notion of transitional space but also to potential space. Indeed, the actors seek access to a new potential space by denying the boundaries and creating signifying routes to it.

Space utilisation

Student utilisation of the space and the uses anticipated by the staff, seem, indeed, to be strongly linked here to the question of learning even though we can observe that what is targeted is more a form of peer-to-peer collaborative learning.

AE1 : « Very often we are both supervising study periods »

AE2 «we often go into the CDI, we do the rounds. Sometimes we leave them to get on with it and we do our best to answer their questions.

Figure 6: AE1's photo
In the photo, her colleague is helping a group of students with their homework.

Nevertheless the photo chosen by AE1 shows the adult is present in a supporting role which contributes to the goal of learning in this space. The educational assistants recognize that their role is to supervise and offer support to the students.

AE2 : « it can happen that we are not really free sometimes. My colleague will try to do what she can or she'll ask a good student if he thinks he can explain the notion to his classmate. In fact, sometimes we even prefer it if they explain things to each other […] they go over it together in their own words. This introduces them to peer support, rather than always asking an adult, the information is on hand just next to them, whereas we would have to look through the whole lesson to be able to help".

From the staff's point of view, if the LC provides learning support, it seems also to be developing towards a system of peer-to-peer learning as we can see in the following extracts.

AE1 : We use room 28 whenever we can when there are a lot of students in supervised study because during these periods, the tables are organized so that they can work together, and we can see them. However, this means we lose a fair bit of space and capacity so this room is really useful".

Figure 7: D's photo
Some of the students in the same class have chosen to leave the supervised study area and work in a small group in the CDI.

The photo taken by the teacher librarian shows how she really wants to develop the CDI into a work space.

AE2 : « some students really like coming to work in the CDI. They bring their maths, they do their homework".

The teacher librarian's choice of photo does not highlight the use of the resources or documentation in the CDI but seems to relate to the students' autonomy both in terms of how they choose to use this space and the work they do in it.

Space and documentation

Spaces and sub-spaces

The function of each subspace, particularly those which are dedicated to storing documents, is not referred to at all in the drawings with the exception of the "reading" area shown by AE1. During the interviews, AE2 points out that : "We have the key to get into the storeroom, if we need three history or four science textbooks we can go and get them from the storeroom if they are available".

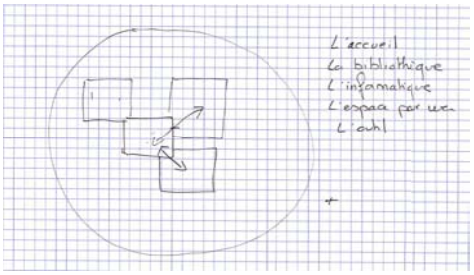

Figure 8: The teacher librarian's drawing.

Paradoxically, it's the teacher librarian who has drawn the most minimalist sketch of the different spaces which make up, what she continues to call, the "CDI », but next to it, she does choose to list some key words which characterise the system. The drawing shows a juxtaposition of the subspaces but does not really indicate how to circulate between them. This said, the fact that there is a circle encompassing the subspaces, reinforces the idea of a desire for globality which is not always satisfied when we refer to the subspaces in detail.

In the CPE's account, we note that she specifies the spaces and their uses in terms of the different roles played by the teacher librarian: "It was my job to say to the educational assistants: remember that Katia is also a teacher so when she tells you that the CDI is closed, well she needs to focus on her class, on the lesson, that's the way it is. I had to get them to take that on board. She's too busy to worry about book loans, so, we can do it, discreetly, we can go in, we can provide this service but that's where we must be wary because it's at these times she's at her most vulnerable, so to speak, because we might be interrupting her in the middle of her lesson plan and put her in a difficult position. She's already managed to explain that and it's up to us to be wary of this. I'm not saying that there won't be times when we slip up, as educational supervisors we have our flaws, OK, but straight away one of us should speak up and say be careful. And it was the same thing for the teachers".

The permeability of the subspaces is limited according to the tasks the staff carry out in them and not according to student usage. In this way the teaching function is partially sanctified to the detriment of a desired utilization.

Use of documents

The development of this school into an LC incorporating the CDI, seems to be leading towards a different relationship to the use of documentary resources within the subspaces, which is also influencing the mediations at work.

AE2 : « it's great that we can help them consider other options when they are looking for information. We tell them, for example, no you won't find exactly what you're looking for on Internet, look in the library's journals section, you'll find the answer in one of the magazines there".

AE1 : « we ask them if they have work to do on documentation so we can then send them to the CDI, they have access to the computers, to the books and afterwards we are there to help them with their information search, just like the teacher librarian ».

What AE1says here is reflected in her drawings and photographs, in which we find the most significant presence of material resources. They are present both in the subspaces, like the reading area, and in the storeroom where the textbooks and archives are kept. They also appear in the foreground of the photo of the lending service which, taken from this angle, puts the viewer in the teacher librarian's "entrenched" position behind the service desk, discussing a certain document with a student.

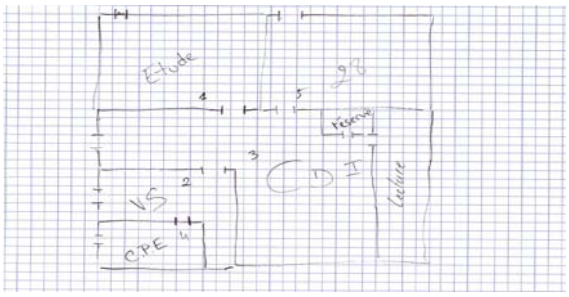

Figure 9: AE1's drawing

Figure 10: AE1's photo

In the photo, documents are present on the shelves. In the background we can see a row of computers with two students working on them. So, although the material resources are only vaguely referred to in one part of the verbatim accounts and only slightly prominent in the pictures, they do, reappear in the description of how the spaces are used.

Presence/absence of the documents

Certain elements shown in the photos and drawings are clues to the uses perceived by the staff like the presence or absence of documents, computers, the students' personal resources and the documents used by staff.

Here is a photo of one of the educational assistants' work stations. We can see her coat, the attendance register, the computer connected to the school's network. On the right, printed charts are posted on a cork notice board.

Figure 11: AE2's photo
the educational assistant's desk when she is supervising in the study room.

Figure 12: D's photo taken from the school administration office.

In this photo, taken by the teacher librarian, we can see the computer workstation connected to a printer. On the right we can just make out the photocopier. All this material is reserved for staff use only. Only those students who ask for or who really need one can get a photocopy which will be made by a member of staff. Has the teacher librarian taken this photograph to illustrate this boundary? It coincides with the following element revealed during the interview:

D : « reflection on the LC means rethinking the space and obviously considering new tools and devices. Those of us working in documentation are currently asking ourselves : should we equip the CDI with tablets or e-readers? That's the question, that's what we're debating. At the moment we can't agree because these electronic devices are constantly evolving. Should we consider using tools which will soon become obsolete? We also have the problem of Wi-Fi connection and its authorisation in schools. So, now either we dig in our heels and resist or we start seriously thinking about the issue, we're not clear on this".

D : " We already have some on-line lessons. But even on the subject of digital textbooks, there are still some CDIs where it is forbidden to come and work on maths. That should perhaps change. Why ban maths from the CDI? On what grounds? »

D : We open up the digital world to the students but some of them are in difficulty, not all families are equipped so we have to adapt to this. This means we have to stay open longer and find solutions; that has also made us think about things. To start with we said OK but how do we make it work? We put the textbooks on-line, OK….then what? So that's helped, it's helped to encourage the use of new computers in the CDI and during supervised study. Technology mustn't become an obstacle for students".

D : « There is textbook content but it's mainly in maths they work on that. Er ..they give them exercises to do on-line and they get the correction, they know which student is connected, at what time and why. That's how we discovered that some students work during the night. Yes…It sets you thinking when you find out that the students who zone out in class were connected at three in the morning. We had a case recently. Students who don't stop yawning in class but when the maths teacher sees they do their exercises between two and three o'clock in the morning (silence) well you can address the problem face on (laughter). That's how it goes…"

The uses perceived here are related to the learning process-learning support. The absence of documents from the CDI, as seen in the photos and confirmed in the accounts shows that the LC project is adapting to this evolution in usage which highlights the fact that information access is no longer the primary objective of those who use these spaces.

The use of photography and drawing helps qualify the accounts formatted by the formalization of the LC project which the different actors have assimilated as a group, and

which ressembles the official line. We can work on the assumption that photography could help to bring different representations to the surface and allow the researcher to adopt a sensory approach to both the expected and perceived usage of space, however, one of the flaws in this study is that the interpretation of the pictures is left up to the researcher; the actors were not given the chance to complete what they said initially with a description of the pictures and drawings they did. We do, nonetheless, believe that pooling several subjectivites, those of the researcher and those of the actors, could provide new opportunities yet to be confirmed.

Conclusion

Given the difficulty involved in grasping new usages of school libraries, we have suggested using photography as a sensory methodology for perceiving the uses of the redesigned library space. This approach has led us to specify, from a theoretical point of view, how the angle or focus of the picture could offer a sensory means to approaching the developments in progress in the field of documentation. This then led us to explain what these uses of the library space imply and also the relationship between information and learning. Based on these elements, we have tried to address expected and perceived usage of a "Learning centre" in France using an approach involving photography, drawing and recorded interviews with staff members. The results of this study show that despite a desire for unification, the boundaries between the subspaces persist whereas circulation and usage are becoming more fluid. This tends to confirm the potential of an existing yet still transitional space.

Furthermore, the dichotomy between the space as an area for living, working and ultimately learning, seems to take precedence over using the documents related to a library space. This reflects the project signified by a change in denomination shifting from "Information and Documentation Centre" to "Learning Centre".

Photography as a methodological tool complementary to interviews and drawings has proved its relevance here but would benefit from being associated with the words and images of the students, a perspective which will be further developed in forthcoming research on Learning centres.

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Student use of library physical spaces: unobtrusive observation of study spaces in an academic library

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Abstract

Despite the massive impact of ICT on library service provision, academic libraries continue to supply patrons not only with collections but also spaces – spaces for study, research, contemplation and relaxation (Bryant, Matthews and Walton, 2009; McDonald, 2010; Carpenter et al, 2011; Latimer, 2011). In order to understand the role of the 'library as a place' and to gather valuable data on study behaviour of students, that would facilitate the planning process of the new library building at the Faculty of Humanities and Social Sciences at Osijek University, Croatia, a large study has been underway. The study employs triangulation to answer the following research questions: How are library spaces, collections and equipment being perceived and used? What factors facilitate/impede library use? How could the new library spaces be designed in order to serve the patrons better?

In the paper authors will focus on the qualitative data, obtained with the help of ethnographic methodology of unobtrusive observation, relating to the students' usage of the library study spaces (quiet study room). These public study spaces were observed (and photographed) during the course of one week in different time periods to capture diverse users and uses and intensity of use. Observers recorded any behavior or event that was regarded relevant to the research questions being investigated. The initial results show that varied activities occur in the library study spaces which have not been catered for properly. For example, students are using the library study rooms as an informal meeting place; at peak periods quiet study room is being used for group work; significant number of working places in study rooms is underused because of inadequate table sizes etc.

Keywords: library space planning, library use, user behavior, students, observation

Introduction

Despite the massive impact of ICT on library service provision, academic libraries continue to supply patrons not only with collections but also spaces – spaces for study, research, contemplation and relaxation (Bryant, Matthews & Walton, 2009; McDonald, 2010; Carpenter et al, 2011; Latimer, 2011). Although many predicted the decline of the academic library, there seems to be actually higher demand for libraries both by academics and students (Antell and Engel, 2006: 553). Modern academic libraries are increasingly introducing hybrid and flexible learning spaces, information/academic commons, broadly defined as physical convergence of digital tools and assistance with traditional reference services, resources and areas (MacWhinnie, 2003: 2). In order to provide for the emerging trends in higher education they accommodate wide range of services: print and electronic information resources, provision of ICT, collaborative and independent workspaces and social space where patrons can eat, drink, chat and rest.

In order to understand the role of the 'library as a place' and to gather valuable data on behaviour of students in library spaces, that would facilitate the redesign process of the existing library and the planning process of the new library building at the Faculty of Humanities and Social Sciences at Osijek University, Croatia, a large study has been launched in 2013. The study used a mixed-method approach, combinig extensive patron survey (for students

and academics) with unobtrusive participant observation to answer the following research questions:

1. How are the library spaces, collections and services being perceived and used?
2. What factors facilitate/impede library use?
3. How could the existing library spaces be rennovated and the new library spaces designed in order to serve the patrons better?

Student survey provided researchers with overall insight into the Faculty of Humanities and Social Sciences in Osijek (later on FHSSO) student body (general demographic information, academic success etc.), their studying habits, and library perceptions and uses. Academics survey was similar in nature and explored their perceptions and levels of library use. Patron surveys focused in particular on factors that facilitate and impede their use of the library. It also collected patrons' opinions of ideal library (space, collections, services etc.). Out of 1404 undergraduate and graduate students, a total of 806 students took part in the survey (57,04%). The sample was representative of the FHSSO student body and included all academic majors at both undergraduate and graduate level. Similar recall was recorded for academics, with over half of the FHSSO staff (53,7%) responding to the survey. Academics responded to an online survey, while the print survey was distributed to students at the beginning of their classes, in collaboration with individual course instructors. This quantitative investigation was followed by the ethnographic study whose goal was to provide deeper insight into the student behavior in library and the nature of activities taking place in different library areas. The final aim was to apply the gained knowledge and understanding to the renovation of the existing and the design planning of the new FHSSO library, in order to better support patrons' work behavior. This paper focuses on the ethnographic, observational study and presents a portion of qualitative data relating to the students' use of the library study spaces (quiet study room).

Literature Review

Observation studies typically involve the systematic recording of observable phenomena or behaviour in a natural setting (Gorman & Clayton, 2005: 40) and they do not deal with the opinions or beliefs about the events or actions with which those being observed are engaged (Sommer & Sommer, 2002). The value of observation is that it permits researchers to study people in their native environment in order to understand “things” from their perspective (Baker, 2006: 171). They can be structured or unstructured, overt or unobtrusive. Structured observation samples a predetermined event or activity, using a prearranged form into whose categories the observer records whether specific activities take place, when and how often it happens. In unstructured observation the observer records any behaviour or event that is relevant to the research questions being investigated. Observational method of inquiry in general has a 'reality verifying' character, whereby what people say they do can be compared with what they actually do (Gorman & Clayton, 2005: 104). The structured observation is considered to be a quantitative, and unstructured a qualitative method. In overt participant observation the observer acts as an active participant in the study group and those being observed have given permission to be studied. In contrast, in unobtrusive observation, the observer is passive and has no interaction with the people being studied. The latter type is also known as naturalistic, complete or non-participant observation.

As every methodology, both types of observation have advantages and disadvantages which should be dealt with carefully. On one hand, an overt observer has the opportunity to better understand the behavior by asking questions of those being observed but people who are aware of being observed might change their behavior. On the other hand, unobtrusive observation raises some ethical questions such as gaining permission to study, right to privacy, confidentiality of data etc. (May, 2011: 358-359). Two general disadvantages of observational method are that it is time consuming and the subjectivity of the observer (Gorman & Clayton, 2005: 105). In addition, observation has several unique challenges such as the acquisition of special skills that can be learned only in field, gaining access to the group for researchers who are not members of the studied group, ethical issues, validity and reliability (Baker, 2006: 179-181). Although observation is generally seen as the least intrusive data collection method, today strict policies are in place to guide research on human participants and that is probably the reason why complete observers are not being used by researchers more often. To address bias and improve validity, researchers can use more than one observers to collect and analyze data - investigator triangulation (Johnson, 1997: 283), include participant feedback and use additional methods of inquiry (Baker, 2006: 184).

Although as an ethnographic method, observation has a long history it has not been commonly used in library and information science (LIS) research. For example, as recently as in 2005 only 3,5% of studies in high-profile LIS journals have used observation as a data-collection technique (Hider and Pymm, 2008). However, the observation is slowly gaining favor in LIS field and the review of current, peer-reviewed literature in English, indicates that LIS researchers are beginning to employ this methodology in the information seeking and public and academic library use/behavior context.

McKechnie used this methodology repeatedly to study babies and young children's behavior in the public library setting (2000, 2006). Two other Canadian researchers, Given and Leckie, used a specific observational approach, the seating sweeps method, to study individuals' use of central public libraries in two large Canadian cities (2003). In 2010 Mandel published an article on her unobtrusive

observational study on patrons' initial wayfinding in a medium-sized public library in south Florida. Different aspects of the library use, seating patterns, user behavior and technology use in the library have also been studied across different academic library settings by a number of international researchers. For example, Applegate (2009) writes about systematic observation of non-computer seating areas in library spaces on an urban US campus. Bryant, Matthews and Walton (2009) describe in their article a case study of user behavior in a newly established library space at Loughborough University, UK. Similar ethonographic study on students' work behavior was undertaken by Bedwell and Banks (2013) at Killam Memorial Library at Dalhouse University, Canada, Suarez at the Brock University, Canada (2007), and Pierard and Lee at New Mexico State University (2011). Seating patterns and use of library study tables was explored, with the help of this methodology, by Loder (2000) and Young (2003). Finally, the use of library computers and laptops was studied by Briden and Marshall (2010), Thompson (2012) and Johnson and Finlay (2013). Although not exhaustive this literature review serves its purpose to document that ethnography as a quantitative or qualitative methodology can be useful to librarians and researchers in the field of library and information science (LIS) who want to understand the patrons behaviors and activities.

Study

Observation study described in this paper was conducted by ten graduate students from the Department of Information Sciences, as a part of their research assignment for *Library Architecture* course. A minimum of 10 hours of observation was negotiated as a requirement for course completion for each student. LIS majors were perfect candidates for the role of observers because they had some training in research methodology and were supposed to be studying other students in their own environment. Their membership in the culture under observation permitted them unobtrusive access to rich data. Data was collected in the period from 25 to 29 November 2013 (week 9 in Autumn semester). The period for data collection was determined on one hand by the head librarian's suggestion: she indicated that this was the period of heavy library use because it is the middle of the semester when students have many written assignments and prepare for midterm exams. On the other hand, the students' research assignments were supposed to be finished by late January so the end of the semester, which is perhaps the period of the heaviest library use, was excluded as the observation period at this point. The observation time periods were purposively selected in order to obtain a glimpse of the ongoing activities across the range of normal library business hours (9 a.m. to 6 p.m.). Only days Monday through Friday were included because the library is not open on weekend. Observations were conducted in four library areas: quiet study room, group study room, foreign languages study room and reference desk. Data was collected at different time periods each day of the week according to the timetable presented in Table 1, resulting in 27 observation periods lasting 60 minutes, in each of the four library areas, and over 100 observation hours altogether.

Table 1. Observation time

Day	Observation time
Monday	2 p.m. – 6 p.m.
Tuesday	9 a.m. – 1 p.m.
Wednesday	11 a.m. – 6 p.m.
Thursday	9 a.m. – 1 p.m.
Friday	9 a.m. – 5 p.m.
Total	**108 hours**

Observation data was collected in print sheets – one sheet was used for each time period for each library area. Students observed specific library areas and recorded their observations of patrons' activities and behaviors and interaction patterns. In most cases students noted activities such as study engaging or supporting activities (reading, writing etc.), library computer user, (smart)phone/tablet/iPod etc. use, independent study, group work/discussion, chatting, and eating and drinking.

The observation protocol was the following: when student observers arrived to the designated library area they would sit and pretend to work (read and take notes) while at the same time observing the patrons' behavior and recording their general observations on patrons' activities and anything else that caught their attention. Researchers also tried to interpret what they observed, often based on their own experience. At the end of their observation period the researchers took photographs of the studied library area to obtain the visual evidence of the actual situation in the room.

Prior to conducting the study, ethics approval for the project was granted by the FHSSO. The notification was posted on the library website to inform patrons that unobtrusive observations would be taking place. Library staff were notified of the study well in advance and the head of the library was actively involved in the research project from the start. Since visual research in particular is associated with a number of ethical issues, such as consent, confidentiality and anonymity, special attention has been given to this part of the data collection and necessary steps were taken to ensure that informed decisions and professional approaches were taken (Wiles et al, 2008). Prior to taking the photographs, patrons were verbally informed by researchers that photographing was a part of the students' research project whose aim is to study different library behaviors and uses and that the photographs will be analysed and used only for scientific purposes (publication of scientific papers) and the redesign of the library. Also, patrons were explained that the photographs will be taken in such a way to ensure the

highest degree of anonyimity by photographing them from behind so that their faces do not appear. In addition, patrons were given the opportunity to leave the room if they preferred not to be photographed. In the end, students observers noted that none of the patrons in the quiet study room objected to being photographed. On the contrary, they became interested in the study and inquired about the renovation and redesign of the library.

Results

The observational method resulted in several interesting findings. The majority of them could not be documented in any other way. Since the large amount of data were collected, in this paper we shall explore only some of the findings to provide a glimpse of the library behaviors and to highlight the usefulness of this approach in documenting patron behavior and implementing changes/renovations in the library. As mentioned earlier, in this paper only results pertaining to one library area will be reported: quiet study room. At the time of the study, quiet study room (located at the far right end on Figure 1) was located on 62,43 square meters and contained a maximum of 35 individual seats. There were eight computer workstations, three individual tables and 12 tables which could seat two persons each. In this room, patrons are never monitored in any way by library staff.

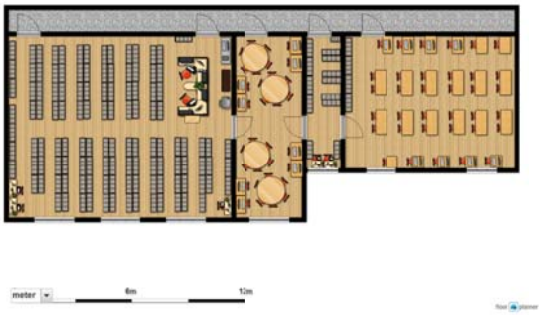


Figure 1. Library floorplan (November 2013)

Before examining the observation results, it might be useful to provide context for the observed behaviors by presenting some of the results obtained in the quantitative study (survey). The gender and age of the sample in the students survey was representative of the general demographic characteristics of student body at the FHSSO (79,5% of respondents were female, and 75,5% fall into the 20-24 age group). According to the survey, majority of respondents studies in the late afternoon (62,5%), in the evening (52,6%) and in the night (45,2%). Majority of students studies at home (94,8%). However, a significant portion of respondents studies in the academic library (38%) and on their way from home to faculty (15,8%). Only five respondents indicated that they also studied in other non-library areas at the faculty, such as the hallway, student restaurant located in the basement of FHSSO and gazebo in the courtyard (2,5%). Over half of the respondents (55%) indicated that physical space of the library (size of the room, number of seating places, computer equipment etc.) were important or very important for their academic success. However, less than a third of respondents (27,9%) indicated that the physical space of the library (size of the study rooms, number of individual seats, computer equipment) did not meet their needs. When asked about their favorite place to study in the library 50,9% of respondents indicated quiet study room because "it's quiet" and they "can concentrate better there". A total of 30,9% of respondents indicated the group study work as their favorite study place in the library because there they can talk with their colleagues and study in groups. When asked, in an open ended question, about the changes the library should introduce to improve the study areas, the largest number of respondents indicated the purchase of more computers (55,3%) and more copies of exam literature (32,7%). Over a third of respondents emphasized that the size of the library study areas should be expanded and that more seats should be provided (30,5%). A significant portion of respondents also indicated the need for free wireless connection in the library (23,7%).

As far as academics and teachers are concerned only 9,6% of respondents indicated that they worked in the academic library and less than a third indicated that physical space of the library (size of the room, number of seating places, computer equipment etc.) was important or very important for their work (28,8%). Over 90% of respondents - FHSSO staff, when visiting/using the library, stays there up to 15 minutes (91,5%) and borrows material (87,7%). A total of 66% of the respondents reported that they did not have a favorite place to work in the library but, expectedly, almost 80% indicated that electronic library resources were very important for their work (78,1%). In their suggestions for improvements of the library the most common were the following: subscription to more online databases, expanding the library space, providing designated workplaces for teachers/academics, wireless Internet access and longer working hours.

The analysis and conclusions reached in the ethnographic study were grounded in the actual data gathered and presented in a narrative style. Recorded observations are generalized under four broad themes: general observations, study behavior, computer use, social and leisure behavior.

General observations

Quiet study room was constantly heavily used. Just as some other similar studies have shown (Applegate, 2009), this library space was on average most intensively used from 11 a.m. to 1 p.m. The morning and afternoon uses were relatively low in comparison. First patrons in this library space were, as a rule, student commuters who as a result of inadequate train/bus schedules arrived to the Facutly earlier than their classes required. Patrons usually

started to pour into the quiet study room after 10:30. Apparently, patrons could chose whether they wanted to sit next to the window or at the back, if they came at 9 a.m. or at 4 p.m. but if they arrived around noon they would probably not find a free spot to sit. Similar was noted for the different days of the week. The usage of the quiet study room varied across week days. Again, the beginning and the end of the week saw less use in general. On Monday and in particular on Friday quiet study area was less used than on other days of the week.

Observers noted that all patrons using this library space in the above mentioned observation time periods were students. Having in mind the results of the quantitive study, it s not surprising that none of the teachers came to the quiet study room: they indicated that they prefered to work in their offices and seldom worked in the library because they could not use their own laptops (since there are not enough power outlets and wireless is not available) and apparently they did not want to take up the few workplaces for students who might not have another option.

It was further observed that unafiliated patrons, who arrive alone and work alone, almost never sit right next to each other. Students observers noted quite a regular pattern of such behavior because whenever an unafiliated patron entered the quiet study room and saw that in the room there were no empty tables (not individual portions of tables but the whole tables) they would leave. As a result, at all tables which can (in theory) sit two persons there was most often one place empty. The only exceptions were people who came to work in pairs but since this library area is intended for individual work the furniture should be adjusted to the needs of patrons working alone. Student researchers also noticed that the size of the tables, or an individual-sized portions of tables, were inadequate and do not suffice for comfortable work if students want to spread out their books, papers, supplies but also jackets, umbrellas and bottles with water.

Students observers also reported that the quiet policy was for most of the time adhered to despite the fact that the library staff was not present and students knew that they were not monitored. From time to time however the level of noise was relatively high, because some patrons working in groups come to this area to conduct collaborative work. However, the students working individually would tolerate them. Student researchers explained that, according to their personal experience, certain level of noise generated by several patrons working together was tolerated because many students from time to time use the quiet study room for group work but also that certain level of background noise was actually contributing to the working atmosphere.

Students indicated that the lighting was satisfactorily and that the area is brightly lit. The air conditioning system, however, was described as utterly inadequate: in the quiet study room the heating cannot be locally regulated so the room was always too hot which contributed to drowsiness. If somebody asked a window to be open persons sitting next to the window would naturally object because in that case they would be too cold. In addition, computer workstations were located along the wall with windows so if the windows were open, and left unattended, the rain or snow might have negative effect on the computers.

Study behavior

According to the students' recorded notes, most of the observed behaviors in the quiet study room were studying or working behaviors. Also, the majority of patrons observed in the silent study room were working individually. In most cases they were reading (from a library book or their own copies), taking notes and working on a PC. While a substantial portion of patrons were observed to be working in the library for shorter periods (up to half an hour) the majority would settle in for longer periods of time (60 minutes or longer). Students observers explained that many patrons who stayed in the quiet study room up to 30 minutes were actually on a break and in between classes or waiting for their bus/train home. Some used that time to prepare for the upcoming classes (go through the required readings, finish an assignment and so forth) and some just to sit and relax, use library computers to check their emails, read news and so forth.

Despite the fact that the quiet study room is intended for independent work, researchers observed that there tended to be a relatively high proportion of students working in smaller groups (Photograph 1). Majority of these groups involved two or three persons. Student researchers describe that the reason for this lies in the fact that the study room for group work is quite small (providing only 32 individual seats) and the level of noise in it is relatively high because patrons tend to use it as lounge area. When a group of students used the quiet study room, in most cases they would gather around one computer and move the chairs around a bit to suit their needs (in most cases so that all can see the screen). Since furniture in this study area is not meant to be moved around, such seating (re)arrangement often impeded the spatial communication in this room altogether.

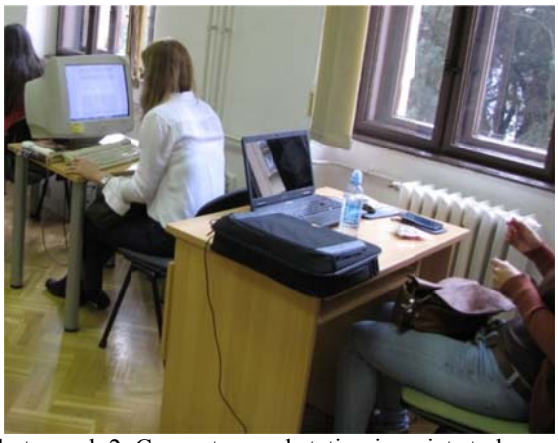
Photograph 1. Group work in quiet study room

Many patrons were noticed to be consulting library books and after studying for some time, leaving their place for couple of minutes to bring more library books, in many cases reference material (large size encyclopaedias, dictionaries etc.). Student observers noted therefore that it would be very convenient if the reference section was located closer to the quiet study room. At the moment, students have to pass two library areas, both unattended by librarians, to reach the reference desk/collection. Also, a number of patrons were noted leaving their possessions (jackets, books) at the desk and returning after 90 minutes or so. They apparently went to class and returned to continue working but by leaving their things spread around the desk they reserved the spot.

Computer use

The students observers indicated that the second most common activity observed in the quiet study room was using library computers. During the peak periods (11 a.m. to 1. pm.) library computers, as a rule, were used to their full capacity, and there were often students waiting for computers to become available. As was noticed in some similar studies, some patrons were noticed to organize "shifts" with their friends or colleagues and take turns using the same workstation throughout the day (Bedwell & Banks, 2013: 9). Also, according to the students observers there were many patrons who would leave the quiet study room immediately after entering and having noticed that there were no free seats at the computers. One student observer noted that at one point when there was the Internet shut down all patrons who were working at computers left the library. Computer use was even and steady across different times of day and week days.

As far as the computer activity is concerned, students reported that library computers were used in two different ways. On one hand some patrons used it for longer periods and obviously used MS Office to write something or take notes, or they searched Internet and databases (academic use). On the other hand a significant portion of patrons also used computers for shorter periods just to check their email or Facebook account (leisure). In addition, it was observed that the computers were old and slow, and that for example screens were blinking, which impeded their use. Also, one out of eight computers located in the quiet study room, was constantly out of order. Based on their own experience, students researchers indicated that this computer has not been in function for some time. Students also reported that the desks which accommodated computers were too small if student wanted to write something or to consult a book while using the computer (Photograph 2). On many occasions patrons sitting at the computer workstations were observed holding their reading material in lap.



Photograph 2. Computer workstation in quiet study room

It was also noted that the number of patrons using laptops in the quiet study area was very low despite the fact that in the quantitative study around 80% of respondents (both students and teachers) reported owning a private laptop. The evident reason behind the low use of patrons' laptops lies in the fact that in this library area there are only three power outlets which can be used by patrons and the library does not provide a wireless Internet connection. Student observers also noted that the desks nearest to these power outlets were favorite spot for patrons and have always been the first occupied. It is interesting to note here once again that the lack of power outlets and wireless connection were noted as major problems by respondents in the survey.

Social and leisure behavior

Apart from studying-related activites, patrons were also observed socializing, endulging in some kind of leisure activities or just resting (sitting alone, just watching). Student observers recorded that in the quiet study area patrons were frequently eating and drinking, using their telephones, listening to music on portable devices, and chatting with friends and colleagues (not related to academic work). Although consumation of food and beverages is not allowed in the library nor in this particular space, students observers explained that students at FHSSO do not have many options for such activities. The

student restaurant, located in the basement of the building, is relatively small and can accommodate cca 15 persons. There is also a cafeteria on the first floor of the building, which closes at 4 p.m., but it seems to be predominantly used by FHSSO staff (teachers, academics). So, the library and in particular the quiet study room is often the only place students often have if they do not want to have their snack in the hall. The quiet study room, on the other hand, provides them with certain level of privacy. Although quiet study room is not attended by librarians, as it has been previously mentioned, it is interesting to note that students who have their snack in this room are very careful and do not leave any trash or remnants of food when they leave. Also, in most cases they do not have any reading materials with them (beacuse they just came for a snack) so there is no potential harm to library books. That is probably the reason why librarians tolerate such behavior.

Since there are no designated longe areas withinh FHSSO library, or FHSSO building altogether, apart from the above mentioned student restaurant and a cafeteria, it does not come as a surprise that a number of students also used the quiet study room to meet with their friends and chat (on topics not directly related to their assignments or academic work). However, their conversations were in most cases very quiet so that they did not disturb other patrons who were working.

Discussion

While the survey indicated that the quiet study room at FHSSO is a preferred study space with the students, the ethnographic study has shown that this library space is indeed heavily used library space and that it supports different patron activites. While it is almost never used by FHSSO staff (academics and teachers) it is very popular with students, especially at peak periods from 11 a.m. to 1 p.m.

Quiet study room at FHSSO as a physical space, despite its many limitations, offers a unique environment to students' learning experience. Altough patrons use this library space for individual learning in most cases, significant amount of small group work has also been reported. Students also seem to use the quiet study area at FHSSO not only as a working environment but also as a social space. They chat and meet with their friends there, and also eat, drink and rest. The multitude of students' study engaging, social and leisure behaviors and activities in academic library was noted and described by Suarez in his ethnographic study at Brock University Library, Canada (2007).

Although not monitored by library staff, in most cases the patrons in this library space adhere to the quiet policy and respect each others' need for privacy and quiet learning environment. Patrons also seem to be very tolerant of a certain amount of noise in this learning environment. Interestingly, several studies have shown that students actually prefer some kind of ambient, background noise which appears to have a positive effect on their ability to concentrate and stay focused and that they seek out quiet but not silent areas for study purposes (O'Connor, 2005: 63; Webb, Schaller & Hunley, 2008: 420; Bryant, Matthews & Walton, 2009: 11; Bedwell & Banks, 2013: 11).

According to the students observers the average usage of this library space for study purposes could be facilitated and largely improved by the provision of adequate library furniture. In particular, they recommended the acquisition of bigger size tables. While it has been noted that unaffiliated patrons at the FHSSO quiet study room avoid sharing tables with other students, it seems that in general students prefer relatively large individual workspaces and that in the case they are provided with sufficient study surface areas that can accommodate their laptops, work material and supplies, they do not mind sharing it with other students (Gibbons & Foster, 2007: 28; Bedwell & Banks, 2013: 12).

In the survey, students expressed their opinion that the existing number and quality of library computers was not sufficient, and the observation study has confirmed that the library computers were widely used across all week days and times of day, and that there were always students wainting for them to be available. Also, the study has shown that the laptop usage is very low, and the reason being the lack of power outlets in this library space and inavailability of wireless Internet connection. Trends of ever increasing demand for library computers, powere outlets and wireless Internet connection for patrons' laptops have been noticed in a number of studies on library computer and laptop use conducted over last couple of years in a number of academic libraries (Briden & Marshall, 2012; Thompson, 2012; Johnson & Finlay, 2013).

The study has also shown, as well as some other library space and use studies which were conducted with the help of ethnographic methodology and student observers in particular (Bedwell & Banks, 2013; Johnson & Finlay, 2013) that the student-led participant observation can contribute significantly and uniquely to the library space redesign and planning and that ethnographic methodology can be successfully applied in the (academic) library setting to gain insight into the patrons' behaviors and uses of library spaces. Belonging to the culture under study and using the same spaces for their own academic work, student observers were able to gather rich data on natural behaviors of library patrons with minimal intrusion in their routine. Also, their own experiences helped them understand and explain the observed behaviors. The potential bias, which is often mentioned as a potential drawback of such studies, has been removed by the regular consultation of student observers with researchers and close cooperation of students, librarians and researcher in the analysis of data.

In combination with the quantitative results from the survey, the rich data obtained in the ethnographic study has helped librarians at FHSSO to understand in what ways the library patrons are using the existing library spaces and how well are their needs being met. In the end, they were given solid evidence and recommendations of what needs to be changed if the needs and demands of their patrons are to be better served.

Conclusion

Thanks to this study, FHSSO librarians did not have to rely only on their assumptions on patrons' study behavior and the use of the library space but were given solid evidence to base their decisions regarding the design of library space and resources. Based on the results of this study several explicit reccommendations have been made to FHSSO library in respect to its redesign and service improvements in order to better support student work behaviors. These studies served also as a powerful tool for the head librarian to convince the decision makers at FHSSO that urgent adaptation of library spaces through the modernization of library furniture and improvements of ICT services was needed. Since library head was from the start involved in the project these suggestions were directly used in the subsequent minor renovations of the library.

Shortly after analysing the survey and observation data, and making them available to the FHSSO decision-makers the first step was made and the number of library computers in the quiet study area was doubled. In April 2014 eight existing, outdated library computers were replaced by 16 brand new computers. Also, some of the existing tables have been replaced by a larger sized ones. The tables have also been slightly differently arranged in the room to allow for more efficient use of the available power outlets (Figure 2).

Figure 2. Library floorplan (May 2014)

It is expected that by the the beginning of the next semester the quiet study room will be furnitured with brand new tables of adequate size to provide sufficient space to accommodate library computers/laptops, reading materials, supplies etc. Also, librarians have started negotiating with IT staff the introduction of the wireless Internet connection, not only in the library but the whole FHSSO building.

Since FHSSO library will soon be embarking on a new library building project, in collaboration with teachers and students at LIS department, it has been arranged that the library space and use study will be continued and repeated at different times of academic year. It is hoped that it will be possible to arrange more observation hours and to focus in depth on some specific activities or phenomena observed in this study in different library spaces (patterns of computer technology use, the group work behavior etc.) and to arrange in-depth interviews with patrons. In this way, the questions regarding the nature of students educational experience, and especially their use of the learning spaces, that is desired in any renovation or construction project will be asked persistently and throughout the planning process (Bennett, 2007: 2).

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The convergence of performance and program assessment: a Multi-Dimensional Action Research Model for libraries

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Abstract

This paper uses findings of a previous study (Gordon, 2006) to determine whether a multi-dimension training model is a viable evaluation instrument for performance and program assessment of school librarians and school libraries. The model has three dimensions that operate concurrently. In the first dimension school librarians co-teach an inquiry unit with classroom teachers using Authentic Teaching and Guided Inquiry. In the second dimension the school librarians identify a problem in their instructional practice and conduct action research by collecting evidence to inform programmatic and instructional decision. In the third dimension the researcher provides support for the librarians through workshops and mentoring and conducts formal research to determine the viability of the multi-dimensional model as training program. Data and findings of the primary study are applied to the case of the school library where convergence of performance assessment of librarians and assessment of the school library program is a result of a strong focus on information literacy instruction. Programmatic components such as facility, collection, and staffing are seen as the infrastructure that supports instruction. The framework for the analysis is organizational learning theory. The analysis extracts criteria from the primary study to explore the multi-dimensional model as an evaluation instrument. The following criteria were met: 1) viability; 2) validity; 3) transformation of role perception; 4) organizational learning; 5) emergence of confidence and leadership; and sustainability.

Keywords: performance assessment, program assessment, library evaluation, school libraries, action research

Introduction

Interest in the assessment of library programs is increasing with heightened awareness of accountability. Influenced by professional library organizations and accreditation agencies, librarians aim to establish the value of the library and its contribution to institutional mission and goals (Oakleaf, 2010) rather than the value of the work of librarians. Cameron (1978) noted that there is no one criterion for the effectiveness of organizations and that organization effectiveness is difficult to assess, making program assessment problematic. There is a lack of a common assessment vocabulary across public, academic, school, and special libraries. As libraries transition to digital collections and e-learning their organizational goals and services are changing, making it difficult to reach consensus about what good library programs look like. Ratings such as "unsatisfactory" and numeric ratings generated by checklists, observations, benchmarks, and rubrics often lack inter-rater reliability and consensus about what these ratings mean. It is only in the last two decades that libraries have taken a systematic approach to program assessment that shifts the focus from inputs, such as collections, to user satisfaction (Hiller & Self, 2004). This shift suggests a connection between the value of a library program in terms of outputs and the performance of the librarian.

Performance appraisal is also problematic. A top-down, one-size-fits-all system ignores the importance of workplace context, the diverse skill sets required for specialized job functions, and the differences between novice and experienced staff. In addition, evaluators may not be as knowledgeable as the person who performs the job. An adversarial climate around performance assessment inhibits honest and healthy discourse and a culture of continuous improvement. An industrial model of assessment, with roots in Taylor's (1911) scientific management theory, focuses on efficiency because managers did not trust factory workers to meet production standards. Taylor combined time and motion studies with rational analysis and synthesis to discover the best way to perform a particular task and manage workflow. He linked compensation to output and introduced the concept of payment for piecework. In contrast, Drucker (1959), who defined "knowledge worker" as one who works primarily with information or who develops and uses knowledge in the workplace, sees the worker as a participant in a reflective process that leads to action and builds a shared, values-based organizational vision. Management by objectives (Drucker 1954; Odiorne, 1964) uses goals and

objectives determined by the worker, in consultation with institutional managers, to structure program and/or performance assessment. A variety of needs and goals rather than a single value (Drucker, 1954) drives the institution. In addition, strategic planning is a tool of participatory management generates "…the continuous process of making present entrepreneurial (risk-taking) decisions systematically and with the greatest knowledge of their futurity; and organizing systematically the efforts needed to carry out these decisions; and measuring the results of these decisions against expectations through organized, systematic feedback. (Drucker, 1974, p. 125)

Systematic feedback is essential to performance improvement. Strategic planning provides structure for generating evidence that becomes feedback when it is communicated and analyzed. Employees create mission statements that reflect institutional vision, set goals and objectives designed to fulfill the mission, allocate resources to the plan, execute the plan, collect evidence that demonstrates attainment of goals and objectives, monitor, analyze, and report on progress. Strategic planning is sensitive to the organization's environment and acknowledges accountability to the community served. It requires questioning the status quo in order to make changes to improve both program and performance and challenges librarians to self-evaluate as they work toward their goals.

The Logic Model also connects program and performance improvement. McCawley (1997) used program planning and evaluation inputs and outputs as indicators, with a focus on service outputs and the relationship between inputs to outputs. The model introduced "outcomes," such as changes in knowledge, skills, behaviors, policies, procedures, or environments. Such outcomes are intangible but they can indicate the impact of the library program in terms of the work of the librarian and the benefits to the library user, patron, or student.

This paper uses findings of from previous study (Gordon, 2006), which is referenced as the primary study, to determine whether the multi-dimensional training model developed from that study is also a viable evaluation instrument for performance and program assessment of school librarians and school library programs.

Literature Review

The school library is well-suited to integrating program and performance assessment because instruction performed by the librarian is the programmatic input and student achievement is the expected outcome that is the measure of instructional effectiveness. There is a large body of research that documents this connection. Gaver (1963) led the first impact study involving 271 schools in 13 states. She found that students in schools with centralized libraries managed by qualified librarians scored higher on standardized, norm-referenced tests than students without centralized libraries or qualified librarians. Subsequent research consistently shows there is a positive correlation between student achievement on standardized tests and school libraries (Scholastic, 2008). Students' higher test scores correlate with: 1) The size of the school library staff (Lance, et, al., 1999; Baumbach, 2002; Lance, et al., 2001; Lance, et al., 2000; Smith, 2001); 2) Full-time/certified school librarians (Lance, et al., 1999; Callison, 2004; Rodney, et al., 2003; Baxter and Smalley, 2003; Todd, et al., 2004; Lance, et, al., 2000); 3) The frequency of library-centered instruction (Lance, et al., 1999) and collaborative instruction between school librarians and teachers (Lance, et al., 2000; Lance, et al., 2005; Lance, et al, 2001); 4) Size or currency of library collections (Burgin and Bracy, 2003; Lance, et al., 2000; Smith, 2001); 5) Licensed databases through a school library network (Lance, 2002); 6) Flexible scheduling (Lance, et al., 2005; Lance, et al., 2003); and 7) School library spending (Lance, et al., 2001; Baxter and Smalley, 2003). These correlation studies use regression analysis to isolate the effect of variables such as socio-economic status. The Ohio study surveyed 13,123 students (Todd, et al., 2004) and reported that 99.4 percent believe school libraries help them become better learners. This study was replicated in Delaware with 5,733 students and 408 teachers (Todd, 2006) and in Australia (Hay, 2006) with 6,728 students and 525 teachers.

In addition, information literacy standards of the American Association of School Librarians (AASL, 2007) identify instruction as central to the functions of facility, collection, and staffing (Fig. 1). These standards connect information behavior and inquiry learning, conceptualizing information as the raw material for constructing knowledge. An information literate student can, "inquire, think critically, and gain knowledge [and] draw conclusions, make informed decisions, apply knowledge to new situations, and create new knowledge." (AASL, 2007)

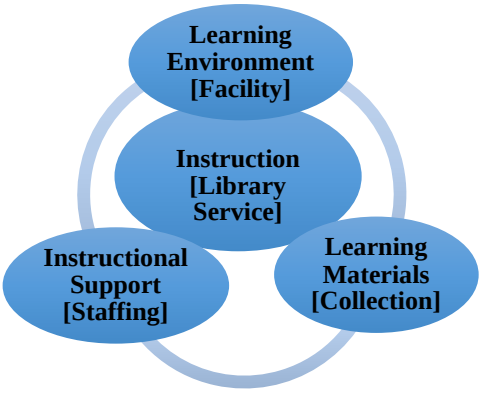

Figure 1: The Instruction-centric School Library Program

In American education the tendency to bring program and performance assessment together was legislated by *No*

Child Left Behind (2002) which measured student achievement by standardized, norm-referenced tests to determine the successful or unsuccessful performance of any given school. In addition, "The conception of good teaching has gradually shifted from a 'behaviorist' to a more 'constructivist' view, in line with emerging research, and many educators have developed their own personal views of what constitutes good practice." (Danielson and McGreal, 2000, p. 4)

In this paper organizational learning theory guides the analysis of the effects of a multi-dimensional action research model on school librarians. Argyris (1974) identifies three theories that explain human behavior in organizations.Theory-in-action (Argyris, 1957; 1962; 1964) identifies the mental maps that drive human behavior, including the way people plan, implement, and review their actions. Theory-in-use, or the tacit structures that govern behavior, is implicit in the actions of practitioners. Espoused theory is embedded in the words we use to convey what we do or what we would like others to do. Argyris and Schön (1978, 16) posit that each member of an organization constructs his representation of theory-in-use that governs behavior. People need to know their place in the organization and how to test their knowledge within it. The organization is an artifact of the individual's representation of it. Organizations are not static entities and organizing is a cognitive enterprise. Organizational maps provide a public representation of organizational theory-in-use to which individuals can refer. These are the shared descriptions of the organization individuals jointly construct and use to guide their own inquiry. Organizational theory-in-use, continually constructed through individual inquiry, is encoded in private images and in public maps. These are the media of organizational learning (Argyris and Schön, 1978, 16-17).

Argyris and Schön distinguish between two kinds of organizational learning: single-loop and double-loop learning. Single-loop learning occurs when "… members of the organization respond to changes in the internal and external environment of the organization by detecting errors which they then correct so as to maintain the central features of theory-in-use (1978, 18). Double-loop learning occurs in "… organizational inquiry which resolves incompatible organizational norms by setting new priorities and weightings of norms, or by restructuring the norms themselves together with associated strategies and assumptions." (Argyris and Schön, 1978, 18). Organizational learning empowers practitioners to grow professionally and effect organizational change.

Methodology

This paper uses the findings from the primary study (Gordon, 2006) of a multi-dimensional training model to explore its suitability as an evaluation instrument for school librarians. The setting for the development, piloting, and study of the training model is the fifth largest school district in its state, serving a growing middle class community with a student enrollment of 5,318. School attendance is high (95 percent) and the dropout rate is low (two percent). Three-fourths of students attend two- or four-year colleges. The percentage of special-education students is 17 percent. The ethnic breakdown is 99.2 percent white. In state standardized achievement tests, sixth- and tenth-grade students consistently outperform the state averages in all subject areas. The Director of Library, Media, and Technology supervises and evaluates building-based professional library and technology staff and district-level personnel. She leads the department in developing instructional goals, curriculum, and performance and program evaluation measures. Eight school librarians across elementary, middle, and high school libraries and a technology integrationist participated in the study. Each participant teamed with a classroom teacher to design, teach, and evaluate a curriculum-based inquiry unit in the school library. Figure 2 illustrates the model.

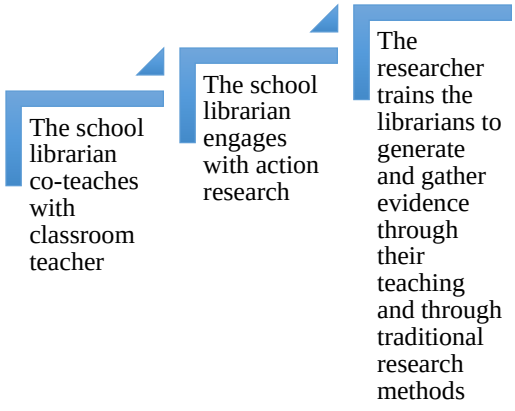

Figure 2: The Multi-dimensional Training Model for School Libraries

In the 1st dimension the school librarian teams with a classroom teachers to design, implement, and evaluate a unit of inquiry in the school library using Authentic Teaching (AT) and Guided Inquiry (GI). Both methods derive from constructivist learning theory that defines learning as a process of constructing meaning from information. They both engage learners in activities called formative assessments that generate evidence of student progress, or lack of it (Wiggins, 1990). Authentic Teaching, i.e., authentic assessment, sets a task rooted in an academic discipline as learners assume problem-solving roles and have opportunities to revise their work. At the same time, teachers/librarians revise their instruction to accommodate learners' needs based on the evidence generated from student work. The learner receives feedback at the point of need in addition to a summative assessment, known as a grade.

Guided Inquiry (GI) (Kuhlthau, Maniotes, and Caspari, 2007) uses the Information Search Process (ISP) (Kuhlthau, 1983), a staged model that identifies thoughts, feelings, and actions that people experience as they interact with information to build and use new knowledge. The ISP functions as a diagnostic tool to anticipate and remediate information processing problems in the six ISP stages. These stages provide the context for intervention and help. Kuhlthau's application of Kelly's (1963) theory of constructs to information searching is based on the premise that the ISP is a process of assimilation and construction.

*In the 2nd dimension the school librarians engage in action research. Each librarian identifies a topic that is problematic in their teaching, e.g., n*ote taking; higher-order thinking skills; use of a variety of sources; evaluation of websites; use of databases; and the connection between learning styles and computer use by teachers (Gordon, 2006). Action research is appropriate for improving practice because it is problem-focused, context specific, future oriented, and aims at improvement and involvement **(**Hart and Bond 1995). Anderson, Herr, and Nihlen (1994, 2) defined it as, "… insider research done by practitioners using their own site as the focus of their study … it is oriented to some action or cycle of actions that practitioners wish to take to address a particular situation." Fig. 3 shows the recursive nature of the cycle as it progresses from reflecting, planning, acting, and observing.

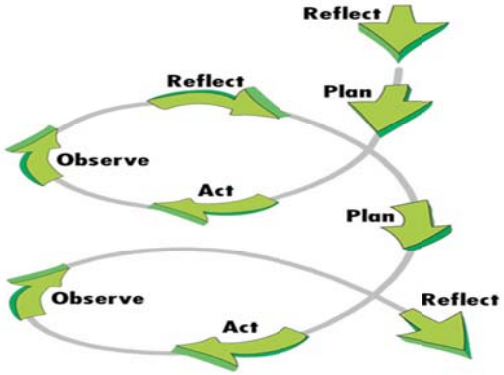

Figure 3: The Action Research Cycle

Action research is distinguished from formal research. The educators in the primary study used *qualitative and quantitative data collection methods including* surveys, interviews, focus groups, observation and journaling. Analysis performed by the teachers and librarians in the primary study included constant comparison, categorization, identification of patterns in the data, and descriptive statistics.

The design process for implementations of the multi-dimensional model is described in terms of interventionist strategy for organizational learning outlined by Argyris and Schön (1978, 220-1) in order to position the model as an interventionist strategy that can serve as an evaluative instrument for assessing and improving the performance of school librarians.

1. **Mapping the problem as workers see it.** Educators define an operational problem in their instructional practice.
2. **Internalizing of the map.** The researcher delivers workshops and ongoing support to help educators to develop a map, or plan that conforms to the multi-dimensional model, for which they took responsibility.
3. **Testing the model.** The primary study tested the multi-dimensional model to determine whether testable predictions can be derived from the map, i.e., the multi-dimensional model. If predictions were not accurate, they were revised.
4. **Inventing solutions.** Educators created solutions to learning problems using formative assessments (AT) and interventions (GI) at the learner's point of need.
5. **Producing the intervention.** The researcher trained the educators in action research as a reflective intervention to continuously improve their teaching.
6. **Studying the impact.** The researcher collected data from 221 email transactions, *five telephone conversations with the Director, interviews with the librarians during five on-site visits during their data collection and analysis, and from the content analysis of their journals and student work. She used the constant comparative method to analyze these data. Content analysis of the librarians' documentation of their teaching units and journals provide data for triangulation.* A debriefing session was held to verify findings and to process and plan the second year of formal research.

   The third dimension of the multi-dimensional model (Fig. 2) involves the researcher as mentor and trainer in the use of the teaching and action research strategies described above.

Findings and Discussion

Characteristics of the model that demonstrate its suitability as a performance and program assessment tool include the following characteristics that emerge from the data: viability; validity; relevance to evidence-based practice; relevance to organizational learning theory and change in role perception; collaborative organizational learning; emergence of confidence and leadership; and sustainability.

The viability of the multi-dimensional model

Action research provides a structure for organizational learning. In the district where the multi-dimensional model was developed and tested a decision was made to change the evaluation system for teachers as a result of the findings. A district-wide committee presented a draft after a year of study (2003–04) and the Superintendent's Administrative Council charged the Director of Library, Media, and Technology to develop systems and instruments for specialized library services. A sub-group of school librarians adapted the district template and applied what they learned from the multi-dimensional model to create a new evaluation for school librarians. The director saw the connection between the model and the four domains of the Danielson and McGreal (2000) assessment model: Planning and Preparation; the Library Environment; Instruction; and Professional Responsibilities. Each domain has specific measurable components to evaluate performance and it is expected that a school librarian's professional development goals reflect the elements of these evaluative criteria. This portfolio evaluation process involves self-evaluation, conferencing, and goal-setting, development of a three-year plan for growth, and the collection of evidence and artifacts. The school librarians seek professional development through professional reading, memberships, conferences, and action research. The director observed:

"I think there is a definite link to the action research project … The action research helped us to get at instruction at a deeper level and to articulate what was missing, i.e., real data-driven reflection and subsequent intervention and thus actualized improvement." (Personal communication, June 30, 2005).

It is evident that school librarians *can design organizational inquiries focused on problems in their practice that results in the improvement of their work.*

Validity and the multi-dimensional model

Action researchers seek to understand why something happens, rather than document the frequency of occurrences. An action research inquiry involves a small number of participants in a specific case. There is no need to establish external validity because findings are applied locally to the small population studied and not generalized to a larger population. Internal validity is also not relevant to action research, which does not claim to establish causality beyond the effect of a specific instructional method as it relates to a particular teaching event. Action research is not held to the same standards in its observational and descriptive studies. However, the researcher in the primary study added rigor through the school librarians' use of theory to anchor their studies. Training sessions provided support in choosing and designing data collection instruments such as structured interviews and surveys. *This mode of action research* deviates from McTaggart's view (1996, 248) that, "… action research is not a 'method' or a 'procedure' for research but a series of commitments to observe and problematize through practice a series of principles for conducting social enquiry."

The multi-dimensional model as a tool of evidence-based practice.

Findings indicate that the multi-dimensional model works as a tool of evidence-based practice to assess the instructional program and the performance of school librarians in their instructional role. "Evidence-based practice is where day-by-day professional work is directed toward demonstrating the tangible impact and outcomes of sound decision making and implementation of organizational goals and objectives." (Loertsher and Todd 2003, 7) In the primary study (Gordon, 2006) the multi-dimensional model actualizes evidence-based practice as a foundational paradigm that supports the convergence of program and performance. There were three ways in which librarians engaged in evidence-based practice: 1) They read the research, including theoretical foundations of education and information science so that their decisions were informed the literature; 2) They generated their own evidence through Authentic Teaching and Guided Inquiry, as well as through action research; 3) They found evidence of their reflective practices in student work through formative assessment activities as well as in the final products students created.

Organization learning and role perception.

The work of Argyris and Schön (1974) in organizational learning can be applied to changes in role perception as they relate to the multi-dimensional model. In the first dimension (AT and GI) librarians changed their mental maps, or theory-in action that guides their teaching behavior. The multi-dimensional model operationalized constructivist theory for librarians where participation is " … a learning experience all around." They conceptualized their teaching to include their own learning. Librarians also changed their theories-in-action in the second dimension through action research. A typical comment was, "It was scary at first, but definitely worth it." The librarians wanted to broaden their skills sets to include statistics, more knowledge of learning theory, and a wider repertoire of data collection and analytical skills.

Changing espoused theory was critical as the librarians found a new vocabulary to talk about their practice that indicates a change in their mental maps. The facility was re-imagined as a learning environment and laboratory for experimentation and risk-taking. They re-defined their teaching to include intervention for their students and mentoring for their teaching colleagues. Frequent opportunities for sharing learning experiences through

email and meetings helped librarians to talk about aspects of their teaching that were not shared in past teaching experiences.

The most dramatic change in role perception was in the change of librarians' theory-in-use, or teaching behaviors. Action research in the second dimension of the model bridged the gap between theory and practice, helping librarians to change their theories-in-use as learning and information theory informed their practice. In some instances theory supported the design of their data collection instruments, such as the Kuhlthau's ISP (1983), Bloom's revised taxonomy (Andersen, et al., 2001), Sternberg's learning styles (1998), Piaget's theory of cognitive development (Piaget and Inhelder. 1967), and Vygotsky's zone of proximal development (1978). A librarian noted the importance of theory in her research. "[It is] time consuming but an effort worth pursuing. Why? Because it reminds you of why you do what you do." The three-dimensional model also improved the quality of transactions between the librarians and students. Librarians enjoyed interacting with their students as they collected data: "[It was] great fun to be able to interview students and hear their side of things for a change. Observing students reach a different level of thinking through teacher's questions … and interviewing students." Librarians saw value in getting the big picture:

"It was valuable to see how students view research, to get a glimpse inside their heads. It is something we often don't get a chance to do. …While we often get the view of individual students, it is hard to know whether it reflects the majority viewpoint. I worked with one group of students over a period of a few days, getting to know them … knowing that many students really did learn evaluation skills and could incorporate this knowledge into other assignments. I saw the enthusiasm and excitement of the students for the project, and the students' honesty when they participated in the interview and questionnaire."

Collaborative organizational learning.

The action research dimension of the multi-dimensional model supported collaborative learning within the librarian-teacher teams.

"Action research is a form of collective self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice of their own social or educational practices, as well as their understanding of those practices and the situations in which the practices are carried out. . . . The approach is only action research when it is collaborative, though it is important to realise that action research of the group is achieved through the critically examined action of individual group members." (Kemmis and McTaggart 1988, 5–6)

Collaboration took place in the first dimension of the multi-dimensional model when school librarians and teachers designed and co-taught their Authentic Teaching and Guided Inquiry units. All the librarians realized why collaboration with teachers is critical and added professional development and mentoring to their mental maps. The librarians deepened their understanding of the importance of collaboration in reflective practice. All of the librarians were interested in collaboration to improve their teaching. When asked what she would do differently the next time, one responded, "I would also try to pick a teacher that let me collaborate with him/her in designing the assignment." Another agreed: "I would have liked to have been more involved with the teacher from the beginning of the unit. It is difficult to take a unit that 'belongs' to someone else and make it work the way I would like."

Another said, "I tried to get the teacher to work with me on: (1) note-taking method and information skills; (2) having the students spend more of their research time in the library itself where I can have a better handle on how they're doing."

Teachers' did not always see the librarians as equal partners. At times librarians had to struggle to teach information-literacy skills.

"The teacher jump-started the project last week so I am struggling to do what I can to get it to adapt I thought we were set to start this month, but she came back from vacation with all her materials in place, having walked off with my ideas. She has a tendency to plan projects without our involvement and we often have trouble supporting supporting the research. I had hoped to forestall this problem by approaching her first, but I guess she just doesn't get it."

Despite these challenges there was a strengthening of bonds between the librarians and collaborating teachers. The change in dynamics was precipitated by the unique expertise of the school librarians in designing and implementing action research. This earned the respect of teachers and the enthusiasm of their students. The three-dimensional model improved teachers' perceptions of the librarians as teachers and as experts in research. Teachers became curious and asked, "Why are only the librarians learning how to do this?"

The librarians struggled with their place as teachers in the implementation of the instructional unit. One librarian noted, "I'd love to rewrite her [the teacher's] unit—a writing style thing with me—but I don't dare offer." They saw their role as facilitating learning for students and implementation for teachers. The retention of old paradigms in terms of the instructional role of the librarians was an underlying factor in collaboration problems. The librarians distinguished between their teaching roles and those of the teacher, particularly with regard to grading

student work. A librarian noted that the action research "… caused me to think about the disconnection between the teacher's and my perception of the usefulness of technology in the writing process and some of the students' perceptions." Another librarian noted that the most difficult aspect of doing action research was, "… making sure the action research blended well with the teacher's objectives."

Another aspect of change in theory-of-use is the quality of transactions between librarians and their collaborating teachers. The librarians' expertise in the design of authentic learning tasks, assessments, and action research earned the respect of their co-teachers. When school librarians incorporated action research with their daily teaching on a daily basis and shared action research with their teaching partners, collaboration became professional development. A*ction research had a positive effect on the practice of school librarians who developed ownership and confidence in the collaboration process as well as the perception of themselves as leaders.* A different kind of collaboration emerged in the second dimension when school librarians became the mentors to teachers who were interested in learning how to do action research. The librarians said they would like to study collaboration with teachers in another action research project.

"How do we get teachers to involve us from the beginning of the planning process? Teachers often do not include us until after the unit is almost all planned. It would be beneficial if we could help plan more thought-provoking questions instead of just find-the-fact questions."

Another wrote, "Why are some teachers resistant to planning with librarian? Is this a realistic or impossible question to answer?"

Emergence of confidence and leadership.

Action research anchored the school library in the teaching and learning context of the school, enhancing its instructional role and breaking down barriers between classroom and library. It bolstered the confidence of the school librarians and transformed their perceptions of their role from a support to a leadership function. The librarian who was working toward her certification wrote,

"One of the most helpful things to me was that it forced me to really get into therole of school librarian. I have worked in the library for nine years but didn't have the same role … This project pushed me to see my role as a 'leader' and helped me to see that I will be making a difference in the world of students with whom I work. My students influenced me to find new and better ways to do things."

At the end of the action research librarians expressed more confident in their teaching roles, especially as teaching partners with classroom teachers. A librarian wrote, "I feel I have concrete data, and common discussion points to bring to the Freshman House teachers on how to improve students' performance. I think the social studies and science teachers can see how information skills affect their curricula, and that projects must be about taking initiative to collaborate. The reading teacher is working to improve skills we identified as weak and I would like to increase the degree of collaboration with [her]. She would like to enlist me as a compatriot in teaching skills of reading nonfiction."

The use of data supported a goal-oriented mind-set for the librarians, as well as a dependence on systematic feedback for decision-making.

School librarians gained ownership and confidence when they were able to make the leap from reflection generated by their action research to the action plan. There were many journal entries and comments like this one:

"Note taking—kids are on target—have lots of sources, but we need to consider revising our 'Trash or Treasure'

review—need to present on overhead—then give each student a researchable question and the paragraph on taking notes instead of completing it as a group exercise. All students would still have the same paragraph and question, but would be accountable for their own notes."

Action research was a powerful intervention that empowered the librarians with hard evidence for improvement of the instructional units, which increased their sense of ownership. The way librarians felt about the action research was a key indicator of their confidence levels and, in turn, their feelings about collaboration. One librarian explained the most rewarding aspect of her action research: "It raised my awareness and caused me to think differently about assumptions and making decisions." They were excited about their projects and research findings at the end of the action research project, which was evident when they presented at a state conference where they found their voices as leaders. They exhibited energy, enthusiasm, and confidence that was transformational. They had clarified their personal teaching theories, explored their sense of self and their role as teachers, and gained awareness of their students' perspectives and needs.

Sustainability.

The primary study indicates that school librarians are capable of designing an organization inquiry focused on problems in their practice. The librarians retained their skills during the second year when the study was replicated. The researcher's contact with the school librarians was the same as the previous year but findings were different. The total number of e-mails was twenty-one, or ten percent of the number of e-mail transactions in the previous year, The content of those e-mails consisted of completed proposals and data-collection materials that the school librarians created. There were no e-mails that echoed concerns of the previous year and no e-mails that

raised new concerns. Site visits and end-of-the-year debriefing session confirmed that the librarians had mastered their action research techniques and had successfully worked independently with little help.

In the third year of the project the school librarians became action research mentors for teachers with whom they had collaborated during the previous two years. In addition, they became mentors for teachers not involved in the study, expanding their sphere of influence in their schools. They were viewed district-wide as the experts in conducting action research. They were able to provide support to the teachers with very little assistance from the researcher. This stage of the project was prompted by teacher interest in learning more about what they were observing when collaborating with school librarians. The director commented, "Teachers who are well respected in the district are asking why they are not included in the action research project. When teachers like _____ express an interest the superintendent takes notice." In the fourth year of the project, the third year was successfully replicated. The three-dimensional model of action research became a train-the-trainer model that was self-sustaining.

Implications for Other Types of Libraries

If the purpose of assessment is the improvement of program and professional performance, the multi-dimensional model is well-suited to staff development and evaluation. It is individualized and can be used by a teacher at any developmental level. It assumes teachers are knowledgeable and gives them power to make decisions. It can be carried out collaboratively. It is an on-going process and for that reason can be more effective than a typical one-day in-service presentation. One of the more significant qualities of the model is that it puts teachers in the position of accepting more responsibility for their professional growth (Wood 1988, 16–17).

The data presented here establish that school librarians can go beyond single-loop learning which focuses on detecting errors and maintaining their theory-in-action (or mental maps) to engage in double-loop learning by setting new priorities and weightings of norms and changing theories-in-use (behaviors) and espoused theory (language). This requires training in the multi-dimensional model and a clear focus of the dominant goal of the library. It may not be instruction, as in the school library, but it is critical the benefits accrued by the library user are the measure of success. Once the focus is established, standards of best practice relevant to the focus flesh out the first dimension of the model from which assessment standards can be derived. In the case of the school library, research-based teaching practices were employed. A problem of practice, related to the focus in the first dimension, is identified and remediated through action research in the second dimension. Training and support are necessary and a formative, rather than summative approach give viability and therefore credibility to a hybrid training-assessment model.

The use of the multi-dimensional model as a training and evaluation instrument is facilitated by the use of MOB (i.e., setting goals and objective for program and performance), strategic planning (i.e., generating systematic feedback), and the Logic Model (i.e., focusing on outcomes assessment rather than input), all of which rest on the acknowledgement of the librarian as a knowledge worker who effects meaningful outcomes in library users through the use evidence to continuously improve program and performance. An interventionist strategy for developing the model can be adapted by any type of library to structure the use of feedback and the planning and implementation of change. Public, academic, and special libraries are still focused on programmatic assessment that marginalizes the role librarians play in organizational change and limits the benefits they can accrue from organizational learning. This is particularly true in the dynamic environment of today's libraries where digital technology has accelerated the rate of change and its impact on the end user. The assessment of outcomes bridges the gap between program and professional assessment in a way that is specific to the library user. Just as the digital age has introduced personalized learning to the individual learner, so organizational learning is specifically tailored to individualized assessment and professional growth in the workplace. In order for these mind-sets to evolve, professional organizations, accreditation agencies, and library educators and researchers need an agenda that focuses on assessing what matters. With this kind of support libraries can successfully re-define themselves in terms of informational, knowledge, and learning outcomes that are unique to the library paradigm of the provision of help through intervention.

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A reporting framework for search session evaluation

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Abstract

Mobile devices have become ubiquitous, admitting a range of new contexts for information access. Indeed, these devices are now becoming a significant means of conducting information seeking even where desktops and other large screen devices are available. This has required the development of new design patterns that cater for the advantages and disadvantages presented by these devices' sensors and smaller screens. In turn, understanding how these new features effect information seeking has required development of new evaluation frameworks. This paper presents one such framework, as well as describing our experience when developing and evaluating mobile search user interfaces.

Keywords: search user interface evaluation, reporting tools, mobile user search interface evaluation

Introduction

Mobile devices have become ubiquitous over the past number of years. Their high rate of adoption is predicted to grow as smartphones and tablets become more affordable[1]. These devices are characterised by their portability, startup speed, connectivity and range of sensors including GPS, cameras and motion sensors. These characteristics have admitted new information access features such as query-by speech/sound (e.g. Shazam and Siri) and query-by-image e.g. Google Goggles) (Hearst, M. A. (2011)). Their sensors have also facilitated new forms of information presentation that leverage the user's context to organise information (e.g. presentation of landmarks on a map) (Church, K. et al.(2010)). Connectivity has admitted a social search context where online communities can be used to answer an information need instead of accessing a search engine (Church, K. et al. (2012)). These developments have arrived quickly as developers rush to utilise new hardware features and gain commercial advantage. The pace and complexity of development has outstripped our ability to develop a deep understanding of how users are using these features to discover relevant information. This is especially true when we seek to understand complex search such as exploratory search.

Evaluation of mobile user search interfaces offers both opportunities and disadvantages. Native mobile applications can provide a view of all user interactions during a search session. In addition, users' context can be monitored. When examining users' actions 'in the wild' - outside of controlled lab conditions - this provides a valuable insight. Creating evaluation tasks and environments for mobile applications, especially when considering contexts such as location or social interactions, is especially difficult; data collection in these environments is also complicated. Recruiting participants also posses difficulties; expecting users to have their own device incurs costs and requires trust on their part in order to allow you deploy your software to their device, while providing a mobile device requires trust on the evaluators' part.

This paper describes our experience of evaluating mobile user search interfaces, particularly in support of exploratory search tasks. In pursuit of this goal, we developed an evaluation framework that models user interactions across two related dimensions, gain and process. Gain - the amount of useful information retrieved - is represented through a variation of Charnov's Marginal Gain Theorem (utilised by Pirolli and Card (1999) in Information Foraging Theory, while process - the steps taken to discover relevant information - is represented by a modified version of the process model described by Marchionini (1995). These views are animated and show the development of users' actions over time rather than presenting the final state achieved. This is especially important since a feature might impact a particular phase of a search session.

[1] http://www.gartner.com/newsroom/id/2610015

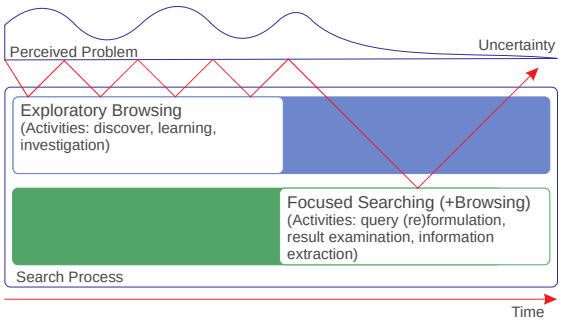


Figure 1: Exploratory Search Session Development (White, R. and Roth, R. (2008))

This paper continues by examining exploratory search and the effects of mobile contexts on search. In addition, approaches to evaluation that inspired this work are reviewed. The theoretic underpinning of the model is then introduced before describing how the model is implemented; this will include data collection from mobile devices, cleaning this data and preparing it for examination. The paper will conclude with a description of the evaluation interface.

Background

Mobile information seeking is becoming ubiquitous. Smartphones admit

- Search from new contexts - through location awareness and mobile communications, users can query on the move or from locations where search would previously have been unlikely. This admits a range of new contexts.
- Information seeking (or components of seeking) can be conducted in new ways, for example, through social interactions such as question answering or through new forms of query that accept input from the device's microphone or camera.
- New modes of presentation that take advantage of users' context make assimilation of information more intuitive. For example, being geographically aware, query results can be presented on a map.
- The always on, always connected nature of these devices allows a user to integrate information seeking into tasks and admits serendipitous curiosities.

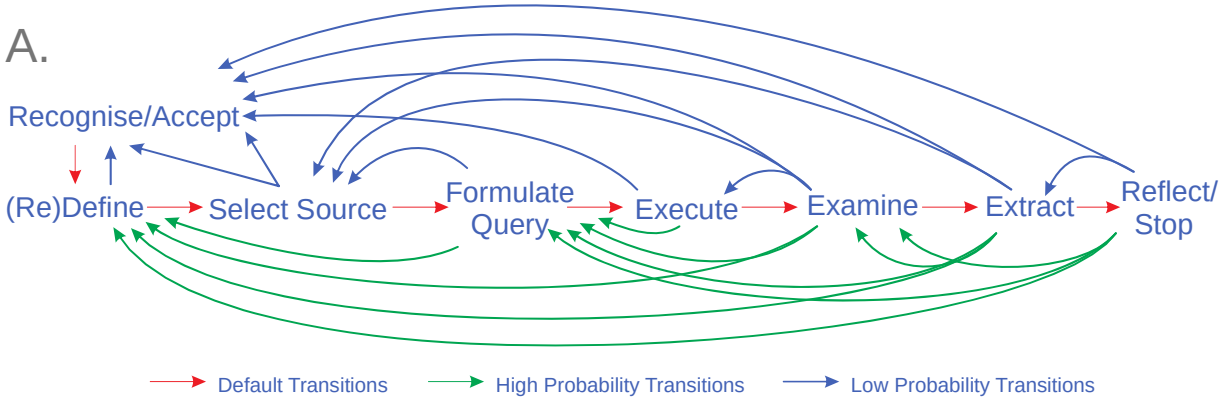
This non-exhaustive list indicates that a host of new forms of query are now in use in a range of contexts by users whose domain and system knowledge varies hugely. While these developments are to be expected, the role of mobile devices in static contexts such as home or office is, perhaps, surprising. These devices are used in static contexts, even when a desktop or laptop is available. The 'always on', low boot time, and 'to hand' nature of mobile devices mean that they are often the tool of choice when a serendipitous curiosity arises, for example, while watching television. Church et al. (2012) found that 29% of mobile searches captured in a user survey were conducted at home, while 24% took place at the work place; these findings have been reinforced by surveys conducted by the author.

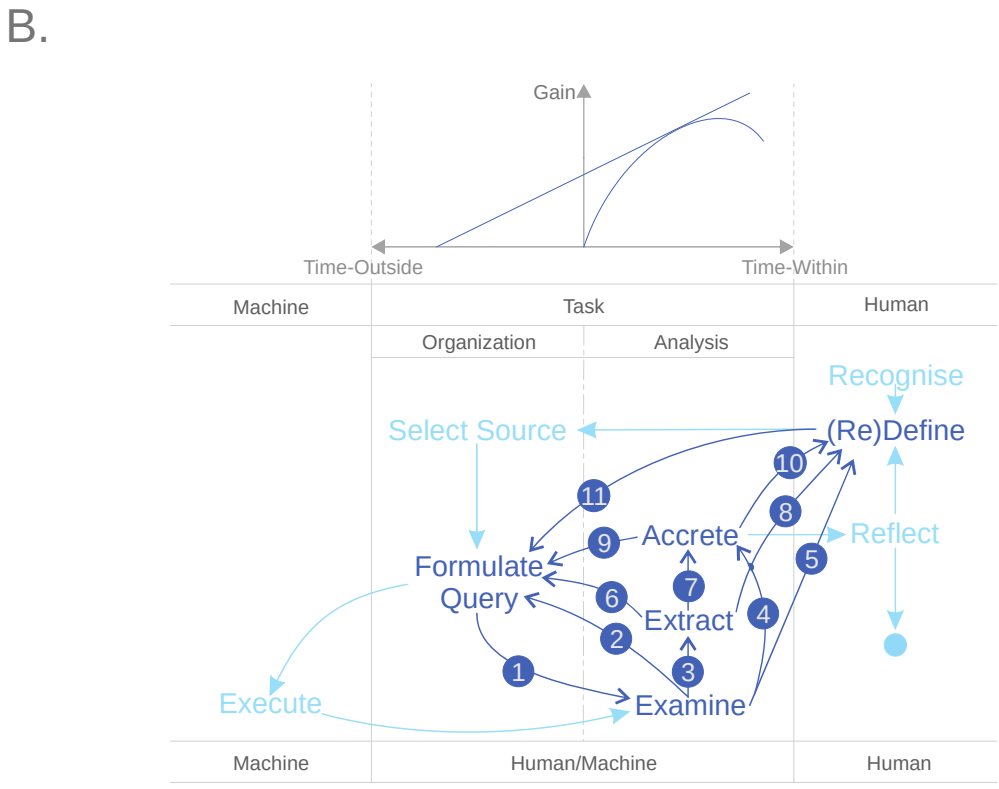
It is also surprising that these devices are used to conduct exploratory search. Exploratory search is characterised by the need to satisfy several information needs, synthesise them into a piece of knowledge that can be used in support of some greater task. Exploratory search is dynamic, and often characterised by an early exploratory phase where users learn about their task, knowledge space and information need. These discoveries often cause the information need to develop, and inform more focused queries that occur later (as shown in Figure 1, reproduced from White and Roth (2008)). A Nielson Report[2] indicated that many mobile searches are not standalone, but are associated with follow-up actions (including further search). This finding is reinforced by Church et al. (2012), who find that tasks that 'assist an activity or task' make up 60% of mobile search tasks captured in their survey. This type of activity is often not well supported by search user interfaces. Mobile search has assumed that a user is mobile while searching and not in a static context. This has, for example, manifested itself through the provision of answers built into search results and the inclusion of maps and other information; this is useful for those on the move, but often useless to those in a static context such as home. These findings indicate a need to support many forms of search on a mobile device, and not just search while mobile; deciding presentation modality based on device type is no longer sufficient. It also indicates the need to develop features and evaluate their impact through the search process.

Evaluation of exploratory search is considered difficult. Many variables impact user actions, and simulating tasks and information domains is complex (Kules, and Capra (2008)). Furthermore, interface and system components must be evaluated while bearing in mind that a component may only improve certain parts of a search session or for search in particular contexts, and may have no impact on others; for example, maps are useful when a user is in a mobile context but may be useless if a user is wholly unfamiliar with a location. It is therefore necessary to carefully construct realistic tasks over a range of contexts. It is also necessary to understand user's actions and relate these to information gain. These view needs to be maintained over the entire lifecycle of the search session.

Several systems have been developed to support exploratory search evaluation. Janson et al. (2006) developed the Wrapper system which was developed to collect user

[2] http://services.google.com/fh/files/misc/mobile-search-ppt.pdf





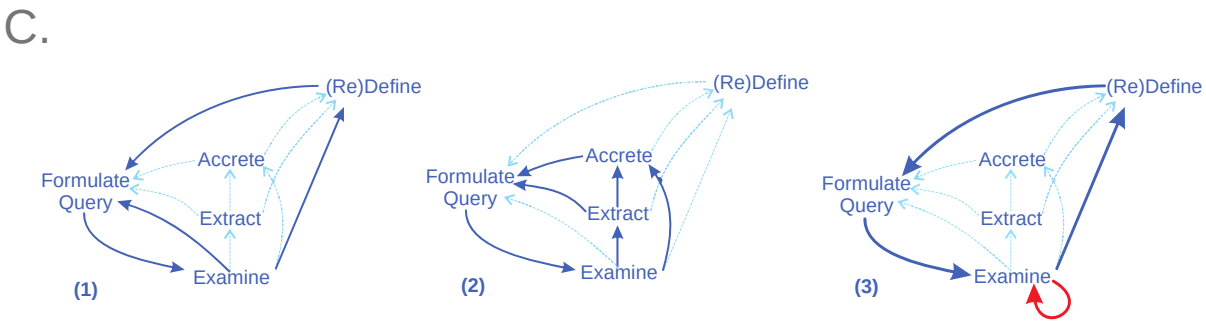


Figure 2: (A) Sequential Search Process Model (B) Combined Model (C) Sample Process Views

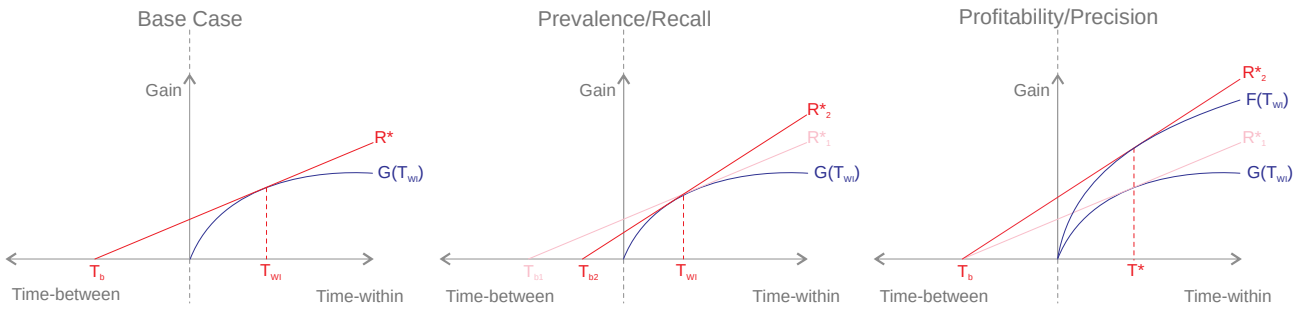


Figure 3. Charnov's Marginal Gain Theorem

interactions across multiple applications and computers and report these to a server where analysis could be conducted. Capra (2011) introduced the HCI Browser system, which provided a management interface for exploratory evaluation, presenting tasks to participants and logging their actions as they complete tasks on web browsers and also presents them with pre- and post-task questionnaires. A system with similar goals, called Search-Logger, was presented by Signer et al. (2011). This system managed deploying tasks to participants, collecting their responses and provided an analysis interface to examine results. Numerous models of exploratory and other types of search have been proposed; these have been examined elsewhere. Individually, they provide a relatively narrow view of a search session from a particular context; together they provide a detailed view of the same session from many perspectives. The power of combining models was demonstrated by Wilson et al. (2008) where two models were combined to provide a deeper view of a search process to identify the strengths and weaknesses of search user interfaces and quantify how well they support various user tactics and strategies.

Evaluation Model

The authors chose to combine two established, generic and expressive models to capture both gain and the process followed by participants while executing experimental tasks (shown in Figure 2, Part B). The models are a general seeking model - described by Marchionini (1995) (reproduced in Figure 2, Part A) and a component of Pirolli and Cards' (1999) Information Foraging Theory, called a Gain Model. Together they provide a view of the search process followed by experiment participants and relate this to their rate of successfully finding relevant information. The results can be viewed overtime to gain an insight into the search session's development and admit views of individual and aggregations of participants. The models can be adapted to highlight use of particular interface features. The combination of models also admits comparisons between results for users or for different versions of a user search interface.

This process model was arranged to convey contextual information about the states and to emphasise observable transitions between them. In addition, this arrangement helps to make the gain graph above the process model more meaningful by capturing 'organisational actions'; these are actions that locate and organise retrieved information, while 'analysis tasks' are actions concerned with information gain. The accrete state was an addition to the original model. Intended to capture note taking or other information collection activities - a common feature of our mobile applications - this state is an example of how the model can be easily modified to highlight feature types. Transitions are associated with particular sequences of interface actions taken by the user. For example, formulating a query, entering text into a search field, submitting a query, and presenting a series of SERPs would pass through the (re)define/formulate query and formulate query/examine transitions. The model reports on the percentage of each transition type made; this indicates how the search process evolved. A more complete explanation of transitions can be found elsewhere (Hoare and Sorensen, (2010)).

Part C of Figure 2 presents some typical search patterns displayed by participants. Typically, during the Exploratory Browsing phase (depicted in Figure 1), users were seen to conduct shallow, rapid searching, formulating queries, briefly examining results and either redefining their queries or formulating a new query. Once they have gained an insight into the task, domain and system, they begin to form targeted, exploratory queries. These produce patterns similar to the next process map, where results are examined, information is extracted and relevant information is recorded. This information is used in turn to redefine and evolve queries. The final part of that diagram demonstrates two other patterns that were observed during evaluations. The first, shown as a sequence of blue arrows demonstrated a tendency by some users to rapidly formulate new queries when the first few SERPs returned failed to satisfy their information need. The rate of redefinition was high, often with terms being added in an unplanned way and with little recourse to information retrieved up to that point. Another

ineffective strategy was observed where users paged through results without modifying their query; convinced that their query was correct, these users believed that the system was at fault for not satisfying their query. The ability to observe these patterns admits the possibility of allowing the search system to intervene and recommend other queries or strategies to the user; this remains as future work.

The gain model is derived from a component of Pirolli and Cards' (1999) Information Foraging Theory. Foraging Theory attempts to explain information seeking behaviour in humans by comparing it to food foraging mechanisms in nature. Here patches of food are analogous to patches of relevant information in an information space. Some patches are more nutritious than others, while others cost more effort to locate and harvest for information. A patch can be exhausted, resulting in no new information being located; this is the point when a seeker should move to another patch. Optimal foraging occurs when the seeker stays in a patch just long enough to consume its nutritious content, before moving to another patch to continue foraging. Charnov's Marginal Gain Theorem is used to describe the state of foraging in a particular patch. Gain is represented by the area beneath the curve in Figure 3, Part A, while the cost of harvesting that information is the time expended both within patches and seeking those patches. Thus, the rate of gain achieved is equal to the slope of tangent R* (Figure 3, Part A). Two types of enrichment can occur, prevalence and profitability. Prevalence can be increased by decreasing the time spent seeking relevant information. This is analogous to creating queries with high recall - a desirable state when conducting the initial Exploratory Browsing phase of exploratory search. Profitability occurs when patches with high nutritional value are browsed; this increases the rate of gain. This is analogous to high precision queries, preferred for the focused search phase of exploratory search. Thus, it is desirable to see a process where initial sequences provide high prevalence and admit queries that provide high profitability. Gain is represented in our visualisation as graph depicting recall over time and precision over time. Other metrics are being investigated.

Implementing the Model

We will now examine how this evaluation framework was implemented. The resulting system was composed of five functional areas:

- Experiment Setup, Deployment and Management - this component admitted marshaling of metadata about application versions and participants into a database that informs the user segmentation component of the reporting interface.
- Deployment Function - in all cases this functionality was managed by Apple's Developer portal and is concerned with deploying features and applications under evaluation to participant's mobile devices.
- Collection of User Metrics - this component is catered for by Google Analytics for iOS Native Application Tracking which collects user interactions with the app under evaluation.
- Data Cleaning - takes sequences of events form the Google Analytic's repository and translates these into evaluation metrics that can be visualised on the reporting interface.
- Reporting Interface - this component consists of a user interface that allows an evaluator to segment cleaned results and visualise these through the gain and process models; the models are represented over time, producing an animated representation of both actions and their effects over an entire search session.

We will now examine each of these stages in greater detail.

The first element of the framework is experiment management (step numbered 1 in figure 4). Experiments that evaluate mobile search interface features must be carefully managed; software versions, participants and contexts are recorded to provide metadata to the reporting interface to allow fine grained user segmentation. It is particularly important to manage software versions and ensure that the correct version is deployed to participants' phones. The interface components developed by the authors have targeted Apple's mobile devices, the iPhone and iPad. Code is developed in Apple's XCode development environment, and applications are deployed through creating an ad-hoc provisioning profile that allows an application to be run on a specific set of devices. This profile and an application deployment bundle can be sent to an experiment participant with instructions on how to deploy these files to their phone through Apple's iTune's programme (step 2, figure 4). In addition to recording metadata and managing software deployment, the framework requires experimenters to develop an interface model that maps sequences of interface component use to transitions in the evaluation framework; for example, forming a query using a search box could look like:

textentry:box1::buttonpressed:button1

This would translate to a transition of type 1 - 'formulate query to examine' (see figure 2). These labels need to be associated with the interface components during the development process. This is achieved using Google Analytic's iOS Native Application Tracking development kit.

Google Analytics provides a large set of tools for understanding user interactions with mobile applications. This includes the ability to capture user interactions with the interface. Method calls are added to event handlers for interface components. These include information identifying the component, the action carried out and

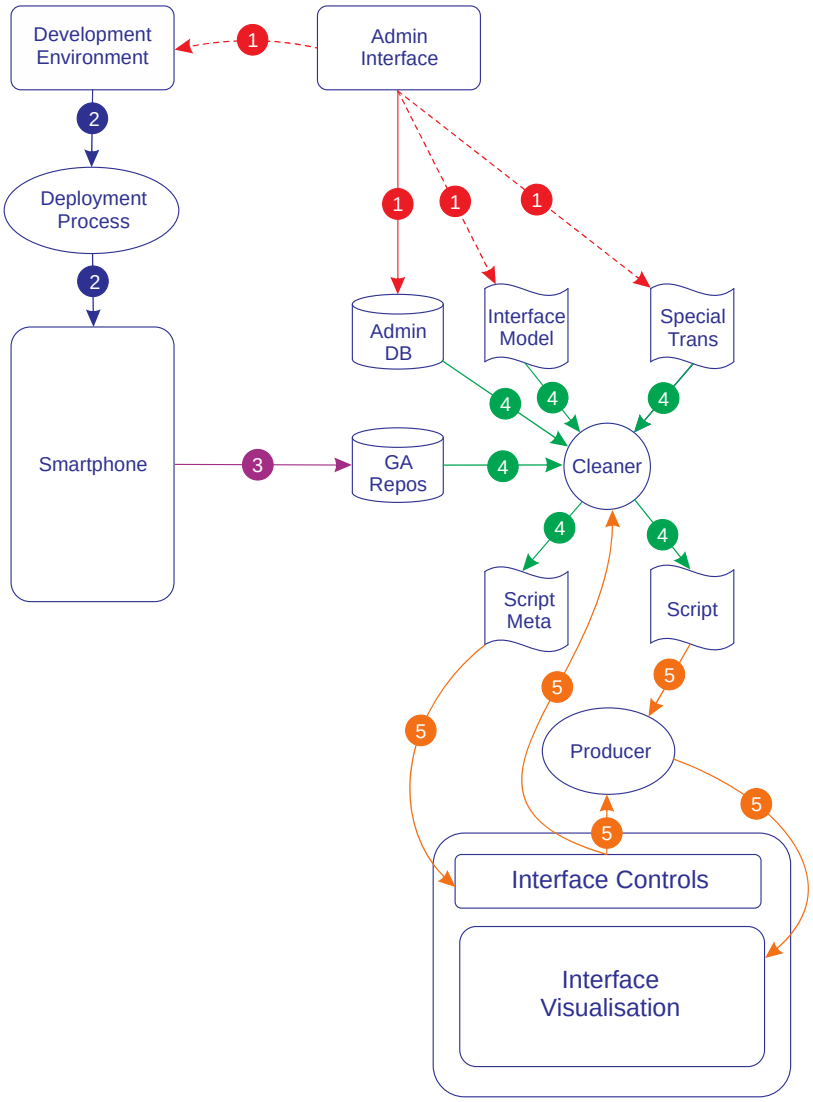


Figure 4: Evaluation Framework Architecture

information, including a participant's unique identity and other metadata, about the interaction. These events are written to Google's collection servers, which can subsequently be accessed from our server through a programatic reporting interface (number 3 in figure 4), Having queried events for an experimental run (using metadata from the experiment management component and user segmentation parameters from the reporting interface), the system must then translate these into a form that can be presented on the reporting interface (number 4 in figure 4). This is done by the 'cleaner' component which takes the interface model defined in step 1, and creates a parsing tree which generates a script of transitions that are displayed in the process model. Average Recall and precision measurements are also calculated at regular time intervals for the user segments defined in the reporting interface.

The final element (step 5 of Figure 4) of the framework presents the evaluation model. The producer component consumes the script and meta-data files to produce timed events that are presented on both process and gain models on the interface. The producer is controlled by the playback controls on the interface, controlling speed and other playback features. The interface also provides a control to select experiment runs and fine-grained user segmentation.

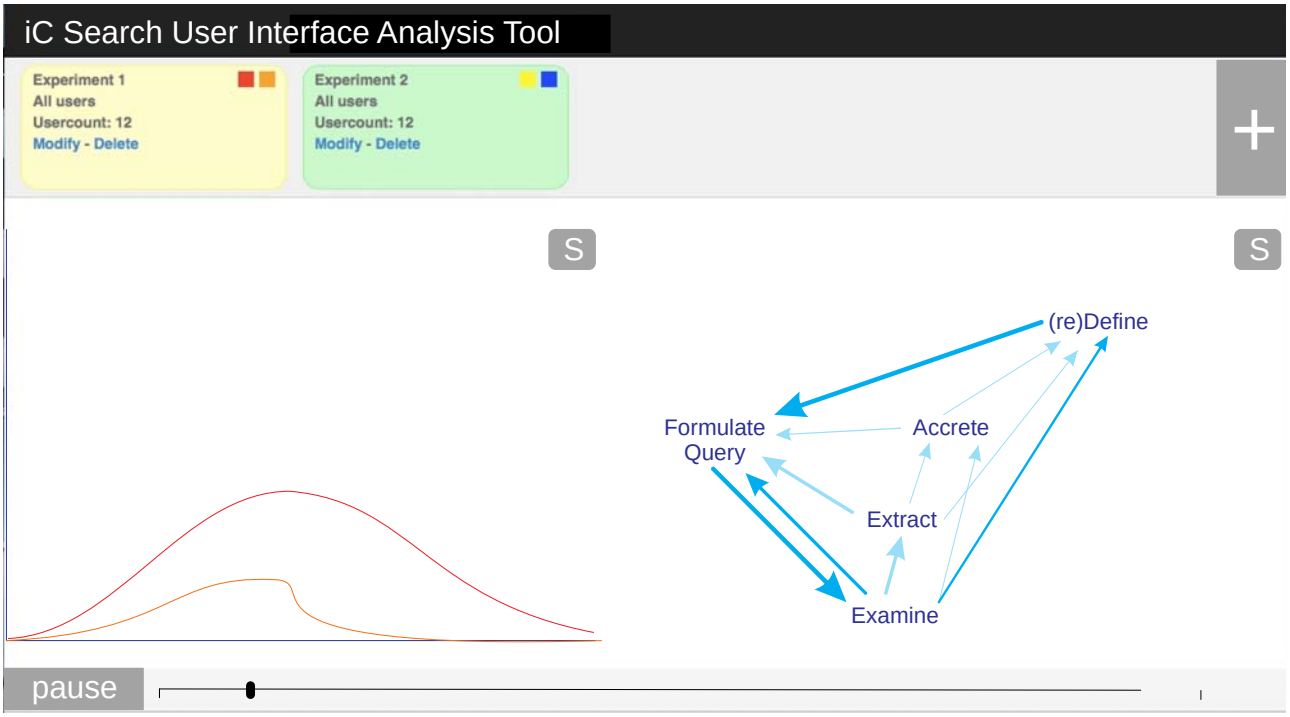


Figure 5. Framework Interface

This control produced parameters for the 'cleaner' component. We will now examine the interface itself in greater detail.

Reporting Interface

The reporting interface is composed of three functional parts; a data segmentation feature, a visualisation of the model and interface controls. The interface itself is written in Javascript and HTML/CSS and runs in a web browser, connecting to a server that hosts the producer component that generates script events. The data segmentation component allows users to be segmented according to various rules. Data for individual participants, or whole participant sets for an experiment can be sampled. These can be further divided by imposing rules on the set. For example, individual participants can be filtered by id or by their recall and precision scores. Participants can be chosen from the set meeting these criteria. Similarly, aggregations of participants can be created by imposing similar rules; for example, the interface can generate a report for all participants with a recall score less than some value. Two data segments can be reported on at any time, allowing comparison between the two.

The reporting interface displays the process and gain model described earlier. This visualisation is animated, showing the development search sessions for one or two data segments over time. Each transition in the model is colour coded to indicate the frequency with which it is transited; these can also be clicked on to reveal a popup that provides more detailed statistics for that transition. Two metrics can be shown on the gain model at any one time - for example, precision and recall. The playback controls allow the animated report to be paused and admit adjustments to playback speeds. Snapshots of the model can also be taken for further investigation later.

Conclusions

This paper has presented the development of an evaluation framework for mobile exploratory search interfaces. The framework presents the development of a search session over time through the lens of two models representing gain and process. Potential insights provided by this combination were presented. The insights provided by this visualisation admit improvements to the search interface. An implementation of this model was also presented. Implementation of a framework to support data collection and cleaning in support of the model was also presented, as was the interface used to partition experiment data and present results to evaluators.

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Curriculum Vitae

Cathal Hoare is a PhD student in Computer Science at University College Cork. He graduated with a BSc in Computer Science from UCC in 1998, after which he worked as a software engineer at Motorola and Comnitel Technologies. On returning to UCC he began to work on applying the benefits of the sensors available on an smartphone to improve search user interfaces by creating query-by-image query interfaces. He has been published widely in the areas of user interface evaluation and search interface design. He has also worked with local companies to conduct early stage research on new products through a variety of Enterprise Ireland grants.

Humphrey Sorensen is a Senior Lecturer in Computer Science at University College Cork, where he has worked since 1983. He was educated at University College Cork (B.E., M.Sc.) and at the State University of New York at Stony Brook (M.S.). He has also worked at the University of Southern Maine and at Colby College. He teaches in the area of database and information systems. His research has largely been in the area of information retrieval, filtering and visualization, where he has collaborated with industrial partners on several funded projects. Latterly, he has researched and published in the areas of multi-agent approaches to complex information tasks, and in the broader fields of artificial life (AL) and multi-agent systems (MAS). He has supervised several M.Sc., PhD and Post-doctoral researchers within these areas.

Where is the library, or is it an archive? Assessing the impact and implications of archaeological information collections

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Abstract

Preliminary observations made during the analysis of an interview study of Swedish professionals working with the management of archaeological information are discussed. The paper proposes that three perspectives called library, archive and museum characterise the articulations of informants on what archaeological information is, what is its relevance and impact and how it should be managed and made accessible.

Keywords: digital libraries, digital archives, concepts, impact, archaeology

Introduction

While nations have made considerable investments in creating technologies, infrastructures and standards for digitisation, preservation and dissemination of archaeological heritage, there is relatively little in-depth research on the impact and implications of the efforts.

We know a lot about technical and practical challenges in the different phases of producing and using archaeological information, but significantly less on how the practices, technical, theoretical and administrative, decisions affect and influence the use and reuse of information.

Literature review

The complexities of the management and use of archaeological documentation and information have been acknowledged for a long time (Reilly and Rahtz, 1992). The introduction of computers in archaeological work has facilitated the processing of information, integration of isolated datasets in to massive data infrastructures. At the same time, new documentation instruments have enabled archaeologists to capture more precise data than before. The necessity of developing new strategies for addressing the use and management of archaeological and other cultural heritage data in the fast digitalising contexts of information use of the stakeholders the information has been underlined in the recent literature (Huvila 2009; Arnold & Geser, 2009).

There is a broad consensus on principled importance of preserving archaeology, but the recurring emphases of the need to improve archival practices (e.g. Richards 2002; Degraeve 2012) and a large number of national and international initiatives for addressing the preservation of archaeological information including the Archaeology Data Service (ADS) in UK, DANS/EDNA in the Netherlands, IANUS in Germany and large European projects including ARENA, ARENA2 and ARIADNE.

In contrast to the relatively large corpus of literature on institution specific case studies and technical issues of preservation, there is less literature on the production and use and potential use of archaeological information. Both ADS and IANUS have conducted analyses of their stakeholders (Beagrie & Houghton, 2013; Schäfer et al., 2014), but there is very little research on the information practices of the other stakeholders of archaeological information than archaeologists (e.g., Huvila, 2007, 2009).

Theoretical framework

The theoretical framework of the study is based on the ecological approach to information work studies (Huvila, 2008) and Pickering's (2008) theorising on the relation of material entities and human practices.

Research questions

The aim of the short paper is to discuss preliminary observations made during the analysis of an interview study of Swedish professionals working with the management of archaeological information. The main question discussed in the presentation is assess how the conceptualisations and practices of managing analogue and digital collections of archaeological information, and those of the nature of the archaeological information itself, influence their outcomes. What difference does it make if a professional is working with a 'digital archive' of geographic information, 'library' of grey literature, or a 'collection' of physical information (i.e. artefacts). How it might change the provided information service, and the work and activity of its users.

Methods

The empirical material consists of sixteen qualitative interviews of Swedish archaeology professionals with special interest in issues pertaining to the archiving and preservation of archaeology. The design and conducting of the interviews was based on the semi-structured thematic interview approach of Hirsjärvi and Hurme (1995). All

interviews were conducted by the author, taped and transcribed by a professional transcriber. The interviews lasted in average 60 minutes. The empirical approach has some obvious limitations. Even if the author has done his best to avoid taking researcher degrees of freedom, additional studies are needed to confirm the exploratory results of this study.

Results

The findings show how the interviewees conceptualise their work and its constituents, and how the various corpora of archaeological information they are working with relate to the notions, purported functionalities and definitions of digital libraries, archives, museums and information infrastructures.

The central finding of the study is that the perspective of an archaeological information repository as a 'library', 'archive', 'museum' or another type of repository is closely dependent on the work roles of individual actors and their organisational contexts. Among the 16 informants, 5 articulated *museum*, 9 *archive* and 9 *library*-oriented perspectives.

Administrators have a strongest tendency to conceptualise archaeological information repositories as *archives* of archaeological records whereas researchers who work on data intensive archaeological research, had a tendency to conceptualise the repositories as digital *libraries*. A *museum* perspective was the most prominent for informants who worked with the management of archaeological finds. The perspectives were not specific to individuals, but seemed to represent different perspectives to the use of archaeological information in different work related situations. An individual informant could conceptualise repositories from more than one perspective.

The analysis shows further that the ways how informants conceptualised and practiced their work and its constituents relate to how they see its potential impact and context of relevance. The conceptualisation of the repositories and the information infrastructure as a whole were not as directly related to the institutional affiliation of the informants than to how they worked and had worked with the information as a part of their daily pursuits and their work role, either explicitly acknowledged or implicitly assumed one. Archive and administration oriented daily work tended to relate to an emphasis of the documentation of administrative procedures. Archaeological contractors had the most complex rapport with the repositories. Partly, they were in favour of a processual perspective of information repositories as an archive to which they feed certain obligatory records as a token of their completed projects. At the same time, however, they acknowledged the potential usefulness of archaeological information *libraries* they could use to support their information seeking. *Museum* oriented informants did see the relevance and impact of archaeological information in somewhat different terms as an ingredient to something that would reside outside of the administrative-scholarly practices of contract archaeology.

Discussion

The orientation of the perspectives to the archaeological information and its relevance can be explained from the perspective of the informants' work roles and the *mangle* (the dance of agency, see Pickering, 1995) of the information, its material containers (i.e. documents) and the stakeholders. It seems that, in contrast to direct institutional affiliations (the articulation of library, museum or archive perspectives did not seem to depend on the current or former employers of the informants), the assumed work role (i.e. the given and assumed idea of the purpose and aims of one's own work) could be a strong determining factor that explains the articulations (as e.g. in Huvila, 2007). At the same time, another factor that seems to relate to the preferred perspective is the material form of archaeological information the individual informant primarily works with. Precisely here, it is possible to see echoes of the Pickeringian mangle of practice, the dance of agency between human-beings and the material objects that participate in a shared process of becoming.

The relevance of these observations to the evaluation of archaeological information infrastructures is that it seems possible to argue that notions of archive, library and museum (understood here in colloquial and non-specific metaphorical concepts) can be used as broad categories of understanding how the different stakeholders value the contributions, services and offerings of repositories. In contrast to the somewhat prevalent archives oriented discussion of the preservation of archaeological information, museums oriented discussion of the need to make archaeological information accessible (often with direct references to very different types of information) and mixed library and archives oriented wants and needs of the potential users of this information, these perspectives could be brought together to improve the repositories, their services and their use by assuming a holistic view of the mangle of the practices of using and producing them.

Conclusions

The practical conceptualisations of information and information systems are related to their usability and usefulness in different contexts. Even if the contents and functionality of a digital or analogue repository would be the same, the propensity to see it as an 'archive' or a 'library' has a major potential impact on its perceived usefulness, usability and key functions.

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Curriculum Vitae

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Assessing the relative value of domain knowledge for civil society's libraries: the role of core collections

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Abstract

Core collections were once at the heart of assessment of a public library's ability to meet users' needs. The commitment to valuable public knowledge has receded over time based upon postmodern readings of what this concept might mean and a move toward a user-centred paradigm within LIS. Working within a knowledge organisation framework that problematises how users' definitions of value are assessed, this paper looks to how core collections can still have relevance within a framework of knowledge that has become increasingly context-laden and contingently based. The question of how value across domains is conceptualised and implemented is investigated with an aim to contribute to a hermeneutically-grounded method of selection that can aid users in finding the best materials to support self-guided learning.

This research aims to explicate why certain domains should be prioritised for civil society settings; what range and depth should be invoked in the process of selection and evaluation and what is the nature of subjective choice in delineating a balance between a core collection and the broader non-fiction collection. The research is grounded in hermeneutical phenomenology and a desire to see librarianship as, primarily, a human science, or at least a philosophically-informed humanistic endeavour. It looks to Betti's objectivist approach to interpretation of *Geisteswissenschaften* as a guide to understanding how library and information science balances one of its core assessment tasks: defining subject priority. This research outlines why scientific subjects should be apportioned a sublimated priority in civil society collections, but also that primarily the defining aspect of civil society collections is how they deal with the need to balance science, humanistic knowledge and the practical, technical and applied topicality that users require. The research reveals that the unravelling of these meta-categories is not as straightforward as might be supposed.

Keywords: collection evaluation; public library collections; subject coverage; core collections

Introduction

The question of what are appropriate domains for a core non-fiction collection to meet the needs of users within a civil society setting has, to date, not received significant attention from researchers, despite being among the foundational questions associated with librarianship. The normative nature of collections designed for unlimited growth, along with a warehousing model of information provision, ensured that such questions were more appropriate to issues of reference than with a circulating collection.

With a change in the reference paradigm associated with digital resources, and with the increasing need to justify selection decisions with reference to resource constraints, it has become increasingly necessary to ask how can civil society's libraries meet the needs of users for valuable knowledge and what types of knowledge needs to be given the highest priority? Moving beyond simple demand-oriented criteria into questions of axiology we should ask how librarians can create a framework for selection that is robust enough to answer the questions of civil society's users and how they might tread a path between the necessary subjectivity enabling them to meet local needs and disciplinary knowledge (the corpus of which is often characterised as immutable or objective).

The hermeneutic grounding of the problem

Gadamer explains how in Aristotle's formulation of "prohairesis," the "formation of right convictions and...making right decisions" a distinction emerges between the scientific kind–"the mode of being known that depends on having proofs" and a moral version that is answerability or a type of respectful listening that is "participation in the superiority of a knowledge that is recognised to be authoritative...(and) allowing one's own convictions to be codetermined by another" (1999, p. 153). Gadamer posits Aristotle as a salve to a prevailing world picture influenced by neo-Kantianism and its "epistemological methodologism" where questions of "what rationality really is, as it operates in the clarity of the

practical life of humanity" (151) and in its expression as *distinguished* and *fundamental* knowledge, as "the theoretical rationality of science" (152) prevail. The balm, according to Gadamer, is Aristotle's "other kind of knowledge" that "life itself is concerned with," the dianoetic virtues: *techne, episteme, phronesis, nous* and *sophia*; all "modes of knowing-being or securing the true."

Where this interpolates with collection theory is in how this kind of knowledge is proactive. Unlike "forms of knowing that are mere acceptance or viewpoint or opinion [and hence] cannot really be called knowing, because they admit error" this virtuous knowledge is sublime. Strictly speaking, where collection development fits the acquiescence criteria, it can be considered, at best, undeveloped. Gadamer highlights these dianoetic forms of knowing as reliable in contradistinction to mistaken or concealed knowledge.

Gadamer outlines how hermeneutic insight helps to enable differentiation of philosophical text and literary artwork so as to avoid doxographic dogmatism. He does this with reference to Plato's "parts of the soul," a doctrine that demonstrates "the unity of the soul in the plurality of its members and likewise the unity of the polis, where well-being of the soul as well as that of the city depends on the harmony of voices" (ibid 154). Aristotle, according to Gadamer, creates an image of the human soul that "exists as one and presents itself as the one which it is in terms of its various possibilities" (ibid). These are interconnected, *phronesis* (practical wisdom) with *ethos* (character), as "aspects of the same basic constitution of humanity" (ibid 155). With our (relatively) free choice we are left differentiating ethical and dianoetic virtues, and as Aristotle presaged, differentiating "knowledge involved in the *phronesis* that guides practice from the other forms of knowing where...theoretical knowledge or cognitively dominated production and manual skill are involved" (ibid).

In his search for interpretative guidelines, or canons, that reveal "the hermeneutic autonomy of the object" (Betti, 1980, 58) Betti looks to the notion that meaning (or sense) "should not be inferred but extracted" (Berzano 2012,80).

> Meaning-full forms have to be regarded as autonomous, and have to be understood in accordance with their own logic of development, their intended connections, and their necessity, coherence and conclusiveness; they should be judged in relation to the standards immanent in the original intention. (Betti, ibid)

The "coherence of meaning (principle of totality)" (ibid, p. 59), allows for clarity to be "achieved by reference either to the unity arising out of the ensemble of individual parts or to the meaning which each part acquires in respect of the whole". This leads to an interdependence of signification and coherence, which in

> a comprehensive totality can, in an objective reference, be conceived of as a cultural system which the work to be interpreted belongs to, inasmuch as it forms a link in the chain of existing continuities of meaning between works with a related meaning-content and expressive impulse. (ibid, p. 60)

Bleicher (1980, p. 27) highlights how Betti considers the problematic relationship between perceiving mind and object through a process of "interpretation of meaning-full forms" (ibid, p. 28) to get to the difficult reality of objectivity and thereby "understanding in general" (ibid). Within the setting of LIS there is a need to adjust the hermeneutic process that closely links author and interpreter according to Benediktsson (1989, p. 212), who also points to how the "objective of an interpretative process is to arrive at contextual information, as opposed to atomized information" and the neglect of contextuality, which is a significant error.

The meaning-inferring activity involved in this process is somewhat different to interpretation per se, it requires according to Betti, working within a framework of respect for the values of other people and doing justice to "the living community of minds" (ibid, p .71). It is eschatological but is not, for Betti, "beyond historical time". According to this view, "history can never provide the framework around which eschatological events can crystallize; these events occur, in fact, within existence, which cannot be determined by reference to history alone" (ibid). Perrin's (1974) pared-back hermeneutic method, looks to Dilthey and Bultmann and works within the notion that "die Kunstlehre des Verstehens schriftlich fixierter Lebensiusserungen (the art of understanding expressions of life fixed in writing)" is really a search for a general understanding of life; what remains may be a sign of finality or a symbol of experience, however so, the limits and means by which intensionality are exhausted beyond historical hermeneutic understanding lead to interpreting this as "a conscious concern for relevance to and impact upon the interpreter and the interpreter's life" (ibid, p.5).

The non-historical meaning-inference, that may express itself as a religious–or some other "continuing and specific encounter" (ibid, p. 72)–is not, and here Betti looks to Bultmann's consideration of this, inconsistent with "the quest for knowledge in the study of history". What might result is a situation in which "knowledge of history and self-knowledge would correspond to one another". They do this apparently through recognition of the nexus between human historicality and "responsibility towards the future" (ibid).

Betti asks us to toy with the idea that historicality is more than just the human interpretative capacity, it is "opportunity" and it links with self-knowledge and awareness of responsibility as qualities that enable the

inference of meaning to take place. Betti (ibid, p. 73) cites Bultmann:

> In this kind of understanding the traditional opposition between the understanding subject and the object understood vanishes. Only as a participant and as...an historical Being can the historian understand history. In such understanding of history, man understands himself. Human nature cannot be grasped through introspection; instead, what man is can only be seen in history which reveals the possibilities of human existence through the wealth of historical creations. (1958, p. 139)

Betti is, however, just toying with such ideas to better refute them. They negate objectivity in such a way that shifts meaning to suppose that "the hermeneutical process of historical interpretation" corresponds with "situationally determined meaning-inference" (Betti, ibid). This would, in Betti's view, mistake "a condition for the possibility with the object of that process" and lead to the removal of the "canon of the hermeneutical autonomy of the object...from the work of the historian". The self-satisficing nature of such an approach, which tempts through exegetical use of texts which only confirm already held opinions, needs to be balanced by a radical disclosure that allows that there may be, *that there is*, something within the text that "we could not know by ourselves and which exists independently of our meaning-inference" (ibid). The subjectivist position confounds interpretation and meaning-inference, and while eschatologically there are similarities, its "putting into doubt the objectivity of the result of interpretative procedures in all the human sciences" requires a demarcation of where objectivity might lie and how we "evidence...the epistemological conditions of its possibility" (ibid).

Placing the knowledge organisation task within a civil society context

Public (or civil society) libraries have changed in many parts of the world to such an extent that the mission to provide mutual support to afford expensive reading materials is much diminished. What remains is a cultural relevance that is characterised by a strongly civic and educational veneer. Working within this context, it is suggested that it is these characteristics which best represent the role that our public libraries now play. The only private libraries of consequence that remain are academic libraries and the collections in these are of little relevance, and of little temptation, to the vast majority of library users. It is for this reason that conceptualising civil society libraries, not for their public character nor for their openness to all, these are well-accepted facts, but for their civic and educational purpose creates a foundation to build collections that better fit the changed milieu. It is contended that the perceived need to meet demands for topicality, based upon either the model of the right of public access or the perception that all domain knowledge has an equal standing, is in need of revision.

If we place the civil society setting of the public library within a combined context of meanings (Roginsky & Shortall, 2009) which ranges from informal networks, through the so-called "third sphere" of non-state and non-market activity and to a notion of a self-regulating universe, we are better placed to unravel the more legitimate questions that we are called upon to answer. While investigation of the civil society context of the public library have been made by scholars such as Kranich (2003), these do not look to elicit what kinds of domain knowledge fits a sector that has interests outside of those of the state, the academy and the market but is reflective of broadly democratic and shared moral values? This conceptual research aims to provide preliminary findings to the questions of what among the numerous topical possibilities that might be represented in a civil society library, is indispensable, and why?

Scientific knowledge in civil society libraries

Both Saračević (1975) and Hjørland and Albrechtsen (1995) point to how the subject view of relevance plays a significant part in how we structure the lifeworld, in the communication of knowledge and in scientific method. Within the context of the civil society library scientific knowledge straddles a chasm between complexity and necessity. Complexity prohibits detailed treatment of any particular subject while, intrinsically for civic and educational purposes, some representation is needed.

When looking at how to conceptualise the collection that handles scientific knowledge the recompense offered for an adumbration of the depth of subject coverage is that this domain should always be accorded the *first priority* in any consideration of a core collection. While it is not necessary to outline in detail the benefits that accrue from scientific methodology and the philosophy of science, it will suffice to point to how scientific knowledge has an important collateral role: "scientific disciplines can be regarded as social devices [facilitating]...the analysis and reduction of raw information to assimilated knowledge" (Garvey and Griffith, 1972, p.123).

Contextualising the realm of non-scientific knowledge

Creating concepts that fit into an elementary structuring of knowledge is fraught with difficulty. Smiraglia and Van den Heuvel (2013, p. 61) outline how, despite this, the "validation of an elementary theory of knowledge interaction" should be attempted. Shifting focus to interaction, rather than organisation, allows us to see "how the nature and behavior of knowledge unities...formulate an alternative to a universal classificatory order, in order to create (temporary) interfaces that allow for interactions of knowledge" (ibid, p. 373).

For the purposes of civil society libraries it is proposed that a more appropriate approach to non-scientific knowledge can be outlined than the current diffuse system

that is based on either classificatory or use-based criteria. In line with Smiraglia and Van den Heuvel's direction to seek interaction as a useful guiding principle in how knowledge structures might be better conceived, a format that divides all non-scientific knowledge into either *humanitas* or *techne* is explained.

Humanitas as a concept allows the capture of a broader range of materials, subject areas and ideas than what we would ordinarily include in the concept of humanities. Tubbs (2014) points to how the concept broadly encompasses a recognition of a desire for self-knowledge– it focuses more on the *en*culturing of the human being (*bildung*) and encompasses an applied literary, historical and philosophical inquiry in a way that humanities, with its encyclopaedic Aristotelian/Scholastic tendency is less oriented toward: *humanitas* might best be seen as a more ontologically-grounded expression of the humanities. Tubbs orients us to the break between the concepts as the separation of philosophy from the broader humanistic canon and how philosophy was able to fit in with the Scholastic pedagogic traditions of the *lectura* and the *disputatio*. The result was that "separated from philosophy, the humanities failed to retain their own philosophical unity and gradually fell apart into individual subject specialisms" (ibid, p. 491).

Techne is one of Aristotle's dionetic virtues and may be rendered as productive knowledge or art. The concept can be utilised as a means to marshal disparate subject knowledge into a taxonomy that allows semantic ordering to take place with reference to the structure of knowledge (in line with Smiraglia and Van den Heuvel's approach). It can do this in a way that is appropriate to a non-expert user cohort with potentially an unlimited range of topical information needs (as might reasonably be expected of a civil society library setting).

Utilising *techne,* in this sense, is not without precedent. Roochnik (1986) speaks of two kinds of *techne* as evidenced in Plato. Both productive and theoretical knowledge can be forms of *techne*. It is outlined in the current research as separate to scientific knowledge and *humanitas,* and as exemplifying a different modality. That modality is purposive action, and it is from this that we may take the central concern of the original concept and then apply it to a large set of classes of subject knowledge. Within this framework all that is not scientific knowledge, and that is not *humanitas,* is *techne*. To use a blunt example, Engineering uses Mathematics and Physics to create the *ergon* (work) of its *technai* (crafts), and would not be included in our definition of scientific knowledge. The concept expands upon the notion of applied science and extends to all classes of knowledge that rest upon some measure of value, outside of epistemic claims to truth or measures of civic or moral virtue. The latter should not be narrowly construed as it encompasses, *inter alia,* a broad range of topicality through history, philosophy and literary exegesis. The concept of virtue acts on our subject topicality in the same way that moral philosophy implies both cognitive and ethical impetus. The issues arising are axiological in nature and contemplate both aesthetic and ethical (normative) considerations of value.

Prioritising Humanitas as the core collection for civil society libraries

It is argued here that *humanitas* deserves to be placed at the centre of a civil society collection primarily because it is universal in its applicability to human Being and that it is relevant to the lifeworld of the individual just as it is to the society in which they live. This leads to the claim that as the most universally relevant subject knowledge, the subject knowledge that constitutes *humanitas,* should be accorded more significant treatment than *techne.* Within the circulating context of a civil society library this would mean that these materials are retained and replaced with greater certainty than items within the *techne* class. Similarly, greater semantic justification for their place in the collection would be needed. These works while not necessarily canonical, serve a similar purpose to a canon. While we may think of the works themselves as important, and in some cases they may be, they fit these axiological criteria only in so far as they represent the domain, topicality or subject that they sustain.

While *humanitas* is prioritised it must fit within a more catholic definition of materials selection that demands that all domain and topical representation is subsumed within the principle of subject range and depth, such that, the broadest horizon of topicality is of the most value to users. If implemented (and potentially it is already the undefined *status quo*), this principle would likely result in a collection that sees *techn*e as the largest domain grouping represented. The implications for how *humanitas* might be treated are in the numbers of works for a subject area (the relevant topical range) and in the depth of treatment–both being provided for *ad abundantiam.*

The importance of *humanitas* subject knowledge, and the axiological nature of the topicality, demands that multiple treatments of similar subjects are integral to assessment of the comprehensiveness of a collection in ways that both scientific knowledge (with its limited comprehensibility to this type of user) and *techne* (with its limited relevance to any particular user) cannot claim. The somewhat arbitrary line between the *Geistesswissenschaften* and non-scientifically oriented humanistic knowledge (and the relative ease of linguisticality as the medium of communication) would seem to demand that a precautionary principle to err on the side of complexity is implemented when dealing with *humanitas* materials selection.

Core collections as remedies for bibliographic uncertainty

Unifying the approach to subject

When our notion of subject is itself problematical, when we debate "aboutness" so that it fits "one perfectly precise description" (Wilson, 1968, p. 71) rather than a multiplicity, and when we are unable to comprehend topicality that extends beyond simplistic precision, we are faced with the dilemma of dealing adequately with *the subject* when its essence is hardly straightforward but is, often, so broadly abstracted that neither theme nor thesis (as Wilson terms it after Monroe Beardsley) can reasonably be recognisable in a classificatory sense.

Wilson explores *indirect reference* as a somewhat bibliographical or subject-oriented equivalent to these notions and asks whether counting of concepts (in his focus it is identifying the subjects of writing) might equally be extensible into identifying the topicality of collections. While quantitative methods to define subject, or topicality, require the addition of an indirect focus on interpretation to be worthwhile (Wilson, ibid, p. 85), in order to move beyond a new ad hoc that we might resort to grouping–the always already familiar and natural–requires

> our ingenuity in finding ways of assembling groups, on our stock of available notions, on our ability to unify a writing [or a collection] by discovering or inventing a concept which all or much of the writing can be taken as exemplifying in one way or another. (ibid)

To achieve manageability, Wilson invokes Cutter's notion of comprehensiveness as it pertains to generalisation of subject treatment. The difficulty of this is not lost on Wilson, he notes that "our notions of what is required for completeness are both exceedingly vague and subject to radical change" (ibid, p. 86).

Looking to Barzun and Graff (1957) for inspiration, Wilson identifies the interpretive quality invoked when identifying subjects as "an appeal to unity" which manifests as "rules of selection and rejection". Just as writers are faced with the task of seeking completeness, indispensability and necessity, such criteria also constitute the conditions within which the essential subject is crafted. In searching for the essence of subject in writing, facticity and ideation emerge, not from a dominant theme, but from that by which "the presence of the rest can be explained"–it is *that which provides the reason for the ancillary matters to be described* which glues together the concept of a particular subject (Wilson, ibid, p. 87).

Hjørland (2013) outlines how knowledge organisation (KO), which collection development planning interfaces with, requires an ontological commitment to uncovering the meaningful relations that emerge from concepts (ibid, p.1). The givenness of what we define as subjects and as classifications cannot be assumed, they emerge from the scholarly enterprise itself. This is associated with a pragmatic appreciation of the fallibilistic nature of knowledge which accepts it is both "tentative" and "provisional" (ibid, p. 2). It is connected, according to Hjørland, with the tendency for the degree of consensus within science to be overstated by those looking on from outside. Where consensus does not exist there will need to be a "decision based on an evaluation and negotiation of the different positions" which also will necessitate moving beyond a neutral position and favouring some positions over others (ibid).

Hjørland highlights a point of difference between his and Feinberg's (2008) approaches to classification. While *finding and describing* is advanced by Feinberg, Hjørland is more of the view–using Feinberg's terminology–that *defining and building* is what domain classification entails (ibid, p. 3). Criteria recognition, when classifying or selecting materials, needs to allow for a set of parameters that are more than private criteria but are "derived from theories which tend to be publicly shared as 'paradigms' " (ibid).

Hjørland points to how knowledge organisation systems need to be "based on and related to current scientific theory" and that "no short cut via user studies, common sense or anything else" can be considered. Domains are not amenable to classification based solely upon theories of knowledge (e.g. a sociology of knowledge), according to Hjørland, *the domain is the foundation for its own classification* (and perhaps, its priority within a regime of collecting). Epistemology offers, according to Hjørland, the royal road to teach the relationship between information science and domain knowledge with many similar problems arising in the various array of domains studied.

> A general lesson from epistemology is that knowledge is created by humans for some specific purposes and serves some interests better than others. Concepts and semantic relations are not a priori or neutral, but should be examined in relation to their implications for the users they are meant to serve. (ibid, p. 16)

While knowledge organisation is substantially about classifying and indexing, it is also about applying these practices in order to achieve a result–as occurs in the development of a collection. While the tasks of classification and indexing, need to appreciate the operable paradigms within the domains in which they are working, theories of knowledge also apply (ibid, p. 9). It seems fair to advance the view that, howsoever domain paradigms and theories of knowledge apply to classification and indexing, they apply in more profound ways when developing and evaluating subject materials. Hjørland points to how "epistemologies are fundamental theories of KO" and also how these have developed somewhat separately to the user-centred and cognitively-oriented theories that have become influential in information behaviour research. The reason is the fundamental document orientation of the KO task set (ibid, p. 9)

> The tendency to ask users is...a kind of positivism in which the empirical studies of users are considered better

> research than the scholarly studies of knowledge domains. The belief that cumulation of empirical data about users may in itself turn out to be useful for classification is...a problematic assumption related to empiricism. The user-based tradition thus represents one among other examples of how empiricism as a theory of knowledge has influenced KO. (ibid)

Wilson highlights how, in the context of descriptive and exploitative bibliographic control, what matters more than subject is, in an instrumental sense, utility. The treatment of utility's associated concept, need, in bibliographic control, is a political factor and it can be established objectively through recourse to a more neutral language that is accommodating of "causes, capacities and consequences" (ibid, p. 153). This is though, effectively, "admitting a political claim or demand for the amelioration of a situation...[for example that the] bibliographical instruments available to the one were fewer than those available to the other" (ibid). While the political questions of equality of subject access are straightforward, if not easily reconciled, Wilson points to how the real difficulty arises with "questions of adequacy that are neither purely hypothetical or conditional, or purely questions of the degree of felt satisfaction" (ibid, p. 154) and it is these issues of knowledge organisation that press on us when trying to articulate a program for valuable public knowledge. Tuominen (ibid, p. 353) describes how when our language (or by extension our collection) mirrors power relations we are left with a lack of real chance to see "other ways of being" (ibid). This intersects with the notion of simple use-demand metrics versus value-based selection methodologies: the former orient with institutionally-defined subject representations, the latter with, ideally, notions of improvement and alternative explication of existing objects of study.

Wilson's argument that all determinations of adequacy relating to bibliographic policy are inevitably political is somewhat obfuscatory. Wilson concedes that at the higher degrees of bibliographical control (ibid, p.115) the mastery of a body of texts bestows a felicitous ability to advise. This mastery, while constitutive of breadth and depth of learning, requires a mediatory quality to be deployed as well (ibid, pp. 115-117). In *Two Kinds of Power*, Wilson's conclusion that knowledge and its relationships and relative prioritisation is primarily political in character has an unintended consequence of imparting to knowledge organised in collections a subjective idealist character which is reductive.

Contextualising subjectivity in subject selection

Buckland (1995) was among the first to highlight the importance of value-based privileging in an era of digital availability. Demand-based decisions regarding local collections, while ever the flip side of value decisions, are according to this partitioning, ever more likely to be taken up, or absorbed, into the digital realm of networked resources. Buckland points to how collection development has a significant advisory role beyond this.

> The array of materials on the shelves can itself alert the reader to what is available, just as any bibliography or catalogue can. Certainly the array on the shelves is a selective, incomplete guide. It is limited to what has been added to that collection and, within that, is biased towards the less-popular material that happens to be on the shelves at any particular time. Nonetheless, a library collection plays an advisory role like that of a selective bibliography, drawing attention to material that has been identified as worth adding to the collection. Browsing books has some attraction over browsing in bibliographies or among catalog records. It is largely for this advisory role that the materials are arranged by a subject classification scheme. (ibid, p. 155-156)

Working within the discourse analysis approach to LIS outlined by Frohmann (1994), Tuominen (1997) outlines a method that looks to uncovering how the identity of the user, as constructed by the library apparatus, creates a base line reference for how discourse, power and science as social practice develop. Tuominen's analysis is particularly useful in helping to explain how the representationalism inherent in scientific practice involves "the separation of the subject's inner world from external reality... [it acts as] a necessary prerequisite for the formation of objective knowledge" (ibid 352). At heart, this separation involves the conscious attempt to remain neutral and conceptualising facts as domiciled outside of language and thought in a space that is universally discoverable (ibid). What undermines such a view is a basic approach to epistemology and ontology that denies their separation: "the objects of knowledge cannot be separate from the accounts given of them, and...our understanding cannot be separated from the sociolinguistic practices through which it is achieved" (ibid).

Hjørland's (2013) domain-analytic view of classification also reinforces the view that subject knowledge is crucial. Only through understanding competing paradigms and approaches and making choices about value can

> a classification [be] a subjective choice or negotiation between different views. The difference between a good and a bad classification is that the good classification reveals deep insight concerning the possible choices and dilemmas and is well argued (and has considered counterarguments, including potential counterarguments). (ibid, p. 14)

Understanding the importance of subject–and subjective–representation in a collection involves coming to terms with how the use of language both enables and constrains the meaning, or sense-making, which we crave; it is also not separable from the social practices that are locatable within the power relationships that constitute a society and its library. The relationship of the *scientific life-form* to the

"generation and improvement of power mechanisms and resources" (Tuominen, ibid, p. 353) is not uncomplicated; the lack of clarity that, arguably, characterises how this is understood can be located in "a certain historically developed way of representing the object of the study...considered to be self-evident [by the scholar], and thus without any reasonable alternatives" (ibid).

By treating the important topicality that resides within *humanitas* in sufficient range and depth such problems have the chance to be sufficiently contextualised, leading to a measure of resolution, resistance or re-evaluation. Core collections for civil society should look to challenging the evidentiary bases of knowledge claims. While they may not be equipped to fulfill this aim in specific scholarly treatments, they can do so through selection practices in the advisory capacity that Buckland (ibid) has outlined. When our civil society collections simply mirror the extant power relations or the naturalised subjectivity of the communities in which we live we are left with a lack of a real chance to see "other ways of being" (Tuominen (ibid, p. 353). This intersects with how use-demand metrics and value-based selection methodologies operate: the former orient with institutionally-defined subject representations, the latter with, ideally, notions of improvement and alternative explication of existing objects of study.

Conclusion

Public libraries operate within a specific civil society context that molds the way that domain knowledge is represented. Various influences militate to expand and contract the range of subjects covered and the depth of their treatment. While the local civic culture that prefigures the collection is important, this should not be overstated. What has been suggested here is that greater focus should be placed on how core collections have a relevance beyond local particularities. The concept becomes valuable when it is interpreted by librarians with reference to broader priorities about knowledge. Defining scientific knowledge, *humanitas* and *techne* as guiding principles allows for incorporating subjective choice in ways that encourage eclecticism to thrive while also allowing relevance to retain its status as an important guiding principle.

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Curriculum Vitae

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Using qualitative methods in measuring work efficiency of library services

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Abstract

Current presentation aims to clarify what kind of qualitative methods have been used in assessing the work efficiency of libraries through library history and how the new cost accounting models, such as activity-based costing (ABC) and time-driven activity-based costing (TDABC) are researched and adapted by university libraries, focusing on the methods used for measuring work time allocation.

The data used in this paper are based on reviewing and summarizing of relevant studies which were conducted in libraries inspired by the ideas of modern theoretical considerations and treatments relating to cost accounting and costing, originally developed for industry and private sector organizations. Cost accounting as well as time and motion studies related with scientific management ideas of libraries throughout history have been closely related to the identification of performance – effectiveness, efficiency and productivity – or in other words, how efficient is the employees' use of their work time. Efficiency equals results divided by costs, in other words, the efficiency of employees means how much good quality work is being done in as short time as possible.Traditional cost accounting research as well as new cost accounting researches such as activity-based costing and time-driven activity-based costing in libraries have almost always combined both qualitative and quantitative methods, like analysis of statistical data (e.g. collecting all types of accounting data about the costs that occur in the production of library services), documents (e.g. job descriptions), time sheets and time diaries, observations, interviews or questionnaires.

Keywords: cost accounting, timing, activity-based costing, time-driven activity-based costing, work efficiency

Introduction

Since the industrial revolution (1750-1870), when handwork began to be replaced by machine work, the problem of finding the most economical way of doing a task has occupied men's minds (Battles 1943).

Libraries are considered structures, which are slow in integrating in the new economic environment – the implementation of the methods of library performance evaluation and benchmarking in the management processes of the library and in forming strategies is taking place gradually. Basing one's management practices on the evaluation of effectiveness, capabilities and contribution, and measuring the usage of resources requires efforts, willingness and understanding. For a long time the management of libraries did not pay attention to such areas of librarianship as the development of the effective management of book collections, classification, cataloguing, and the like. This inattention was not important; the small size of collections, staff, buildings, and clienteles made for simplicity of operation and demanded not very sophisticated approach to the ways of doing things (Coney, 1952, p. 83).

By the end of the 19th century, libraries had become service-providing institutions, whose task was to collect, store, preserve and make available books for users. Simultaneously, libraries developed a need to justify their budget and costs to their parent organizations, was it university (in the case of university libraries) or local government (in the case of public libraries).

Library managers at the end of nineteenth century were ready to start to apply the ideas of scientific management and cost accounting.

The development of scientific management required also the development of comparable methods for accounting and reporting, so that the actual status of progress and costs could be monitored. Among the tools of performance management, accounting is the oldest, dating back to at least the Renaissance. As modern performance management grew, however, it was apparent that adequate control required far more detailed cost data than existing budgetary accounting provided. This led to the development of cost accounting systems which related costs to the work performed (Hayes, 2001, pp. 3-4).

Librarians in these libraries were interested in achieving maximum efficiency at minimum cost. They accumulated data on unit costs, particularly costs associated with the cataloguing and processing of materials (which amounts to a large part of the library's budget), in order to identify the ways which would reduce these costs. Cost accounting studies as well as time and motion studies which were developed at the end of the 19th century, were started to undertake regularly to create efficiencies in library operations through time reductions (Lynch, 1978, p. 262).

A literature overview, conducted by author of this paper, of how libraries embraced cost accounting and timing as the possible methods to measure work efficiency of library between 1877 and 2014, indicates a great interest in this theme among libraries. This paper gives an overview about the methods used in studies of cost accounting in libraries.

Cost Accounting and Work Time Allocation as Reasearch Topics in Libraries

The first library cost accounting studies took place already in the second half of the 19th century. The first reference to library cost accounting in professional literature appears to have been in the very first volume of the *Library Journal* in 1877, where Charles Cutter, in reply to an inquiry, estimated "the cost of cataloguing" for an unnamed large library as $0.40 per volume and for an unnamed small public library as $0.16 per volume (Rider 1936, Harris 1989).

The early studies and reports of the results of the library cost accounting (Cutter, 1877; Whitney, 1885; Bishop, 1905) indicate that one of the main reasons why cost accounting reached libraries was the need of library managers to justify their costs to the public as well as to their parent organizations, which however was seldom easy. Critics seemed to think that investment in the cataloguing system was a total loss. In addition to cataloguing costs, the work which did not seem to involve costs in the eyes of the public had to be justified, such as helping readers to find necessary books, keeping shelves in order so that every book could be found at its designated spot, replying to written enquiries etc.

The first library institution, which was used in the measuring of cataloguing in terms of time spent was The Grand Rapids Public Library (USA) in 1914 (Reichmann, 1953). The organizational committee of this study reported that: "Today the library must emulate the business organization in employing the cheapest grade of labor where it can be used and using its highest priced labor only for strictly professional work" and "Each member of the staff should be doing the most advanced work for which she is equipped" (Morsch, 1954). This study marked the beginning of a new stage in the history of cost accounting research. The librarian no longer was a scholar with independent time use, but was transformed into an employee performing routine work, to whom in addition to accuracy and thoroughness the requirement of speed and productivity in performing work tasks was set.

Only *cataloguing costs* are ever mentioned in all these early references. Probably because it has always been the most costly part of library work and thus library managers are constantly looking for ways to cut these costs. Lucile M. Morsch (1954) says that: "Economy in cataloguing is economy that actually saves expense in money or time on the library budget as a whole, and does not merely save this expense in the catalogue department to transfer it to another department or to some future time" (Morsch, 1954, p. 479).

A study carried by Fremont Rider in Wesleyan University, Middleton, Connecticut in 1935, focused on the idea that administration and overhead should be calculated as part of cataloguing costs, by which Rider meant the rent or cost of housing the catalogue department, heating, lighting, water, telephone costs, printing, stationery and postage, depreciation, insurance, janitorial services and building repairs. The authors of the study warn that no cost system can cut costs. All it can do is to show the administrator where the costs may and should be cut (Rider, 1936; Harris, 1989).

In 1940s, libraries began to adapt the time and motion studies method, originally developed by Frederick W. Taylor and further developed by Frank and Lillian Gilbreth.

While library literature contains many examples of cost studies and reports of time devoted to different phases of the library operation, there have been not many applications of time and motion study technique in the formal sense. In fact, many of these studies actually exist only as the manuscript materials (for example, Jewel C. Hardkopf and Watson O'D. Pierce studies from 1949, refereed by Logsdon, 1954). Time and motion studies in libraries (e.g. Baldwin & Marcus, 1941; Battles et al, 1943; Hardkopf, 1949; Pierce, 1949) did not only measure the performance of individual worker but also dealed with such matters as work simplification, salary standardization, determination of the standards of performance for specific library operations, improvement of working conditions (in regard to light, noise, fatigue), systematic in-service training, and employee turnover. Another characteristic of the use of time and motion studies in libraries was a careful definition and assignment of work in each department. Work definitions were expected to facilitate the measurement of performance. They fixed responsibility of the performance and influenced the hiring and assignment of personnel (Lynch, 1978, p. 261).

The 1960s and 1970s were the times when social indicators emerged in public sector management including libraries. This movement is closely related to human resource management. Besides staff management and its intra-organizational aspects, human resource management deals with the general issues of human management, including those related to the labor market and job

performance. Job performance evaluation makes it possible to assess positions and employees' work (work performance) (Türk, 2005). Although a number of theories and paradigms were developed to manage, analyze and study the organization and its activities, the principles devised by Taylor still appealed to many library managers. Random time sampling for work and cost analysis became popular among library managers and researchers (Spencer, 1971; Masterson, 1976; Divilbiss & Phyllis, 1978; Mick, 1979; Mosborg, 1980).

However, the first studies, which took into account the employee perspective - rest periods, staff meetings and inevitable interruptions - began to appear and publish not until the 1980s-1990s and 2000s, with the development of new public management (NPM) and evidence-based policy (EBP). Then new cost accounting methods, such as activity-based costing (ABC) which was designed in the United-States during the 80's by Cooper and Kaplan (Cooper & Kaplan, 1988) and time-driven activity-based costing (TDABC) which was designed as revised and easier version of ABC by Kaplan and Anderson at the beginning of 21st century (Kaplan & Anderson, 2004; Kaplan & Anderson, 2007) are emerged and adapted also by university libraries. The testing and implementation of the ABC (Goddard & Ooi, 1998; Ceynowa, 2000; Poll, 2001; Ellis-Newman, 2003; Heaney, 2004; Ching & Leung, 2008) as well as TDABC (Pernot, et al, 2007; Stouthuysen, et al, 2010; Siguenza-Guzman, et al, 2013; Siguenza-Guzman, et al, 2014) methods has already reached in university libraries around the world.

Librarians before and since Melvil Dewey have devoted a fair share of time, effort, and pages of literature for finding and reporting more effective ways of getting work done (Logsdon, 1954). The implementation of cost accounting systems in libraries has historically been treated as a technical innovation rather than an organizational or management innovation. The most important consideration is that librarians are not machines which can be set at a given speed and expected to produce a uniform product.

The Most Common Methods of Cost Accounting and Timing Research in Libraries

In library and information science cost accounting research, it is however quite common to measure the time spent by employees on various activities. Efficiency equals results divided by costs, in other words, the efficiency of employees means how much good quality work is being done in as short time as possible. Hence, what are these methods by which this determination is made?

In commercial organizations accountants had discovered, that all elements of operating costs fall into three main categories: labor, raw materials and overhead. In libraries the largest expenses are usually made for overhead, followed by costs for labor and library materials. After total costs have been obtained, these must be analyzed into unit costs – i.e., in case of library work, into cataloguing costs *per volume catalogued*, into circulation costs *per volume circulated*, into bindery costs, *per volume bound* etc. (Rider 1936).

Formal motion and time study, however, goes somewhat beyond the concept of work simplification and streamlining of processes. R. M. Barnes lists four distinct parts to the process, namely, (1) finding the most economical way of doing the job, (2) standardizing the methods, materials, and equipment, (3) determining accurately the time required by a qualified person working at a normal pace to do the task, and (4) assisting in training the worker in the new method (Barnes, 1949, pp. 1-4).

The first formal time and motion study of a library procedure was conducted in 1943 and it analyzed the loan routine at Bradley Polytechnic Institute Library. Today, in the 21st century, it seems rather amusing to read that "the right hand did most of the work while the other remained idle – the left hand simply supported the book, while the right hand removed the card from the pocket, handed it to the borrower for signing, stamped the due-date slip, and placed the card in file" (Battles et al, 1943).

It is an important question in traditional cost accounting what is the cost of the offer for certain product or service. In addition to aforementioned, new cost accounting models such as the *activity-based costing*-ABC (designed in the United-States during the 80's by Cooper & Kaplan) and *time-driven activity-based costing*-TDABC (designed as a revised and easier version of ABC by Kaplan & Anderson at the beginning of 21st century) also measure the costs associated with the time spent without using human or material resources.

There is a four-step approach to implement the ABC system (Cooper & Kaplan 1988):

- identify the key activities and relevant cost drivers,
- allocate staff time to activities,
- attribute staff salaries and other costs to activity cost pools,
- determine the cost per cost driver.

In the TDABC model only two parameters are required: (1) the number of time units (e.g. minutes) consumed by the activities related to the cost objects (the activities the organization performs for products, services, and customers) and (2) the cost per time unit. It is important to stress, though, that the question is not about the percentage of time an employee spends doing an activity, but how long it takes to complete one unit of that activity (the time required to process one order, for example how much time it takes to deal with one ILL request - order reception, request handling, transmission of orders) (Kaplan & Anderson, 2004, p. 133). Knowing the real (practical) capacity of the resources used and the time spent on

activities, it is possible to find the cost of each activity by multiplying the time spent on activities with the practical capacity of the resources (Kaplan & Anderson 2007).

According to Ian Brooks (2008), time has always been an important factor in the organization, and it is nowadays being emphasized as an important part of the competitiveness of the organization. Our understanding of time and the usage of time in the working environment has become a key factor. For instance, productivity is an indicator of how much work we are able to perform in a certain amount of time. Time often creates tension between the employer and the employee (for instance, the length of the working day, but also studies conducted by the manager to measure how much time an employee is spending to complete a certain work task) (Brooks, 2008, pp. 160-161).

Ralph R. Shaw (1947) has arqued that: "People are at least as important as systems" and recognize that the best schemes of operation require working conditions enabling a staff to enjoy its tasks and take pride in them. The conditions in question concern pay, hours, vacations, privileges, and the like, which are of the same interest to catalogers as to the rest of a library staff, but they also include such essentials as adequate lighting; light-weight book trucks, in sufficient numbers to reduce physical exertion to a minimum; adequate working space; typewriters in good repair, kept so by experts rather than by catalogers; comfortable chairs and other furnishings and supplies designed for the uses to be made of them. People need more than the materialistic things mentioned above. They need incentives, credit when credit is due, and an opportunity to participate in the decisions that affect them" (Morsch, 1954, p. 480).

Specific time studies of personnel activity will give the most precise data about the actual tasks performed. The self-administered diary method is most often employed in historical library cost accounting studies for determining labor costs (Rider 1936, Miller 1937). Time sheets are another very common method for costing purposes, but in that case, time sheet codes need to be developed by the library or department managers to inform decisions they will influence. Chargeable and non-chargeable time must be clearly distinguished. For example, staff communication meetings are clearly non-chargeable time. Their purpose is to keep staff informed and give updates on organizational policies and culture. Professional body conferences, seminars and workshops will all be non-chargeable time. If the staff is attending training courses to develop their work-related skills, the time spent on training will also be non-chargeable time.

However, some organizations who have had experience to recording staff work time, find difficulties when some of their staff book time on to time sheets over above the level of the hours they are contracted to work. For example, Friedman & Jeffreys "Cataloging and Classification Survey in British University Libraries" (1967) shows that "a serious difficulty arose with the determination of the amount of time spent on the various activities. Library staff was asked to indicate which of a number of given periods of time (hours) they spent on each activity in one week. It was surprisingly revealed that some members of library staff appeared to work longer than a forty-hour week!" (Friedman & Jeffreys 1967).

Despite the Friedman & Jeffreys experience, Diane R. Tebbetts (2007) is convienced that if time studies are conducted on a regular bases, data for cost analyses will be readily available and save much time and actual time sheets or "logs" will provide the most accurate data (Tebbetts 2007).

In 1970s, the methods such as random time sampling with self-observation and interviewing staff with closed questions were added for library cost accounting studies (Spencer 1971, Masterson 1976).

For library activities, identification and definitions, the direct observations, systematic sampling process and the open interviews without the structured questionnaire are the part of new cost accounting models studied in academic libraries (Pernot et al 2007, Stouthuysen et al 2010).

The first step in the case of new cost accounting research usually involves interviewing library staff to identify the main activities performed in the library and the role that each staff member plays in these activities. Library employees usually describe in detail how they perform each of their tasks. The most accurate descriptions can be achieved when library staff members physically perform the tasks while describing them to the interviewer – which may be considered direct observation. From staff descriptions or direct observations the performed tasks will be documented. The need for further interviews or observations depends upon how well the descriptions and documentation match the actual tasks being performed.

Certainly it must be emphasized that all library activities are intellectual activities, which demand knowledge, judgement, and initiative, and every plan to increase the output must take these factors into consideration. Felix Reichmann's (1953) has argued that "librarians, but especially when they are dealing with acquisition and cataloguing or even with bibliographical describing, should have freedom to decide how much time can be spent on the cataloguing or describing of one title, or that the concern is with quality alone not with the quantity of output. A reasonable equilibrium between quality and quantity has to be found, since the acquisitions program of research libraries makes it imperative that close attention be given to the sum total of titles catalogued" (Reichmann, 1953, p. 310).

Conclusions

Libraries today are included in the general demand for cost transparency and effective cost management. With the data they have traditionally collected, libraries can assess details about the costs of collection building; what they need now are reliable data about the costs of their services and products. Nowadays, the cost accounting reseaches in libraries can be also identified as case studies combined both qualitative and quantitative methods – collecting and analysing statistical accounting data, interviewing staff with using semi-structured or open questions, observations, analysis of documentary sources, which is important to supplement as well as to compensate for the limitations of other methods.

The most widely used qualitative methods in work efficiency studies have been the following: 1) observation study, during which an observer records the time necessary to complete a task and computes the output per hour and unit cost for that task; 2) diary study that involves the direct participation of each staff member for data collection: the employee records the beginning and ending time of each task during the designated period of study; 3) interviews with staff to obtain a detailed description of the various sub-systems of the library, and to identify tasks and task elements; 4) work sampling technique, based on a statistical formula involving random observations of the work activities etc. Other methods such as the analysis of staff statistics, annual reports, staff duties, organization charts and various library statistics are also used.

Documentary and statistical evidence acts as a method to crossvalidate information gathered from interview and observation given that sometimes what people say maybe different from what people do. Thus, it is very important regarding the results of such research that the methods, by which the measurements are carried out, have been selected very carefully, without compromising the culture of the specific organization.

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Curriculum Vitae

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Studying user appropriation of University and Secondary school «Learning centers»: methodological questions and issues

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Abstract

How can Information-Communication researchers define a protocol for the study of emergent phenomena? In the context of a research project examining the creation of nine Learning Centers in France, we were faced with this query. The concept of the "Learning Center" has been taken up as a new model for the library, a "place" situated between learning, training, teaching, living and "being." We were interested in the ways in which different actors appropriate the idea of the Learning Center and which dimensions they choose to develop or adapt. Rather than evaluating the degree of successful compliance to a model, we sought to understand how actors "do with" and co-construct this new form of the library through their uses of space. Our inquiry, as applied to information practices and culture, foregrounds the issue of the most pertinent approach to empirical study. Ethnography is a powerful tool for in-depth study of users as they participate in the definition of informational devices. While comparing our methodological choices to certain observational techniques, we explore the strengths and limits of an approach in which the focal points of observation, undefined at the outset through floating attention, become more accurate during the different phases of observation and interviewing. The relevance of certain data collection instruments used for describing and understanding "seeing" over time (ethnographic fieldnotes, photographs) is also discussed. We attempt to show that emergent phenomena require an open-ended, comprehensive approach; a posteriori categorization can afford a rich way to investigate user practices in an as yet undefined institutional setting.

Keywords: appropriation, library, learning center, space, qualitative research

Introduction

In her study of the notion of "context" in information practices, Christina Courtright reminds us that an informational environment is not a given, nor a mere "framework" for action, but that it is continually constructed, defined and redefined by individuals by and through their activities (Courtright, 2007). Research into information practices has time and again underscored the need to recognize the "setting" as anything but a stable backdrop (Elmborg, 2011). At the same time, as we consider the nature of the appropriations of library services, we are tempted to begin the study with a clear-cut analysis and mapping of the architecture, the zones and spaces and associated resources, in order to determine how library patrons identify, interact with, or counteract the logistical and symbolic "offer" made to them.

This problem of defining the informational environment comes particularly to the fore when we consider the case of new or emergent spaces such as the "Learning Center," which has elicited much interest in the past few years in France within the university and secondary school arenas. The emergent nature of the learning center in France derives not only from the very concept of the "learning center" which has, as yet, not come into clear focus, but also, from the fact that most of the sites selected for our study are themselves still in the process of creation or implementation of new learning centers, and therefore, are as yet in an experimental phase (Maury et al., 2014). Indeed, as our research shows, the very notion of the learning center is less a physical space, than a project, an undertaking, an ongoing process intended to introduce, promote and experiment with, new kinds of collaborative interactions and a blending of leisure and work activities. This complexity thus leads to a degree of methodological caution not unlike that to which constructivist approaches already invite the researcher, when seeking to relativize the

a priori "reality" of the environmental components of informational practice. What sort of protocol for study can best allow for the exploration of the "coming into being" of the learning center in France today? If qualitative study appears suited to the given objectives of this inquiry, to what extent does the observational protocol seem to project or to anticipate the relationships between users and newly conceived spaces? How and when should the actors' discourse be confronted with observation of practice?

In this article we will first discuss the main objectives of our study, the types of research questions which we have sought to address, and then explain how our methodological stance and observational methods grew out of an initial exploratory contact with the sites chosen for our study. Presentation of some significant examples of the data obtained, as related to methodological issues and to interpretive challenges, will allow us to offer some insight into the strengths and potential weaknesses of the protocol chosen to carry out this study, and to point out some of the ways in which the study of user appropriations of learning centers can make us more attentive to relational and dynamic processes which define information culture.

The Learning center in France, a concept, a process?

Much of the discussion in France concerning the Learning center begins with a reminder that this innovative approach to the library is an idea which has been imported from the US or the UK, and is currently being adapted within the context of French university or secondary schools, as well as within the institutional and geographic context of the specific sites which have chosen to pursue the objectives of the Learning center. Thus, the French learning center is at the outset presented as a translational or transformational process. Within university settings the transformation of the academic library into a "learning center" has focused on the need to revitalize and to revisit the role of the university library, through expanded and modernized online services and digitalized resources, through the creation of spaces for collaborative exchange between students and/or students and their professors, and through increased access to various cultural or leisure activities allowing to redefine the university library as a place "to be" as well as a place for more active learning. Within secondary schools such a project has been taken to signify the development of a new learning environment designed to accompany pupils rather than to dispense knowledge to them, while creating closer proximities between the "vie scolaire" services (attendance and discipline offices, guidance counseling) and the traditional school library.

Promotional discourse (found in project statements, school and institutional web sites, press releases) revolves around the learning center as a response to students' new needs and expectations and as an opportunity for enhancing or enabling students' academic and professional potential through modernization of services and technology. While the attractiveness of this equation between students' success and the modernized library services, in political terms, is an undeniable factor in obtaining the necessary funding of the architectural and infrastructural modifications involved, and while the modernization of library facilities and services has also been used as an argument for potential cost reduction through downsized staff, the learning center projects all present an attempt to attribute a new pertinence to the school or university library by recognizing its potential as a pivotal, cultural and academic service at the heart of the learning community. The key concepts of renewal, revolution, innovation, modernization, often mentioned in professional literature or promotional discourse, seemed to us an interesting starting point for our study: just what sort of "revolution" does the Learning center represent for the actors involved? How is each center experienced (and activated) by the members of each community and how are these innovations perceived and indeed, acted out in the daily ordinary activities of students, teachers, and other actors (parents, school counselors and attendance officers, university staff and faculty, and the nearby local population to whom these innovations are often also addressed)? Reorganized and redesigned spaces, architectural projects and new services affect users not only in the sphere of informational practice but in defining the very culture of a given community. Thus in methodological terms we were interested in developing a protocol allowing for comprehension of new library services as they are integrated into a range of social practices, of which academic, and more precisely, informational, activities are a part.

In addition to taking into account this nexus of interrelated social practices, we were faced with another challenge: the different sites chosen for the study (four secondary schools, and five university-level libraries) are in varying degrees of "completion" of their learning center project (see Table 1). Each site has its specific goals and priorities, yet in most cases the resources and services developed to reach these goals are not only most often still in the developmental phase, but are seen as a progressive series of adaptive innovations, to be decided and negotiated along the way as a function of how different members of the community invest their time and energy in the project.

Table 1: Nine Learning Center projects in France

Learning center (LC)	Characteristics	Timetable	LC Project status during inquiry
High school 1 Professional vocational high school Alsace	Motivate students, interaction between faculty/staff/students	(1) 2013-: restructured spaces, digital resources improved /added (2) 2014- : modifying practices	Ongoing spatial modifications; discussion about new roles for staff
Prep school Residence 2 Ile-de-France	Modernize facilities to create new learning environment	(1) 2008- networking resources Phase 2 2013- : Reorganized spaces, extensions	Ongoing spatial modifications; preparation for new digital resources; discussion about roles
Secondary School 3 Nord-Pas de Calais	"Connected school": new technology to improve pedagogy	(1) 2012:-2013: spaces reconfigured; (2) 2013-2014: IT development	Evaluating ITs; Consolidating partnerships, changing roles for staff
Secondary School 4 Midi-Pyrénées	LC developed "naturally" out of proximities between library and attendance office	(1) 2005: reorganized spaces; (2) 2010-: formalized restructuring as LC	Ongoing reflection on digital resources
Science University Library 5 Ile-de-France	New building: modular spaces and services for collaborative workspace and learning sessions	2012: Notion of LC integrated into architectural project; January 2013: new library inaugurated	LC boundaries in question: library? Campus?
Business School 6 Ile-de-France	Online service expansion, new work spaces and cultural offerings	2008: renovated library spaces and services	Undergoing evaluation for updating of LC
Science and Technology university 7 Nord-Pas de Calais	LC "innovation": new spaces to develop community	Feb. 2014: Science center opened 2017: completion architectural project	Construction underway; new services/programs currently developed
Humanities and social science university 8 Nord-Pas de Calais	Humanities LC sub-theme Egyptology/Archeology;	Pre-project submitted to funding institutions, renovation of library bldg	Ongoing projects: renew current spaces (expositions, conferences)
Polytechnic engineering university 9 Midi-Pyrénées	"Third place" for engineering students	4 phases starting 2009; Innovate teaching, create informal exchange for students, teachers, local businesses	Ongoing: reinforce services and restructure multi-function spaces

As can be seen in Table 1 and in mission statements and pre-project papers, each site presents new and reconfigured spaces and architecture as key ingredients of the "revolutionized" library setting. The emblematic Rolex learning center at the Swiss federal institute of technology in Lausanne is just one example of the emphasis placed by learning center planners, upon the importance of redefined, updated, and significant spatial configurations as central to the learning center "experience." Could our study take into account the ongoing processual aspect of each project through an inquiry into the role of space? To what extent could the appropriation of the learning center be analyzed as a function of the users' experience of and in, the spaces of each site?

Qualitative study of LC appropriation: an anthropology of space

Recent study of library use, and in particular use of space, has turned within the past ten or fifteen years toward qualitative inquiry and more specifically, ethnographic study of user practices, activities, and interactions (Caraco, 2013). In the university library setting, ethnographic studies of student activities such as their use of library facilities in the course of research projects, have demonstrated the interest of such tools as observation, interviews, focus groups and cognitive mapping, all of which allow for the creation of a holistic view of user practice through detailed description, and an inductive interpretive approach (Bryant et al, 2009; Duke & Ascher, 2012).

Yet qualitative study is not merely an effective way to understand the library from the user's point of view; methodological choices derive from the very definition of research objects and objectives. Indeed, the interest in qualitative investigation has accompanied an expanded vision of what constitutes informational practice in everyday experience, and also, a broader definition of what sort of activities take place in informational environments (Maury & Etevé, 2010; Béguin-Verbrugge & Kovacs, 2011). Beyond the models of information seeking, finding and sharing, we were interested in trying to understand what social practices take place in the learning center as space and place, and how different actors "do with" the services proposed to them and thereby co-construct their environment. This approach implies that the actor is not simply "reacting" to, or "receiving" the library's features and offerings, but that he or she also somehow participates in its constitution. As Huizing and Cavanagh have suggested, the conflict in practice theory between objective

(order as determining human behaviour) and subjective (human agency determines order) positions, can perhaps best be resolved through an intermediate posture; the study of practice requires an attention to what people actually do and "to the processual forms of doing, knowing and organizing out of which order and change arise" (Huizing & Cavanagh, 2011).

This approach to practice implies an inquiry into the dynamics of the library, into the patterns, forces and changes by which users experience and give meaning to the spaces and services of the library. As Michel de Certeau has suggested "space occurs as the effect produced by the operations that orient it, situate it, temporalize it, and make it function in a polyvalent unity of conflictual programs or contractual proximities" (1984, 117). Space in the library setting can be seen thus as such as "practiced place" (Certeau, 1984); Certeau's distinction between the mobility of space (constructed through practice) as opposed to the stability of "place" is in this sense not unlike the distinction between "third space" with its creative instability and moving borders and "third place" (or simplified commodified place) discussed by Elmborg (2011). Space as practiced place can be seen as relative and relational rather than absolute (Hall, 1966); a proxemic approach to library appropriation takes into account how users adapt resources and spaces to their needs and thus develop forms of knowing or learning in the process of their activity (Rogoff, 1995). As a "process of becoming," the notion of appropriation implies the emergence of an identity through action.

Our study of learning center appropriation through the analysis of practices of and in space can thus be seen as informed by an anthropological perspective, in that each site is considered as a whole, which implies taking into account its multiple dimensions and establishing relationships between them (Laplantine, 2002, 49). Our stance differs from most ethnographic library studies which have as their primary or ultimate objective an evaluation or improvement of services or infrastructures. In order to gain an understanding of the phenomenon of the learning center, the point of departure for our study was to consider all practices as relevant, and in so doing to avoid as much as possible the imposition of an a priori analytic framework or listing of criteria to be taken into account. How do ethnographic tools allow for the study of the learning center as considered from this inclusive, social constructivist perspective?

Ethnological study: from wide-ranging and in-depth observation to identified dynamics and points of tension

Different qualitative techniques have been developed to study the use of spaces in the library and the library as place (May, 2011) in particular within the public library (Given & Leckie, 2003; Aabo & Audunson, 2012). In an attempt to relate the nature of activities to the different spaces in which they are carried out, researchers have developed spatial mapping techniques such as cognitive mapping by which library users are asked to draw schematic representations of the library space and its resources. This technique allows researchers to gain insight into users' perception of library spaces and facilities. Interpretation of this data can yield unexpected and useful results in particular when compared to representations of the same space as drawn by librarians (Fabre & Veyrac, 2008). Other techniques, based on direct observation, include the seating sweeps method. Given and Leckie developed an inquiry into social activities in the Toronto public libraries using this sweeping technique, by which user activity in specific locations of the library was recorded by means of a coded check list of types of behaviors (Given & Leckie, 2003). In this study, researchers included in their checklist not only the activities being carried out but the types of belongings users had with them, thus collecting rich data concerning the ways in which library patrons construct and personalize their environment. Although the coding process tends to produce results based only upon pre-categorized elements, this technique presents the advantage of direct observation of the relation to space. Since our priority was to gain insight into user activities and practices, direct and unobtrusive observation seemed of particular interest for our study.

However unlike the "sweeps" method we sought to understand user practices more fully over time, through immersion in the learning center. Rather than to identify or enumerate activities in a static way, we wished to observe how and where these practices begin, to what extent they are developed and how they evolve. In addition, the pre-coded behavior checklist, while an effective tool for the researcher once the primary major activities have been included in the list, tends to close the investigation to the unusual or the unexpected.

If observation seemed relevant as a primary investigative tool, reliance on established lists of research objects or phenomena to be observed seemed likely to introduce a fundamental bias or pre-reading of the learning center. Unlike a priori research protocols with pre-coded categories to be sought or verified, our a posteriori stance required that any hypothesis derive from a reading of data obtained; observations were not conceived as "proof" but as having potential significance in a process of discovery (Paillé, 2006). Thus, after the initial contact with the staff and directors at each site, which allowed us to collect information concerning the history and "philosophy" of each project, as well as floor maps and architectural plans on paper, we preferred to begin our study with preliminary observations in and around the learning center, giving "free-floating" and in-depth attention to all possible aspects of learning center features and activity. This was

accomplished by two primary means: walking slowly through the libraries and noting in as much detail as possible the organization and presentation of the learning center facilities and user practices, and choosing a vantage point, by taking a seat at a chosen spot at one of the tables or armchairs of the learning center in order to observe users in the surrounding environment for a chosen period of time (usually up to an hour). Our fieldnotes included as many elements of observation as we could possibly record, including but not limited to, activities and interactions, gestures, objects, movements, etc.

After an initial exploratory phase (of one or two day observations at each learning center), followed by discussion with members of the research team in order to discuss and compare our preliminary observations, a non exhaustive list of "dimensions" for discovery was proposed (see Table 2) as having potential for investigation during the course of further ethnographic observation. These elements were not to be taken as a closed framework or guide to direct each researcher's exclusive attention but as an open-ended proposition of interrelated points of interest arising from initial contact and observations, to which each researcher was encouraged to add any emergent phenomena.

Table 2: Dimensions for observational study of Learning Centers (LC)

Boundaries of the LC	Where does the LC start and end? What zones are present or suggested? Modular zones, hybrid zones? Boundaries between the LC and other "competing" or complementary spaces?
Uses, practices within different spaces (apparent or emerging)	Occupation of space, unoccupied spaces, ignored spaces, spaces "(re)defined" by users through unexpected activity; the relative importance given to activities of learning/teaching/training and living/"place to be" in different spaces; use of tools and resources; informational features such as reference desk, leisure sections, other services
Tensions	noise/quiet; acceptance/resistance; autonomy/collaboration
Rules and regulations; modus vivendi	Rights, obligations, interdictions, and how these rules contribute to the rhythm of life in the LC
"Identity" of the LC	Terms or symbols which appear or are posted ("library", "learning center", etc) to designate or characterize each site (on signs or sign systems in around the LC or on other materials such as web sites); How do sign systems and wayfinding systems present and differentiate spaces and their presumed functions
Other, emerging dimensions	Unexpected, surprising aspects

The advantage of an open-ended approach was that we arrived with no preconceived criteria for observation and were able to "take in" different slices of life at each site. When possible, and in cases where we obtained the permission to take photographs, we did so, at a discrete distance from users, in order to help record these moments. Photography allowed us to create traces of continuous changes over time (added or modified resources), and to interpret these changes in light of our observations. Pictures of changing or moved furniture for example provided interesting clues to the ways in which spatial reconfigurations decided by the library staff were unfolding in time, with possible consequences for the types of collaborations between those responsible for different services or rooms (Maury & Kovacs, 2014). However while our intent was to remain as unobtrusive as possible, this was more problematic in the secondary school setting in part because of the need to make and maintain regular contact with the librarians and their staff and other teachers in order to carry out this research project. Unlike the university setting, secondary school libraries are closely monitored and access to schools for ethnographic research calls for more and closer involvement with actors. In one of the high school learning centers for example we were once asked by a teacher to assist pupils with an assignment. While university learning centers allowed for more detached observation, secondary school and university actors alike were often eager to share their experiences with us, in order to exchange ideas about their initiatives and projects, even though we had presented our research objectives as purely analytical. When possible, we carried out at least three to four continuous hours of observation on each day, and between four to eight half-days of observation for each site. In order to gain familiarity with a limited number of sites, the six members of the research project each conducted observations of two or three of the learning centers. This division of labor allowed us not only greater immersion than if each researcher were to conduct observations at each site (given time and funding constraints), but also, since each site was observed by at least two members of the team on different days, we were able to compare our perspectives, as a form of data triangulation, and thus gain greater insight into each learning center.

In both cases (university and secondary school) one of the weaknesses of the observational approach remained the difficulty of observing close hand the on-screen, reading and mobile phone activities of learning center users. Thus we were not able to observe with precision the nature or content of catalogue requests, note taking or studying activities and exchanges, especially within the enclosed study rooms for collaborative or team work present in the university learning centers. This difficulty remains one of the weak points of the investigation, which we tried in part to overcome through brief informal conversations with learning center users, including those people we had observed directly, during which we asked why they had come to the learning center that day, which resources they had come to use, in which rooms or spaces they were going to work or had worked that day, and for what reason they

generally came to the learning center. We also noted when possible during these informal conversations the students' grade level or university degree or year.

Ethnographic interviews, while valuable data collection tools, were considered as a secondary or supporting technique, in particular as another form of data triangulation. User discourse collected in the interview process, while shedding light on different actors' attitudes or opinions, and while allowing actors to produce a rendering of his or her own activities, constitutes (no matter how well-intentioned the interviewee) a fundamentally different form of data from observation and the observational materials of note-taking and photography. That is not to say that the researcher's observations are completely devoid of certain a priori conceptions or that direct observation provides unmediated and uniquely privileged access to the 'field' as if looking through a window onto the world (Hert, 2014). These precautions do not diminish however the potential gains of observation as a primary data-collecting device, since individuals are not always able to explain (or to remember) their activities, routines, gestures and are also likely to avoid mentioning certain choices they might consider to be in some way transgressive behavior or simply of little interest.

At the same time, semi-structured, open-ended interviews can clarify certain practices and bring to light users' motivations and attitudes. We considered that both informal conversations and formal interviews could be useful, notably in order to ask users to comment upon or react to certain of the observed practices or phenomena. Formal interviews were conducted with members of the teaching and library staff after the observations were completed or well underway. Questions asked during the in-depth interviews (one to two hours in duration) were designed to elicit detailed responses and commentaries concerning the actor's conception of the learning center (or learning centers in general), his or her descriptions and opinion of its spatial and temporal characteristics and the type and degree of changes he or she thought were involved in the learning center project, in particular with regard to the relative importance given to activities or resources associated with "learning," "teaching," "training" and/or "being." Actors were also asked to remark upon any new, significant or unexpected practices they had noticed or that we brought to their attention.

Methodological questions and issues: the example of space and/as identity

To what extent can we evaluate the relevance of these methodological choices? Although full results of this research project will be presented and discussed elsewhere, some of the questions directly arising from observations of the appropriation of space can provide an idea of the relative strengths and weaknesses of our approach.

In each of the centers selected for study, the question of "borders" or boundaries of the learning center came to the fore early on during the initial phase of contact with project managers and during preliminary observations; this question seemed as well to touch upon a number of often sensitive issues for the different actors. The boundaries between zones or between the learning center and "competing" spaces, were mentioned in the mission statements which we consulted and the initial project presentations which librarians proposed to us before observations began. We also noted during our preliminary observations for example, that different signs designating and naming the learning center or its services could be found at varied entrance points or "borders" such as doorways or hallways (see Figure 1).

High School 1: two different signs present services in the LC

High School 1: an unused poster promoting the learning center

Figure 1: Signs and "borders" to identify spaces

The signposts of one university learning center featured the word "library" (in French) while the words "learning center" appeared in English, and at one secondary school, the door leading to part of the learning center featured two different signs mentioning "attendance services" and "library." These signs led us to investigate the problem of naming and designating the learning center and we were thus prompted to include, in formal interviews, questions pertaining to the contradictions between mission statements promoting the learning center as an integrated service, and the signposts retaining the names of the different services associated with the learning center. Interviews and further observations then allowed us to investigate the issue of naming and identifying zones and spaces as related to ways in which different actors perceive their professional roles or their stake in the learning center.

Initial observations also allowed us to identify some of the ways in which users experience and "act out" differentiated zones within the learning center or between the inside and outside of the learning center. At High School 1 we observed that few of the teachers chose to use the central staircase of the newly opened learning center to descend to the lower level of the school and the classes and spaces below. Another route was possible, and we observed that teachers used stairs which were located on the outside of the LC. At the same time, at this school, the librarian, as well as teachers who worked regularly with students in the

learning center, generally kept to the upper level "library section" although the learning center at this high school comprises several differentiated spaces (the upper floor library section, the lower floor "attendance" and quiet study room, and an outer atrium for informal study and conversation). This observed practice led us to investigate the issue of how the borders are defined by the actors of each learning center. One teacher (High School 1) explained in a formal interview conducted after our observations of these seemingly self-imposed "limits" on actors' movements in space, that she was reluctant to descend into the study hall section of the learning center because there, pupils might not recognize her or understand her role. Both observation and subsequent discourse allowed us to question the ways in which reorganized spaces imply new or modified roles for library professionals, faculty and staff. New and peripheral spaces, especially spaces conceived as hybrid work and social spaces suggest changes in roles and identities, which can produce a certain feeling of insecurity or identitary uncertainty.

In certain cases, learning center actors' attitudes and opinions, collected through informal conversation or formal interviews, prompted us to redirect our attention to specific details related to the occupation of spaces by students. Once again the issue of boundaries can provide an example of this use of interviews to refocus our attention during observations. We observed, at High School 2, a residence hall for high school graduates enrolled in demanding preparatory classes, that certain students worked in the evenings at tables located in the hallways located near the "library" spaces. This observation, followed by an informal conversation with one student who explained why she preferred the hallway to the library or other study hall facilities provided in the residence hall, led us to question the link between chosen fields of study and the interest for the learning center. The student we encountered explained that as a math and physics major, she did not consider the library to be useful to her, unlike her fellow literary students. Our observations had at first allowed us to investigate how students occupy the different spaces and rooms of this "tentacular" learning center, constructing and deconstructing its center and periphery; conversation also provided an element related to the disciplinary identity of students as related to the choice of space.

The choice of immersion over time provided clues as well to the nature of spaces as "territories" of or for certain groups. At Business School 6, for example, the arrival of a faculty member in search of a group of his students, was an unusual event (he needed directions to find the study room); this learning center as we had previously observed it was almost completely dominated by students.

Observations served also to verify discourse and sometimes to invalidate or call into question certain opinions. While a sense of 'losing ground' was apparent in the discourse of librarians in one university learning center who worried that students found what they needed in the nearby cafeteria or atrium spaces, our observations showed that students in their practices (and discourse) clearly differentiated the roles they attributed to each space and considered the learning center and the surrounding cafeteria, atrium and student bars and lounges, as complementary rather than competing places of study, socializing, conversation. All of these activities were observed in the learning center and in the other nearby "gathering," work and eating places, but as we noted, they were carried out in different ways.

Conclusion

Our approach to the learning center as an evolutive process led us to question the ways in which spatial, structural and technological reconfigurations were linked to changes in the daily activities and roles of different actors. This research project was therefore an opportunity to define a study protocol which could take into account the ongoing processual aspect of nine different learning center projects in France. Our methodological choices allowed us to remain receptive to the widest possible range of user practices not only as they take place "within" each learning center but as they contribute to the very construction and definition of the learning center itself, as space and place. Ethnographic observation over the course of several months, in an a posteriori inductive approach to data collection and analysis, led us progressively to focus our attention upon significant regularities in user behavior in time and space. Yet we also remained attentive to emergent or unexpected activities, seemingly marginal, but which pointed up possibilities for further investigation.

One of the difficulties inherent in this methodological stance is that of the interpretive activity which involves putting into words that which has been observed, with all of its nuances, regularities, differences. The written rendering of the learning center as it is experienced and appropriated by users requires a delicate balance and a constant dialogical movement between the empirical and the theoretical, the seen and the known, in an attempt to arrive at meaning. The challenge of this dialogic approach to qualitative research data as it is reshaped and textualized is that it seeks to associate as much as possible the sensible (that which the researcher derives from observation, the senses, the affect) and the intelligible.

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Digital Library assessment through multiple measures

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Abstract

Digital libraries of archival historical and cultural resources are expensive to create and maintain. Thorough assessment of both the service itself and the collections selected for digitization can demonstrate the success of the project as well as the value of the digital library and will aid future funding requests. As evident in the research literature, while digital libraries are often evaluated on the basis of usability, only rarely are users asked about the value or usefulness of the content of the digital library. Useful or valued collections will attract additional users, will help inform decision making for future projects and will make evident to funding agencies that resources have been well spent. Usefulness, however, is amorphous and challenging to measure. A digital library of archival materials developed at a large academic institution was used as the case study. The goals of this project were to determine how to ask users about usefulness and value of collections in the digital library; and to collect statistical data applicable to the question of usefulness. Combinations of both qualitative and quantitative data were analyzed, presuming that the multiple perspectives and data points would lead to comprehensive and actionable results. The data gathering methods included web and database analytics as well as interviews and a survey. The research resulted in specific suggestions for the improvement of the digital library, results applicable to many digital libraries.

Keywords: Digital Libraries; Evaluation; Assessment; Hybrid Methods, Usefulness

Introduction

Digital libraries (DLs), broadly defined, organize digital assets in searchable and accessible online collections. They may contain everything from historical images to journal articles to scientific data and they operate on a plethora of software. DLs are expensive undertakings. The assets must be selected, digitized, stored and described; user interfaces developed; and everything must be migrated and sustained. As with any expensive endeavor, regular evaluation of the system and contents is essential to keeping the DL relevant and useful. Evaluations of DLs inform improvements in the current systems and the design of future systems, demonstrate return-on-investment and impact on the community; and aid in determining the priority of future projects.

Typically, DL evaluation has centered on usability, measuring the ease of use, navigation and appearance of the DL. From online shopping sites to collections of cultural objects, the research literature on DL evaluation abounds with usability studies. A less asked and less studied aspect of DLs is usefulness. Usefulness measures whether the content of the DL is germane to the users; that is, whether the content fulfills an information need.

Background

The best engineered interface is of little value if the digital assets it presents are not relevant to the users. Although usefulness would appear to be fundamentally important, it has been relatively little studied. As highlighted in the 2005 JISC study on digitization in the UK, digital projects have emerged in a "piecemeal fashion." "Moreover digital projects have tended to be driven by supply rather than demand, spurred by opportunity instead of actual need." (JISC 2005, p. 2). With rich collections of archival and cultural materials, those that have been digitized are those the organization housing the materials presumed the users needed or wanted. As Birrell (2010) wrote: "Traditionally, digitisation has been led by supply rather than demand."

Likely part of the reason that usefulness has been less often studied is that usefulness as a concept is difficult to define. The user simply knows a useful resource when she finds it. Marchionini (2003) wrote: "Needs assessment research in information science recognizes that there are different levels of needs that users may not be able to articulate." (p. 120) Likewise usefulness is transient. Digital objects of no importance to a user one day may be the answer to an information need the next day. Or a

digital object irrelevant to one user may be essential to another user. To be useful the digital asset must be located just in time.

Usefulness is inextricably linked to usability. Interface is a significant factor in the perception of the quality of the DL; thus technical, interface, and performance measures cannot be ignored. A DL brimming with resources will be useless if the interface is difficult to use, or the metadata is too coarse for the asset to be discovered or properly placed into context.

Even though users may find assets through metasearch engines, the DL's own interface must be constructed in order to provide a search the user executes easily, with confidence the search will result in all the pertinent assets. Without a reasonably functional interface and clear metadata the digital object will be undiscovered or rendered useless. The interconnections between usefulness and usability make it difficult to study one without the other.

Usefulness is also more difficult to quantify than usability. Page counts, time spent on pages, the number of downloads are important evaluation criteria. A highly specialized digital library, however, may have a relatively small user base. While the number of page counts and downloads may be small, the DL could be vitally important to this user group. Easily quantified units of measure, such as page counts, used without context, are not always dependable measures.

Despite the effort placed in developing usable systems, the user may not even access the digital assets through the DL's own interface. With metasearch engines, the direct use of many digital libraries is discretionary. Increasingly, the user working through Google may have little concept of where the chosen digital object actually resides and the location of that digital object may not be relevant to the user's work.

In an increasingly connected world, the audience will likely be more expansive than the target audience of the DL. Potential users are anywhere and the uses they may have for a digital object may be unanticipated by the DL developers since digitized materials are without geographic or physical restrictions. Lynch notes: "digital libraries are showing a disconcerting and exciting tendency to find their own user communities, which may be very different from the user communities envisioned or designed for by the digital library developers." (2003, p. 196) DL developers now must anticipate that the constituency may be much larger and the usefulness of the digital object may be far broader than originally intended.

Thus, usefulness combined with usability will inform future directions for DLs. Assessing the value of the service by incorporating both usefulness and usability measures will help developers demonstrate a return-on-investment to administrators and funding agencies. Also, usefulness and value can support appeals for additional funding or support for future projects. Measuring for usefulness helps developers better understand user needs and demands. Along with usability, value measures can also help guide improvements or corrections in the service. Lastly, with rich cultural heritage and archival collections remaining to be digitized and budgets constrained, usefulness could help determine priorities for future projects.

The evaluation project described here aimed to both assess the digital library and to determine which methods or combination of measurement methods yielded actionable results. The digital library at the San Diego State University's (SDSU) Library and Information Access (http://ibase.sdsu.edu) houses diverse assets including forty thousand archival photographs of the university, the student yearbooks, nearly nine thousand issues of the student newspapers, a collection of California murals, Chicano posters, alternative student periodicals, historical postcards and other diverse collections. Like many libraries, SDSU has limited resources but a wealth of archival and historical collections. Setting priorities for digitization is challenging when a large and diverse number of worthy collections compete for limited resources. The recent economic challenges also increased the importance of demonstrating the value of the DL to administrators who allocate funding. In addition, analyzing the value of the DL also necessarily involves analyzing the interface and operability, which could be used to improve the service. Usability can alter the users' perceptions of the DL and thus aspects of usability were included in the research. Further, while the existing interface to the SDSU digital library was functional, any online system must undergo regular improvements and adjustments to apply new technologies and improve services.

Literature Review

Usability studies are myriad; the literature offers comparatively little for usefulness or impact. (Showers, 2103). Generally, DL research literature supports the use of multiple evaluation tools including both quantitative and qualitative methods. (Marchionini, 2001). A combination of automated analyses, interviews and observations can provide information about large numbers of users with little context; while more qualitative methods provide contextual information about a smaller, though representative number of users. (Blandford & Bainbridge, 2009) Wilson (2103) defined and described mixed-method research emphasizing the use of both quantitative and qualitative measures. Meyer (2011) discussed the assessment of several digitization projects in the UK all evaluated through multiple methods. Adzobu (2014) described a multi-faceted review of a digital

library at a public university with an emphasis on user needs assessment.

Several evaluations of DLs included questions or sections specifically inquiring about usefulness or impact of the content. Xie (2008) addressed usefulness in research examining users' perceptions of two digital libraries. The responses illustrate the importance of usefulness to the clients. Several respondents commented on the interconnectedness of interface design and collection quality. The DiSCmap project formed the basis of a usefulness study conducted by Birrell and co-authors (2011). They directly analyzed usefulness with the goal of determining digitization priorities and recommending strategies for cooperation among digitizing organizations. Warwick (2008) asked users about the usefulness of digital resources, observing from their data: "there is a very wide range of resources being used, and very little agreement as to which are most useful." (p. 92) Fuhr, et al. (2007) specifically addressed usefulness in the conceptual model they designed for the evaluation of digital libraries. The authors described usefulness as "reflecting how users perceive the relevance of a DL with their needs, the width, the breadth, the quality, as well as the validity of its collection, and the ability to serve their goals." (p. 28) They advocated mixed methods such as user studies, information behavior and content-related studies. Petter, DeLone & McLean (2012) reviewed the history of information system success and noted "use and outcomes should be the real focus of IS success measurement within organizations." (p. 354) In their observations organizations tend to neglect the role of the user and fail to focus on how the system is used and whether users are satisfied. Schlosser and Stamper (2012) drew attention to the lack of data on the user of digital collections. They advised promotion of digital collections to make potential users aware of the resources and increase use. They also noted that just because a collection is digitized does not mean that the resources will be used.

Methods Employed

Based upon current research, the SDSU digital library was evaluated using a multi-faceted approach. Quantitative methods and qualitative methods were combined to obtain data on both the usability of the system and the usefulness of the contents. The study included brief interviews, expert evaluation, quantitative data from Google Analytics and native database reports, and finally an online survey. The methods were selected to obtain a diversity of data efficiently and with little cost.

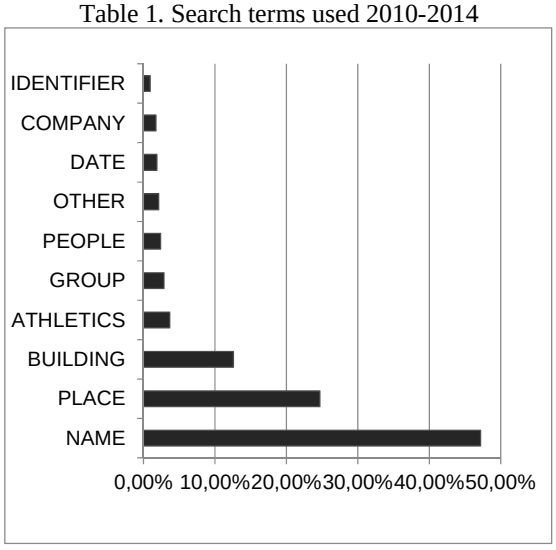
The **online survey** was linked to the database entry page in an attempt to obtain data from users of the DL. The six question survey asked viewers if they found what they were looking for, and if they found the digital archival resources available useful. They were asked for suggestions for making the site better as well as suggestions for resources to add. The survey return was too small to be statistically relevant.

Quantitative data collected from the native database reports and from Google Analytics provided solid information on site usage. The DL operates on customized software developed by iBase. Two of the most significant reports provided by the iBase database are *No Results Searches* and *Most Popular Searches*. Both reports include user data from the DL launch in 2010 to March 31, 2014. According to the *Most Popular Searches* table, the most commonly searched terms were selected from the list of controlled vocabulary. The six most searched terms on the controlled vocabulary list: 20th Century; People; Campus Buildings and Areas; B; San Diego State University; 1970s photos. (Personal names are organized alphabetically, thus all surnames beginning with a B could be browsed.)

Selection of very broad categories from the controlled vocabulary suggests that many users were browsing or were unsure of the materials held in the database.

A free text search box is available from most pages. When users utilized the free text search box, the searches were more specific. 47% of all searches typed in were personal names. Places and building names also featured prominently in the most common searches. Table 1 displays the most commonly searched terms grouped by category.

Table 1. Search terms used 2010-2014



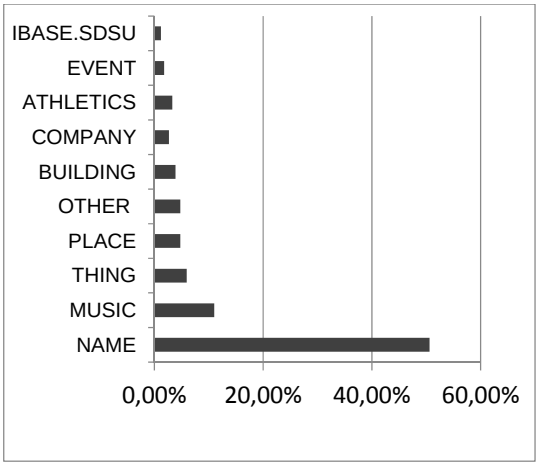
Further, users browsed all thirteen collections every month; none of the collections was overlooked. The University Archives Photograph Collection and the Student Newspapers are the two most browsed

collections, which may be expected, as they are also the largest collections.

The *No Results* reports show a gradual change. Through 2013 searches with no results were primarily Names of persons, Identifiers (the unique numbers given to each digital object), Places and then Dates. The most common reason for a lack of results was that the database contained no items to meet the search requirements. Users infrequently mistyped or misspelled searches. In contrast, the 2014 data show Dates as the most frequently searched items returning no results, followed by Names and then Identifiers. The date searches returned no results nearly always because the user typed in a two-digit year rather than the four-digit year required by the database. Another reason for no result searches was a misunderstanding of the advanced search page. Users sometimes typed words or dates into the Identifier field. Likely, users ignored or did not see the field labels and simply typed their queries into the first available search bar, which is a fielded search for Identifier.

Google Analytics offers a complimentary set of data. Data from Google Analytics cover March 2013 through March 2014. The reports from Analytics helped determine what searches brought users to the DL. Though Analytics does not report the terms users searched in Google, it does display the search term typed into other search engines such as Yahoo or the SDSU library's site. The *Organic Search Traffic* table shows the searches conducted in a search engine which resulted in a link the user followed to the DL. As shown in Table 2 more then 50% of the non-Google search engine searches bringing users to the DL were for personal names. Searches for music, objects including art, places and buildings also resulted in users clicking through to the DL.

Table 2. Organic Search Traffic



Another Analytics report, *All Traffic – Landing Page*, lists the page on which the user first enters the DL, even those entering from Google. The search terms can often be intuited from the landing pages. When a user clicks on a link from a list of search results, from any search engine including Google, Analytics records the DL page on which the user landed. More than half of the landing pages were clearly associated with a search on a personal name.

According to the *All Traffic – Site usage* table the number of users per month remains stable at approximately 1100 sessions. Users spend an average of seven minutes on the site and view around twelve pages per session. Users accessing the site from a Google search view on average seven pages and stay three minutes. Those users who access the site directly through bookmarks or typing in the URL view an average of twenty-one pages and stay longer at the site than other users, about seventeen to eighteen minutes. Users who enter the DL from the library's web site view the most pages, twenty-five, and stay for about fourteen minutes.

Turning to qualitative methods, the University of Buffalo, New York, Library and Information Science 516 class, Information Sources in the Social Sciences conducted an **expert review** of the DL under the direction of Professor Lorna Peterson. The class was asked for an analysis of the value of the contents of the DL to the university and the community and to assist in the identification of other potential digitization projects. The report constituted a significant portion of the students' grades. The students' final recommendations addressed usability, especially interface design issues, such as the need for a larger font and reorganization of the home page to better utilize the space. Recommendations for the search system and metadata included taking better advantage of the controlled vocabulary and providing pop-up help windows to assist users. The evaluators also noted a lack of a stated focus or mission for the DL.

Among the recommendations for additional digitization, the class supported a focus on collections of local interest. They suggested continuing digitization with collections concerning local San Diego companies, especially those started or directed by SDSU alumni, and a focus on immigration and border issues as well as international trade. (San Diego lies on the US border with Mexico.) The class further recommended the use of social media to better promote the site.

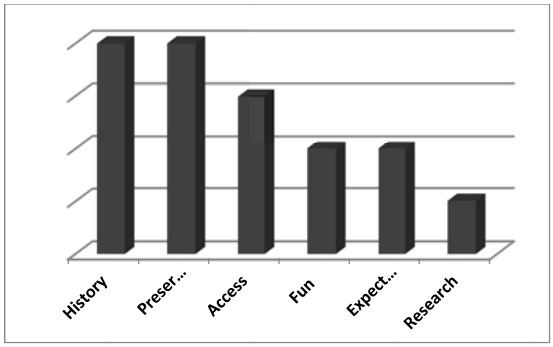
Lastly, staff conducted **brief interviews** in an effort to obtain insight from non-users of the DL. Following best practices, the survey was kept brief and the questions direct. (Iarossi 2006) The survey asked two primary questions: 1. Do you think these kinds of digital libraries are useful? 2. Please suggest other materials for digitization. The only personal question asked was the

volunteer's affiliation with the university. The sample included a majority of undergraduate students, several staff members, two unaffiliated persons, two alumni, two graduate students and two faculty members. The volunteer sample reflects the population of this primarily undergraduate school. As responses became increasingly redundant, recruitment was halted at twenty-five volunteers.

For the interviews random volunteers were approached at their work or study area. All were working on their own computers. Observers asked the volunteer to navigate to the DL using the volunteer's own computer. Observers presented a brief and informal introduction and asked the volunteer to locate a resource using the DL. If needed, the observer suggested search terms that would result in a diverse set of results, such as buildings on campus or football, which would return both images and text resources. The observers conversationally asked volunteers if they had seen the site previously, and for their opinions concerning the usefulness of the available resources. The observer asked if the volunteer knew of any resources in her/his discipline, or in his/her interests that are not digital, but would be more useful if digitized. The observer noted the volunteer's approach and success at locating a resource and reactions and answers to the questions.

None of the volunteers had seen or used the DL previously. Nearly all volunteers suggested that the DL must be underutilized because it was unknown. Nearly all the volunteers suggested a program of promotion for the DL principally using social media. All but one volunteer considered the DL valuable. Without prompting all of the volunteers offered reasons for why the DL is useful as shown in Table 3. Most addressed the importance of preserving the university and city histories. Many reflected that the materials held in the DL would be unknown to users before digitization and how the DL increased the accessibility of these resources. Several simply expected the library to digitize and develop digital libraries as part of the library's mission and service.

Table 3. Why the digital library is useful



When asked for suggestions for future digitization projects some volunteers suggested electronic textbooks or the answer keys to exams. As the volunteers had never thought about digitization, superficial answers or suggestions that would personally aid the volunteer were to be expected. Other responses, however, were much more thoughtful. Observers' suggestions for digitization projects included: graphic arts and comics; local and neighborhood newspapers and newsletters, playbills, photographs and video from student performances; photographs of student and faculty works of art; oral histories, particularly with SDSU alumni; anything relating to border issues and immigration. The digitization suggestions segue with the interests of the community; San Diego hosts the Comic-Con International, the city is located on the border with Mexico; and the university has strong performing arts departments. Interestingly, few volunteers mentioned interactivity. One suggested allowing artists to upload their own photographs; another suggested an interactive yearbook.

Discussion

Both quantitative and qualitative data suggest that patrons are finding useful materials in the DL. The DL has maintained steady use, all collections are regularly consulted, and the expert evaluators and interviewees valued the resources.

The results of the interviews and expert evaluation can be viewed through the framework of total economic value, a means of cost-benefit analysis. Total economic value is a means of determining the worth of non-commodities such as the environment or libraries. Existence value is when on-users value the DL even though they do not have an immediate need for the resources it holds as demonstrated in the comments obtained in the interviews. Option value was also expressed; the non-users enjoyed knowing that the DL exists. The volunteers appreciated the DL for prestige factor of finding resources associated with the user, in this case the university, have been valued enough to be included, as well as bequest value, an appreciation that the materials will be available into the future. (Matthews 2013; Tanner 2012).

Also, the expert evaluators and the interviewees agreed upon the significance of collections of local interest and history. Concentrating on materials specific to the university and city would help provide a focus and mission for the DL. Additionally, users frequently searched for names both within the database and through search engines. This may be a reflection of the resources held in this particular DL or may be indicative of the use of the Internet for social connections. Either way, the data

support the prioritization of collections concerning SDSU and San Diego people, groups and organizations.

The quantitative data are less amenable to interpretation. It is challenging to compare statistics from one digital library to another. Too many factors influence the data, including the audience, holdings, and software, to make relevant comparisons across DLs. One of the best uses of the data will be to compare the DL against itself over time and after improvements or additions.

Accordingly, the evaluation has spurred enhancements in the DL. Addressing several of the interface issues, a redesign will be rolled out in the summer of 2014. Since many users took advantage of the controlled vocabulary, the list will be featured more prominently in the new design. The fielded search screen will be altered so that the Identifier field is not the first search box. Also, since many failed searches were the result of malformed dates, the new design will include help on date searching.

The research results also influenced the prioritization of digitization projects. The digitization of a post card collection containing San Diego and California images was begun in 2013 in an effort to include additional local materials.

The interviews and evaluation pointed out the need to publicize the DL. Based upon her research Matusiak (2011) advocated better promotion of unique digital collections and better strategies for gaining the attention of users. The Schlosser & Stamper (2012) research concurred with the importance of promotion to direct users to appropriate resources. Thus, the SDSU digital library will undergo two more evaluations. The first will compare this current usage data to data obtained after the new interface is brought online. The second phase will include a social media promotion campaign to determine if awareness of the DL can be increased and which methods of social media work best.

Conclusion

The primary purpose of this research was to determine if a combination of measurements could lead to practical data concerning the usefulness of a digital library. With little library and archival literature to draw upon, the project used several quantitative and qualitative methods. The research confirmed the usefulness of the current collections and indicated new digitization directions. In addition, the research inspired alterations to the interface to address usability issues. The research validates the use of hybrid or mixed methods to present a more comprehensive picture of the usefulness and usability of the digital library.

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Curriculum Vitae

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Assessing requirements for research data management support in academic libraries: introducing a new multi-faceted capability tool

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Abstract

This paper introduces the practice of assessing requirements for research data management (RDM) support in academic libraries, building on concepts of maturity, capability and readiness. An overview of existing RDM assessment methodologies, tools and instruments is presented, with institutional exemplars from the UK and the US. Drawing on consultations with the eScience community, we describe the development of the Community Capability Model Framework (CCMF), the derived capability factors and the CCM Profile tool. Finally, a Case Study for Agronomy research data is presented, showing how the CCM Profile tool can be applied to disciplinary research, to provide summaries and visualisations of data-intensive capability, which may inform planning for RDM support services in academic libraries.

Keywords*:* Research data management services, Capability assessment models, Data-intensive science

Introduction

The need for academic libraries to provide a range of research data management (RDM) services to large-scale disciplinary projects and local researchers, reflects the increasingly data-intensive research process described as the "*Fourth Paradigm*" by Hey, Tansley & Tolle (2009). Additional drivers come from research funder mandates for data management plans to be submitted as part of the grant application process e.g. European Commission Horizon2020 Projects and the National Science Foundation in the United States, and from the reputational risks associated with problems of data access, data quality and integrity over time. Institutions such as universities and research units with substantive research portfolios, have significant data assets; this legacy data may be in a wide range of storage locations, formats and types. A key early activity in developing RDM services in libraries, is to understand the variety and state of this legacy data. In parallel, it is also crucial to understand the range of disciplinary practices and norms which underpin the research data lifecycle. This disciplinary evidence gives a perspective on the capability and readiness of the particular domain community for data-intensive research. Taken together, these two approaches provide a rich foundation to inform the development of RDM services. In this paper, we present a review of RDM assessment methodologies, and introduce a new tool for libraries, based on established capability and maturity models (Crowston & Qin 2011).

Theoretical Framework and Literature Review

Libraries now have a range of assessment methodologies to capture RDM requirements associated with legacy data and current research practice. One of the early tools to be developed was the Data Asset/Audit Framework (DAF). The need for such a tool was highlighted in a Recommendation in the "*Dealing with Data Report*" by Lyon (2007): "*JISC should develop a Data Audit Framework to enable all Universities and colleges to carry out an audit of departmental data collections, awareness, policies and practice for data curation and preservation (Rec 4).*"

The DAF tool was developed by HATII at the University of Glasgow, UK and is described in detail by Jones, Ross and Ruusalep (2008). A four-stage methodology was conceived which involves a planning stage, an asset identification and classification stage, an asset assessment stage and a reporting stage. The tool is designed to be used by non-specialist staff. The DAF methodology was

validated in pilot developments at each of the project partner sites at the School of GeoSciences, University of Edinburgh and the Innovative Design & Manufacturing Research Centre, University of Bath. Additional UK sites (King's College London, Imperial College London and University College London), also carried out DAF pilot studies. An overview of the methodology and pilot outcomes is available (Jones et al 2008) with full reports from the pilots at Edinburgh - Ekmekcioglu and Rice (2009), UCL – Polydoratou (2009) and Imperial College – Jerrome & Breeze (2009). Note that the tool is now known as the Data Asset Framework.

The UK Digital Curation Centre has developed the CARDIO (Collaborative Assessment of Research Data Infrastructure and Objectives) and CARDIO-lite tools, which provide a maturity-based assessment of research data collections and practices. The three-legged stool digital asset management model from Anne R. Kenney at Cornell University, has been used with foundational elements of technology, organization and resources. Statements relating to each of these aspects are then presented to the user, who will rate maturity on a five-point scale. An overall picture of the position for research data curation is then provided. The CARDIO-lite tool has been remodeled into a Mini Quiz by Fowler (2012) at the University of the West of England.

The application of interview-based mechanisms has also been used to assess RDM practices. Three contrasting approaches are the Data Curation Profiles Toolkit developed at Purdue University by Witt et al (2009), scorecard approaches such as DMVitals, Sallans & Lake (2013) and research persona development e.g. Lage et al (2011). The Profiles Toolkit represents a well-documented suite of instruments used to gather information about disciplinary data collections and practice. There is a User Guide, Interviewer's Manual, Interview Worksheet and a basic template. The interviewer is prompted to probe particular data lifecycle areas and data management behaviours in some depth, to gather a full picture of the curation requirements of a particular domain. Examples have been collected in a Data Curation Profiles Registry. DMVitals developed at the University of Virginia, is an Excel-based tool with three types of worksheet: interview questions, data management categories and the report sheet. The latter contains sections for a sustainability index as percentage ratios which are grouped into five colour-coded levels of maturity; these are followed with recommendations and action statements. The personas approach developed at the University of Colorado Boulder, seeks to categorise researcher profiles based on their interview responses to a fixed set of nine questions about their data curation practices. Results are then conflated into one of eight personas e.g. *"Very interested, has no support", "Receptive, already has a repository", "Not interested, competitive discipline with proprietary funders"*. This gives a landscape of perspectives and data requirements, which can subsequently inform the development of RDM services to researchers who share traits.

Survey instruments which may be based on Web software tools such as SurveyMonkey, have also been used to gather requirements about data curation practices and legacy data. Two examples which both provided rich and detailed quantitative and qualitative material, are those from the University of Bath, Pink et al (2013) and Knight (2013) at the London School of Hygiene & Tropical Medicine.

Research Questions

Given the character of existing tools, we sought to develop an assessment tool which addressed the widest range of parameters affecting data-intensive research: policy drivers, legal environment, researcher training, disciplinary practice/culture, technical infrastructure. The aim was to develop a simple self-assessment tool primarily for researchers to use, to catalyse the collection of disciplinary profiles to inform RDM service development in libraries, research funder investment decisions and policy-making in the data arena.

Methods

We gathered input and ideas from eScience researchers across a range of disciplines and data curation communities, to scope development of the community capability model (CCM) framework. This was achieved via a series of six international workshops (Cambridge MA, Melbourne Australia, Stockholm Sweden, Bristol and York, UK, and Amsterdam, Netherlands), which explored different maturity models and scoped the data requirements landscape. The workshops also helped to pinpoint the capability factors and the visual presentation of the concepts. In addition, three mini case studies were completed which introduced policy and practice perspectives from different stakeholder groups: an academic institution (University of Bath), a research funding body (Economic & Social Research Council ESRC) and the research community (a group of Principal Investigators from eResearch South). This collated evidence informed a CCMF White Paper (2012) which articulated the foundations and structure of the model and its dimensions. A visualization of the model was derived as a basis for the CCMF-Profile template.

The Research Data Alliance (RDA) has provided a further arena to engage with a wider group of data stakeholders and an RDA CCM Interest Group was established, meeting at the 2nd Plenary in Washington DC.

Results

The CCM Framework contains eight capability factors (Openness, Legal, Ethical & Commercial Considerations, Collaboration, Economic & Business, Skills & Training,

Common Practices, Research Culture and Technical Infrastructure).

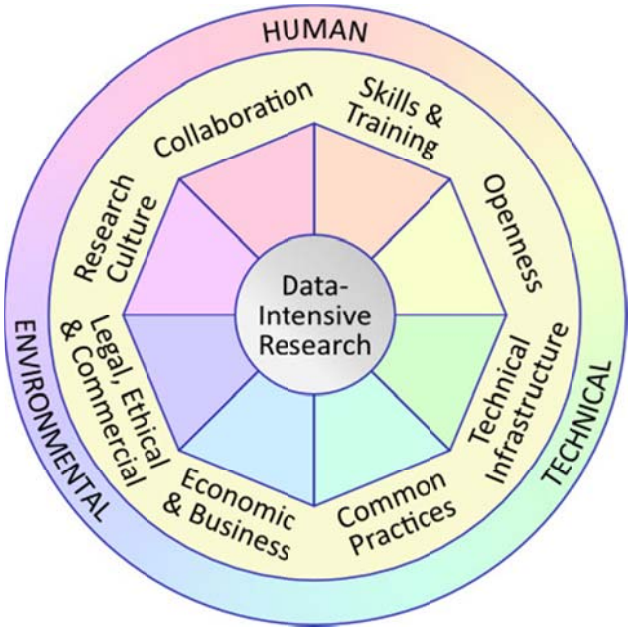

Figure 1: Community Capability Model Framework

We have developed an Excel-based CCMF-Profile template, which includes a range of characteristics associated with each data capability factor, allowing a deep analysis of each dimension. Five capability levels, ranging from "nominal" to "complete engagement", are selected to describe the discipline, the project or researcher.

Figure 2 shows the Excel worksheet for the Collaboration capability factor, which has four characteristics exemplified by four questions. A participant scores each of these depending on where they estimate the current state to be (Nominal activity (1); Pockets of activity (2); Moderate activity (3); Widespread activity (4); or Complete engagement (5)). The sum of the scores provides an indication of how well the Researcher believes that the relevant community is engaged in terms of that particular capability factor.

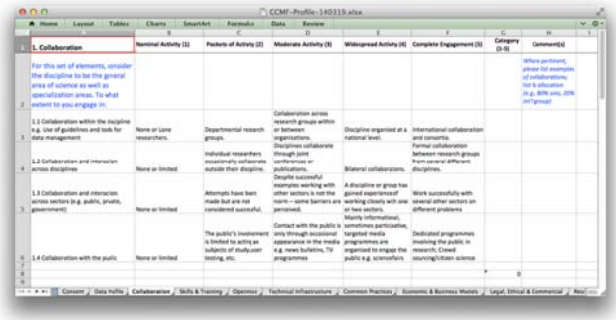

Figure 2: Worksheet for Collaboration Capability factor

The CCMF profile tool is being applied to assess RDM capability by academic libraries, disciplines and projects.

Case Study – Agronomy

At Purdue University, a Principal Investigator in the area of agronomy spent several hours customising the profile tool (iteratively), to make it more appropriate and accessible to other agronomists. For example, in a number of cases the original language was changed to make it more (sub) discipline-specific and the original examples used in the profile were changed to be more relevant to agronomy. In addition, the language in several questions was modified to clarify what was being asked for.

Following this process, the researcher and two other research agronomists spent less than one hour completing the localized profile tool. The results are shown in Figure 3.

In this case, all three researchers are agronomists, working in areas that are similar. Their research foci are different, but they do collaborate - all three share graduate students, methods and resources. Researcher 1 oversees a field station for studying water quality and works with other groups on campus; Researcher 2 works with environmental Nano materials with other groups regionally; and Researcher 3 works in crop physiology/ecology and works with national groups.

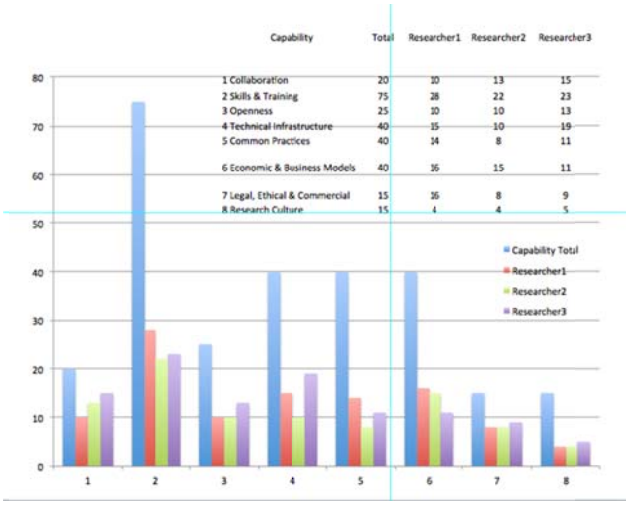

Figure 3: Results from Agronomy case study (adapted from a slide by Scott D. Brandt)

Even a cursory analysis comparing the three scores of the Researchers from least amount of activity or engagement in an area, to what would be most activity or engagement (indicated in blue), can be quite revealing. As can be seen, capability 2, Skills and Training, is the area in which there are the largest gaps, but there are relative gaps throughout. For Researcher 1, the highest score was 3 (8 times) and the mode was 2, or Pockets of Activity. For Researcher 2

Nominal Activity (1), was the mode, and the highest rating was a 4 (Widespread Activity) in Openness of literature. Researcher 3 had much more variety, selecting 4 (Widespread Activity) 7 times, and gave Openness of Literature a 5, indicating complete engagement.

Such analyses and comparisons based on self-assessment can be used to highlight trends and gaps within an area or discipline, which can then be used to plan or modify goals, priorities, policies and resource distribution, depending on the desired outcome.

We envisage that the CCMF-Profile tool will be particularly useful for undertaking longitudinal studies over a period of several years, to monitor progress in specific areas.

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Curriculum Vitae

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Little Scientist, Big Data Information fusion towards meeting the information needs of scholars

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Abstract

With increasing numbers of scholarly publications, and multiplicity of publication-types and outlets, overviews of research fields have become a challenge. We bring together bibliometric methods, information retrieval, information fusion, and data visualization within a new project, *INCITE - Information Fusion as an E-service in Scholarly Information Use*, with the aim to develop improved methods and tools addressing emerging user-needs. In this paper we report on ongoing research within that project. (a) We elaborate on a qualitative user-study in which the emerging needs of researchers in the age of big data are explored. The study is based on interviews and dialogue with seven scholars at different academic levels. Data analysis was informed by adaptive theory, in accordance to which iterative pre-coding, provisional codes, and memo-writing were used to reach a more abstract level of analysis. A number of challenges related to the multiplicity of information sources and extent of data were identified including difficulties in keeping track of all the relevant sources; the inability to utilize extensive sets of data being taken for granted; and using data reduction strategies that at times go against the scholar's own ideals of scholarly rigor. In analysing these difficulties, we have identified potential solutions that could facilitate the process of forming overviews of different research areas. (b) An example of such a solution is presented, which is builds on the Dempster-Shafer Theory and is designed to allow for interactive individual ranking of information sources in the process of a coordinated search across different information sources.

Keywords: e-services, information behaviour, bibliometrics, information fusion, big data, research area overviews.

Introduction and background

In this paper we report on ongoing research related to provision of e-services to scholars. Traditionally, there has been a disconnection between qualitative and quantitative approaches. We bring together both of these where project members with diverse but complementary strengths in INSU (information needs, seeking, and use), bibliometrics, information fusion and visualization join forces.

According to a report by the European Commission (2008: 51), the number of researchers in EU-27 in 2006 was listed as 1.33 million, with an annual increase of 3.1%. This was given in full time equivalent; the number of actual individuals goes beyond this. The numbers given for the US were higher and considering the countries in the rest of the world, the total number becomes rather substantial. Each of these researchers, regularly or at times, is involved in accessing scholarly communication data, making sense of and forming overviews of research fields. This is commonly a *time-consuming* and *costly* process. We plan to gain further insight in this process with the aim to facilitate and improve this scholarly practice.

Advances in digital technologies have contributed to increased production of data and new strategies for collecting and managing information. This has given rise to the advent of massive and complex data sets, which go beyond the capabilities of common software tools, and are commonly referred to as 'big data'. The definitions of this term are varied; for some the size of data (in terms of measurement units such as Exabyte) is a main issue, while for others it involves broader aspects. Researchers at the Oxford Internet Institute explain their view of 'what big data is' as follows:

> Our working definition is that they are data that are unprecedented in scale and scope *in relation* to a given phenomenon. In other words, data that represents a step change in how a field or discipline is able to address social science questions. (Meyer, Schroeder, Taylor, 2013 – emphasis added)

Here big data is defined as a relative concept where what can be seen as big (or not) depends on the context. Others have highlighted three related attributes of information assets in conjunction with other requirements by sating:

> Big data is high-*volume*, high-*velocity* and high-*variety* information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision making. (Gartner IT Glossary, 2013 – emphasis added)

Regardless of how it is defined, big data has become a phenomenon of our time and in relation to it, scholars have become faced with new opportunities and challenges. While processing of big data in terms of capture, storage, management, search, cross-referencing, analysis, sharing, transfer, and visualization requires technical solutions, it is also imperative to investigate the information needs and behaviour of scholars in the face of the new challenges and opportunities.

In this study, the focus is placed on scholars' endeavours in forming overviews of research fields. Although the size of data sets used by scholars in this pursuit may not yet reach millions of terabytes, we are witnessing an exponential increase in the volume of scholarly communication in different formats. The volume and variety of data that can be used to form overviews of different research fields have increasingly become of magnitudes that go beyond the scale and scope of common tools available to everyday scholars.

Whereas a literature review in a near past would have involved reading and analysing a few hundred articles, today such an endeavour becomes a challenge when the volume of relevant publications extend to thousands, or tens of thousands of items. Thus, the production of scholarly *literature reviews* or *overviews of research fields* has become a major challenge, particularly in multidisciplinary fields where publications from many different areas may be of interest.

The use of publication indicators and bibliometric measures as proxies for quality, and in turn as methods of assessing centrality of published literature has been shown to be marred with a number of problems (Borgman, 2007, 63ff). There are many issues associated with assessing relevant works by means of citation frequency or impact factor measures. First, using highly regarded publications based on the sources' reputation as measured by its (journal) impact factor is questionable since average performance of a publication does not indicate that an individual paper will fare well in terms of received citations (Seglen, 1997; Cronin, 2005). Furthermore, citation frequencies aggregates cumulatively, meaning that recent research always is at its disadvantage in comparison, and at the same time citation frequencies are highly skewed, e.g. in the way citedness is distributed over time (van Raan, 2006). Other issues relate to differences in publication as well as citation practices that present themselves in the problem of comparing sources to each other within and between different research areas.

Multiplicity of publication outlets, including a flourishing of open access journals and depositories not included in citation databases, complicate the situation further. It is not always possible to identify the most relevant sources of information that should be observed. The current labour intensive identification, evaluation, analysis, and mappings are no longer adequate.

To address these challenges we have witnessed the arrival of various data-mining, content analysis, and visualization tools which can be used in algorithmic analysis and visualization of bibliographic data.

Nevertheless, problems remain. Consequently, we have initiated a project, INCITE, in which we examine the current approaches and consider development of new improved methods and tools that can be of service to researchers. In the project, we address two major challenges that confront any scholar. The first challenge involves a cluster of issues including validity, quality, uncertainty, and usability of scholarly communication data. There are many problems with data integrity, duplicates, name ambiguity, and non-standardized formats. The second challenge is to put scholarly communication data to optimal use. We here see a unique opportunity in utilizing techniques and methods from the research field of information fusion (IF) (Liggins, Hall, & Llinas, 2009), where much research has been performed regarding decision support for different types of application scenarios. In particular, we anticipate that the IF methods utilized for building predictive models and handling different types of uncertainties may provide a novel and fruitful perspective on scholarly information use. One important initiative in this direction is to evaluate whether the methods for combining uncertain information, typically utilized in the IF domain, could model different types of certain and uncertain relationships between bibliographic items from various structured and unstructured sources in order to support information retrieval and use in the scholarly process.

Accordingly, the overall aim of the INCITE project is to evaluate existing procedures in data access, analysis, and visualization and to construct improved methods and tools based on a combination of information retrieval, bibliometric methods and information fusion methodologies that can be used in analysis, visualization, and interpretation of large quantities of data to support researchers in their day to day information use. The focus is placed on the production of overviews of research, especially in multidisciplinary fields in which the potential relevant items are too extensive to be managed by human reviewers.

Based on this background, in this paper we present (a) an interview-based user study, which was conducted to inform the follow up activities within the INCITE project. We then present (b) Interactive Individual Ranking as an example of the types of solutions that we are investigating within INCITE.

(a) The User Study – Introduction

Studies of researchers' information behaviour suggest that these differ widely between disciplinary categories. Some distinctions between broad meta-categories such as science, social science and the humanities tend to note that while scientists relate more to journal articles as their primary literature, humanists, on the other hand use books and archives to a higher degree, while social scientists also rely on institutional data (Case, 2007) as their primary resources. This is further emphasized by a JISC meta study of twelve user behaviour studies. Their conclusion was that disciplinary differences in search behaviour prompts libraries and other service providers to gain the ability to serve many different constituencies (Connaway & Dickey, 2010).

In terms of temporal factors, researchers generally use literature of recent age with a majority of the read literature being less than two years old (Tenopir and King (1998), cited in Borgman, 2007). The same authors also found that the time spent on searching and downloading articles roughly doubled between the years 1984–2000, a period during which the manual practices of finding literature turned into digital downloading and printing (Ibid.).

The fast web-based information searches, and the incorporation of bibliographic databases, digital archives and institutional sources within the web, suggest that differences between these sources are on the brink of levelling out. The JISC report speaks of finding ways of providing seamless access to resources, arguing that providers must be able to accommodate different needs due to changing user behaviour (Connaway & Dickey, 2010, p. 32).

An early study of user queries on the web (Jansen et al, 2000) found that in contrast to users of traditional information retrieval tools, web searches were found to include a low use of advanced search techniques (such as Boolean operators), instead having a rich variability of unstructured search terms. This implies that there was a need for new types of interfaces and methods to create term lists and indexing results (Jansen et al, 2000, p.226).

While informed by such findings, we conducted a new user study so that we are up to date with the current situation and in order to examine the potential relevance of *big data* for information behaviour of scholars. That is, we wanted to examine whether the increasing number of publications and available material (volume); diversity of publication types and outlets (variety); and the speed of production and manipulation (velocity) has had a bearing on the needs and behaviour of scholars. Furthermore, we wanted to focus on scholars' information needs and search strategies only in relation to *two specific tasks* of forming an overview of a research area and writing literature reviews.

Purpose of the study

The overall aim of the study is to gain an insight into the information needs and information strategies of scholars in the light of ever-increasing information volumes and types. The overall research question posed is:

> In what way, if any, has the availability of increased volume of information, multiplicity of sources, and emergence of new data types had a bearing for scholar's information behaviour in their processes of

forming an overview of a research field and or *writing literature reviews*?

To investigate this, a number of sub questions were formulated, all related to scholars' use of information in the process of conducting the mentioned two tasks:

i. Which information sources are used/ prioritized?
ii. How are new upcoming sources and publications identified and to what extent are these accessed and used?
iii. What amounts of documents and bibliographic data are typically accessed and or reviewed?
iv. What are the methods and tools used when faced with large amounts of data/ publications?
v. How is prioritization done, if at all?

Methods, materials, procedures

This paper reports on on-going research. For the purpose of gaining a better understanding of scholars' information behaviour, the use of interview technique was deemed to be appropriate (see e.g. Case, 2007; Denzin & Lincoln, 2005; Silverman, 2005; Yin, 2003). So far, seven interviews have been conducted with scholars from seven different countries, two of whom had English as their native language. The participants comprise of three professors with extensive knowledge of their fields and numerous well received publications. Of these, two hold the position of scholarly journal editor. Two participants are seasoned researchers with several years of postdoctoral research activities and numerous publications. One participant is a PhD student at an early to mid-stage of completing the PhD programme. The final participant is a researcher / expert bibliometrician whose current role involves supporting other researchers with various bibliometric studies.

All these study participants have had a background in, or are currently closely associated with, the field of Library and Information Science (LIS). The assumption behind this choice was twofold. First, LIS is a multidisciplinary field; hence an overview of a topic of interest may involve knowledge of, and access to, publications from different fields. Second, it was hoped that by being from the field of LIS, the participants would be very familiar with a variety of relevant information sources and have a solid knowledge about different ways of accessing and making use of potential sources. Further interviews with scholars from other fields are planned.

Prior to the interviews, the objectives of the INCITE project were discussed with the participants. The semi-structured interviews each took from 45 minutes to over one and a half hours. The interviews were recorded and transcribed. In several of the instances, the interviews were followed by looking at actual examples from participants' related experiences in forming an overview of a new field, as well as studies and visualizations conducted by the interviewer that involved larger data sets. In looking at these examples, a number of problems related to search methods, data access and visualization were discussed. These were used to prompt comments from the participants. If new information beyond what was said in the interviews came forward, notes were made and included in the data analysis.

Data analysis was informed by adaptive theory (Layder, 1998). A brief provisional coding was conducted at the time of transcribing the interviews. The recordings were listened to and transcriptions were read on multiple occasions and at each time the allocated codes and memos were revised and cross-referenced. Iterative coding and memo-writing were used to reach a more abstract level of analysis. The qualitative data analysis software AtlasTi was also used to facilitate the coding and analysis process.

Findings

A basic assumption underpinning the INCITE project is that *accessing and reviewing publications and forming overviews of different research areas are integral parts of the scholarly practice.* In the dialogue with the study participants, not only did we find grounds for this, but a nuanced variation of the goals for such efforts emerged. As part of the objective with a literature review, one participant, for example explained "I think it's necessary in order to realise that we are not reinventing the wheel all the time" and so that one does not address "something that has already been studied tonnes". Another comment was "I need to start with a little bit of sense of overview at least of what's going on there". But there was a variation in reasons expressed, such as "well I do the literature reviews because it is expected", or "I want to position myself within a scholarly discourse", and "we know that there are some rules and these are probably silly, maybe they are, but this is the only way for us in order to be accepted". The different reasons that were imbedded in the discussions could be summarized as follows. (a) Environmental scanning: with aims such as getting informed about a research field and new emerging topics; keeping abreast of fast evolving areas; and getting a sense of what one's research community regards as valuable or of importance. (b) Intellectual and creative work: with aims such as identifying interesting gaps in earlier research; positioning one's work within a field of study; to find supportive or contradicting evidence for one's own research findings ideas, or writing; and to avoid reinventing the wheel. (c) Meeting the norms: the aims here include getting to know who one should cite in order to get accepted by the research community; to avoid being seen as a newbie; so that one's writing gets accepted for publication; and to meet the expectations and play the academic game.

The dialogues with participants, therefore, lent support to our first basic assumption. We also examined a second conjecture. In the recent times we have witnessed major advancements in the digital communication technologies

which in turn have led to the advent of new data types, upcoming information sources, as well as emergence of novel research areas. Therefore, a second assumption associated with the idea of the INCITE project is that *the combination of emerging new phenomena, and diversity of information sources, as well as the sheer size of the available information may lead to difficulties in locating, accessing and processing the data required for forming overviews of different research fields*. We also found support for this assumptions in the interview data as a nuanced picture of potential challenges materialized as described below.

All the study participants showed awareness of a multiplicity of information sources and channels present on the information landscape. While the preferences of information sources varied among the participants, that is, although a source that was valued highly by one participant could well be described as less suitable or relevant by another, all of the participants to a lesser or greater extent had accessed and used multiple data types and sources, (some to a very advanced and extensive level). Depending on how one chooses to count, around 40 different information sources/resources were named by the participants. These could be categorized as: freely available search engines, databases, open access repositories, social networking sites, other web-based resources, printed sources, and human recommendations. In the dialogues that took place, one could find a pattern emerging where the expressed or implied challenges would be associated to two different types of situations.

Complexity related to variety and velocity – First*, related to recent research or new research topics*, a lack of relevant publications in scholarly journals and indexed databases was highlighted. While much research may be conducted, the publication of results in scholarly journals and indexed databases lags behind. Therefore it has become important to access alternative sources of data that might allow access to new discussions or findings. One participant explained about a topic of interest by saying, "the research on this new phenomenon is very limited and much about it is written in press articles, promotional material, articles by practitioners, and blogs" going on to indicate a need to access these and other alternative sources. This need could also be exemplified in the following comment by another participant; "if you try to develop a research project it should be an area where there is not much earlier research, and then it's necessary to look at blog writings and stuff people have in Facebook and things like that, which are not sort of reviewed; or alternative journal sources, but which are as up to date as possible. And which might have a very new insight, or finding of a viewpoint, because I think academic research lags behind a lot; if we try to keep up to date with development of networked environments via scientific literature it's not going to work".

It became evident that identifying and accessing the many different alternative sources of information, which might prove to be relevant, is however, a challenge. One participant, for example, while talking about research on a new phenomenon, said "[it] is so recent that it's transforming really, as we speak. That most of the documents that we have are press articles and blog entries. But simply as researchers, don't manage to keep up with the pace of transformation". Another participant who had mentioned that access to researchers' websites and blogs would be useful did not access these with the comment, "I seldom do that, but maybe that's a good idea. But I wouldn't be sure how to find them. Yeah, yea; those researchers that I know by name within my own field, those websites I find easily of course. But otherwise, there are.., in another instance I wouldn't know who to look for." Yet another participant, referred to the need to learn webometrics for analysing information on different websites, blogs, etc. explaining, "because it's..; it's also a reasonable delay before something gets indexed in subject databases or multidisciplinary citation databases. So time is a disadvantage. So I would [if the participant could] probably look at the web somehow and collect data from the web." Similarly other participants also discussed the need to access alternative sources and data types indicating a difficulty in knowing where to look or how to get access to these.

Individual strategies – To access the up-to-date information and alternative sources, participants had, therefore, formed personal strategies; for example one of the participants, would keep the calls for papers and or conference participations to follow up after the calls' deadline. This participant would access the conference programme and after the conference date would look for the potentially interesting presentations on researchers' websites and blogs as well as their academic social media accounts, or conference websites. Other strategies included accessing practice papers; using various forms of news alerts for capturing the reports by research centres and market surveys by big survey agencies; periodic searches on key-researchers or project websites; joining mailing lists; periodic random searches on different search engines; following related debates in mass-media; attending seminars of potential relevance; building network of contacts and receiving tips to then be followed up by snowballing and so on.

Still, much of the findings seemed to be seen as random and often serendipitous. A respondent described that an open depository related to a topic of interest was found randomly; or that the respondent had by chance got to know about "some empirical work going on in Europe" which was then followed up. This respondent also provided other examples of random discoveries which had proved to be of much interest and relevance for the respondent. Related comments could be exemplified by: "it's very serendipitous also, it's not just a linear process.

It's just – ok, I start from here and I jump there – a bit like that", or "sometimes I also find the things completely unexpectedly" or "this is another one, this is from a journal and this is probably, I also found a little bit unexpectedly" or "I don't know, I just came across this one. And that was an excellent, excellent, excellent discovery".

Challenges remain – What was indicated in several different forms was *the inadequacy of the traditional methods and tools to help find and access the relevant sources and or help form an overview of the topic in hand*. In relation to the inability to use traditional bibliometric methods in forming an overview of new topics, one comment was, "bibliometrics also require certain period of time to accumulate citations or papers or whatever". Another similar comment was, "new emerging topics, interdisciplinary research, new ideas that are not really communicated through standard modes of communication; like journal articles or books, where you have open repositories for input and output and so; this new media is not covered by bibliometric. […] So you probably have to use web resources in another way; blogs, links, between web pages etc".

Although the participants were aware of different potentially relevant sources, *the task of identifying and including them in a systematic search seemed to be a challenge*. For example, although a participant discussed the relevance and importance of a number of sources, when asked if those sources are included in the information collection strategy, the response was, "not always, I must admit, not always. There are a lot of sources that are not… I forget about them, I don't think about them. It's not that I don't want to include them, simply I don't think about them".

Accordingly, the first main problem identified in association to emerging new research areas was the lack of tools and services that would facilitate a systematic and coordinated effort in identifying and accessing the relevant sources.

As in these examples, the participants most frequently related the use of alternative newer sources to recent research or to studies of new phenomena. When traditional scholarly publications are available, those are preferred. This could be seen in an example of a participant who had earlier indicated the centrality of blogs and other new media in relation to research in new areas. When asked whether the participant had a good way of bringing together those types of data, the response was, "definitely not; and honestly I think we must be very, very, very careful. When you want to publish in selective journals, you know, they are traditional; they are conventional. When they see that you are referring to things in blogs or ..,'ooh!!'[gesturing a negative response presumably by the reviewers], there is a kind of status; okay? All the scholarly works carry a status and are worth mentioning, the rest, mm, don't look very nice". This brings us to the challenges experienced in relation to topics and research fields that are of enough age to have been addressed in scholarly publications in the traditional sense.

Complexity due to volume – Second, therefore, in relation to established and especially multidisciplinary topics, as expressed by a participant "the main problem is not that I don't have many references, or literature", in these instances the problem is rather "that I have too much". *Accordingly, the main problem identified in relation to established fields of study was the challenges brought forth by the huge size of relevant publications.*

One challenge relates to the difficulty in identifying all the fields and disciplines (and related journals) in which a topic of interest may have been explored. As one participant who had found it necessary to identify and use publications from different fields explained, "because there are contributions from people from different disciplines so I..; and also I'm a little bit at the interface myself, I don't consider myself very neatly positioned in any particular boxes so I use contributions from [several different fields]". The searches for this participant would start with a common search engine, known journals, and then snowballing, describing "then from there I see that probably there are other journals, other resources that I didn't know of that they can have some interesting stuff for me" indicating that at times this leads to discoveries in other fields than originally were imagined.

When it came to the volume of the data, one participant, the bibliometrician, regularly accessed and processed huge sets of data. The other participants, however, seemed to take it for granted that access and processing of big data sets were not possible for them. They indicated that a comprehensive coverage of the relevant material is not possible with comments such as "that's impossible, I try to get the central information" or "when you are a beginner researcher you don't know where to stop. People don't teach you. Because you have this idea that you should cover as much as you can, this is completely impossible." One participant said, "I've never been concerned with preparing something which is comprehensive, exhaustive – this is something that I cannot do." In another comment a participant said, "I am very pragmatic, you see. I have a limited amount of time, right, I have a limited amount of time, I want to quickly discover things of interest, I don't want to discover *every*thing of interest."

While the typical magnitude of the data successfully accessed and analysed by the bibliometrician was large (e.g. in one instance 19 million references and around one and a half million documents), a typical number at each instance by the other participants was a lot more modest (ranging from around 20 articles to several thousand publications).

The search and the required reading were often described as a very time-consuming process. For example,

a professor who through participation in a collaboration project had been introduced to a new research area had identified only some of the key books in the new area for reading in order to get an overview of the key ideas. This professor indicated that the reading of those books took a whole lot of time, including a whole summer vacation, without being able to cover it all. Another researcher discussed the way some researchers account for a rigorous systematic search in their publications and added "this is not what I can do, because it takes a long time and it takes more than one person." This participant elaborated further, "when you don't have much time, what I do instead and what I think a lot of other researchers do, we are not that systematic, we identify a little set of literature which we consider relevant for our research […] and then you use those." The limitations in time and financial resources for systematic searches, therefore, were highlighted time and time again with comments such as "there isn't that time anymore, unless you have money". When a systematic extended review is not seen as feasible, this is dealt with in different ways. One participant explained, "so I try to find an elegant and very nice and acceptable formulation when I write my papers to make people understand that yes, I did some literature review, it's not comprehensive. So I try to see what people usually write in papers when it comes to this and I found that a lot of people, much more authoritative than I, think like: this is a very short literature review so no ambition of being comprehensive, it just covers the most recent literature you can identify in a kind of a period of time. This is what I do usually. So I perform selective, short literature reviews. This is what I do right now in my research. I was a bit more comprehensive when I was a doctoral student, but I had more time at that point and it was probably more expected."

Individual strategies – Several participants were in agreement that more systematic and rigorous searches are only feasible during one's PhD studies, when one has the time and when this is expected. At other times, in response to common restrictions, reduction in the volume was seen as necessary. Often when a search would return voluminous results, only the first few items or pages of results were considered. At times, a search would be concluded just as soon as a small number of relevant items were found. For some participants, relying on human recommendations was a core strategy and was identified as a preferred trusted means of finding documents of interest. Strategies for reduction of large volumes of data to manageable sizes included modifying the search terms; delimitations by date of publication, publication source, and document type. The refinements were done in order to include mainly items that are "considered within the scholarly community" as important pieces of literature, items that are "somehow recognized as really belonging to the field", papers produced by organizations that "are recognized as well-reputed and well-established and authoritative", or documents by authors who are regarded highly. The idea often was to choose those items that could be recognized as significant and could show the selection to be justified. For this, often the items selected would comprise of those top ranked by the search engines or most highly cited items as identified by a citation database or items highly recommended by an expert, and so on.

Being cited highly was a recurring response in different forms. Some of the participants who indicated the high level of citations as a quality measure for selection in parts of the interview were somewhat in contradiction to what they said in other parts of the interview. For example, in case of one participant, when asked whether in selection any attention is paid to the number of citations, the response was, "not at all", and elsewhere in the interview this participant commented "sometimes people do a lot of honorary citing that I don't like, because not all articles written by respected or well acknowledged scholars on a specific topic are the most important articles on that topic", still in another part of the interview this participant indicated high level of citation to be a criteria for selection at times. This could be interpreted to exemplify the scholarly ideals that are not easy to fulfil given the limitation of current praxis and norms. This could be better illustrated in another example where a participant demonstrated informed awareness of the limitations of the citation practices. Still this participant would base relevance ranking on the assumption that these measures "are of a good standard", indicating that given the current situation and available information this is "the best assumption" that one could have.

System shortcomings – Even those who had the know-how and resources to invest in this task did not find the processing of large sets of data an easy task. One participant, while talking about an established database, mentioned, "they have other problems. They index a lot of rubbish, for instance. I looked at some of my papers that are not really very interesting, not peer-reviewed or nothing, but they still index it. So there are a lot of garbage too". Beyond the quality of the data, several participants described the limitations of current tools in helping them beyond the selection. Although the participants were aware, and to various degrees took advantage of the search refinement possibilities offered by different databases and bibliographic services, when it came to huge data sets their needs for refinement went beyond the options offered. A participant, for whom theoretical discussions were the key interest, gave a reason for seldom using databases as, "you can't really search for theories". Another was interested in studies that had adopted a particular perspective in investigations of a particular phenomenon while using a particular method. This participant had also found it difficult to find relevant

items. Although one could refine the search (by different criteria such as date, language, research area, journal, etc.), and could use a sophisticated combination of terms to get close to what one wanted, this did not seem enough when huge sets of data were retrieved.

In the interview sessions, participants were shown examples of analysis and visualization tools which most of the participants found of interest. When for example one participant was asked if such a system would be of use, the response was "Yes! It would be. Definitely, absolutely. This is, I mean, you see, how can a person manually manage something like identify what's relevant when you have 11,000 hits or something." Beyond the facilities that are commonly offered in databases, there were other wishes for features that did not seem to be available in current systems. For example, one could not easily identify only those documents in which *definitions* of a term are provided. At other times one was interested in publications about terms that could have different meanings or be treated differently as a "sociological phenomenon" or "a technical subject matter". Just selecting the research area or journal did not help to refine the retrieved items to a satisfactory level. It was a wish that search facilities in databases could help with some sort of content management, for example for a system to "collect me everything that has been written and then put it into categories like..; well I would see if it's about fans, or if it's about tagging, or is it about something commercial or cultural criticism […] So if it had that kind of presentation or had some keywords that tells what their angle roughly is, then that would be very useful for me."

Some sort of content analysis was sensed to be done in freely available search engines, but the algorithms and reasoning behind the selection were opaque to participants. It was common knowledge that these search engines often return huge numbers of results in magnitudes of tens of thousands or millions. However, dealing with the full extent of the results produced by search engines was not of interest to any of the participants, as much of it was found to be of no relevance, with comments such as "I notice that a lot of garbage comes up that is absolutely not relevant for me". In these types of services, the participants typically viewed only a handful of the first pages of results with comments such as "so maybe in the first page, or in the first two pages I tend to find resources that look more interesting to me and then I give up, because I realise that then it's all completely irrelevant". Here the non-transparent, non-interactive algorithmic selections were seen as a shortcoming. It was not so that in every case the most relevant would end up on top, as one participant mentioned, "if you just have the patience to skim then you can find some really, really, relevant pearls", but as mentioned earlier, in many cases the time and resource restrictions defined the boundaries of what was included in the collection of items retrieved and reviewed.

Challenges remain – Therefore the problem identified is not a lack of seemingly relevant material, the problem is rather identifying the items actually relevant among the results found by the search engines and the lack of facilities to help analyse the large sets of findings in a meaningful fashion.

Accordingly (a) the sheer size of available material, (b) limitations in the available tools and methods for locating and accessing the material, (c) limitations in the available tools and methods for meaningful content analysis of the material, (d) limited time and resources and (e) scholars' knowhow are identified in this study as factors affecting the level of information accessed and used.

Visualization – Returning back to the content analysis and visualization tools, the level of familiarity varied, but most of the participants did not use these on regular bases. Except for the bibliometrician, who had qualified knowledge of some such tools and regularly used them, only a couple of the participants had, on some occasion, used simpler such systems. Two participants had commissioned production of bibliometric analyses, and or visualized maps of the research areas of their interest. All the participants except for one, however, found such tools and services of interest. The one participant who did not, elaborated, "I think you have to take into account that this notion of learning styles, visualizers verses verbalizers. You know if you are a strong verbalizer, you will never find that kind of picture of any value at all". However, this participant was one of those who on earlier occasions had used a simple visualization tool that had helped categorized the results into clusters of closely related items. Therefore, even for this participant analysis and visualization tools fulfilled a purpose and were seen as useful as long as the outcome was simplistic and self-explanatory. This participant continued, "when I want something I want specifics, I don't want totalities". Similarly, in several instances the example visualizations were found to be interesting and useful but they did not go far enough in their analysis or in meeting the wishes of the users.

Another stumbling block was indicated to be the learning curve required for their use and for interpreting the outcomes. Even a participant who had attended workshops with the system designers could not yet use the tools. This was despite the fact that this participant had found visualization to be particularly useful and relevant. Regarding the outcomes, the participant who did not appreciate visualizations as much as the others discussed the work required for deciphering the outcomes by saying, "does it tell me something intelligible right now or am I gonna have to work at it in order to discover what I want to know [laugh]? If I have to work at it I don't want to do it because I'm lazy, right. Which is the other factor that one has to take into account, how much effort is somebody going to have to put in to learn how to use these tools". For most participants, user-friendliness was

seen as a must especially in areas where the researcher users are not technically oriented. User-friendliness was not an issue for the bibliometrician though; there, other qualities were of more importance. As expressed by that participant, "the most important thing is that I understand mathematics and statistics on which they are based. Otherwise, the other stuff like which button to push, and what happens then, and what is practical, you learn by time, so to speak. And because I have used them so much, thousands and hundreds of times, so it's never an issue any longer. So, and I never bother about if they could be more practical or more user-friendly". For this participant the algorithmic transparency was very important in order to understand and ensure that the analysis is correctly done. This participant at times had excluded the use of some tools due to the black-boxed nature of the tools.

Wish list – Accordingly, a number of wishes were identified in the dialogues with the participants. These included a tool or service that could help users to identify potentially interesting sources of information. A tool or service that would facilitate coordinated searches in these different sources. As user preferences and information needs and circumstances vary from one instance to the next, such a system should be flexible enough to allow for inclusion or exclusion of the sources. It should also allow for the allocation of the level of importance to each source based on individual preferences. Furthermore it should be transparent and interactive to allow the user to modify the findings to fit individual needs. There is a need for ability to combine common selection criteria with meaningful content analysis options. That is, tools and services are required both for reducing the huge numbers in more meaningful ways in some instances, and / or for assisting in the analysis of the contents of huge sets in a more meaningful fashion in other cases. In relation to the latter, this is a final excerpt from the interviews: "Yes, with references of wishing something, technique, or method or theory; when you're doing bibliometrics, you're always looking at the tip of the iceberg. You look at the most frequent, the most central authors, papers, or journal of a field, but that doesn't tell you.., that doesn't really give you a measure or an understanding of what the whole field looks like. So if you look at co-citation analysis, most of the papers.., you look at one percent of everything in a subject area, 2%, or 5%. Of course you can download all the.., the whole subject field, but just even then only use 1% or 2 %. Because you're then.., in my.., in one sense it is reasonable to do that, because.., and you regard the rest as noise, right. But I would really be interested in a method or theory that could sort of visualize the whole field; "what is the total content and the total context of this field?". So, but the problem is you can't cluster the whole field because then you get associations, they are so weak that they are meaningless. So that would be really interesting. A brand new method of mapping the field without losing 90% of all the items. Thank you! (laugh)"

Discussion

Although no general trends can be identified based on this limited number of interviews, we can still discuss how the findings so far relate to the research questions posed.

In response to the first question (i) we found that a large number of information sources and search tools were used by the participants. These could be categorized as freely available search engines, databases, open access repositories, social networking sites, other web-based resources, printed sources, and human recommendations. The priority given to each of these varied from one person to the next, and based on the situation. The way new upcoming sources were identified and included in searches (question ii) varied as to the level of their sophistication. Some of the participants combined extensive mixes of strategies to keep updated with new relevant material. The amount of information collected and used (question iii) also varied considerably among the participants from just tens to millions of items. To deal with the large amounts of data, reduction (e.g. by date, number of citations, recommendations and other strategies) was common (question iv). The use of more specialist semi-automated tools in data analysis and visualization was not very common. In relation to the last research question (question v), most participants used various features offered by search engines, databases, and journals for some level of analysis and ranking, although problems with these tools and their function were identified. These problems ranged over, lack of algorithmic transparency, limited interactivity in the selection process, inability to indicate individual preferences, absence of a coordinative function, limited flexibility in automated analysis features, and inability to form a more comprehensive view instead of adopting a reductionist approach among others.

As shown above, previous research has identified a number of problems with the use of publication indicators and bibliometric measures as proxies for quality (Borgman, 2007). Some of the user-study participants showed informed awareness of such problems. Even so, in the absence of other means of adequately dealing with the sizable data, bibliometric measures were still commonly used in identifying the key resources and for the reduction of data to manageable sizes.

Similarly problems of data integrity were acknowledged by some of the study participants. Such problems were dealt with at times (mainly by the bibliometrician) by employing laborious time consuming manual manipulations, while at other times they were accepted as a fact of life and not dealt with.

Previous research (Tenopir and King (1998), cited in Borgman, 2007) indicated that researchers generally use literature of recent age. This was the case for several of

the participants. In our study we found the 3V-attributes of information assets (volume, variety and velocity), to be of relevance here. In response to challenges of volume, several of the study participants indicated that they use the age of publications as a way of reducing the number of documents that they use. When it came to newer phenomena and new research areas, it was mainly the recent scholarly publications (if in existence at all) that became of interest. When it came to the velocity aspect, the challenge was in the efforts to keep up. This was also associated with challenges related to the third V, i.e. the variety of different sources and data types. While sophisticated strategies were put in place to access multiple sources, one could not be assured that all items of interest are found, as new sources and types would emerge.

The study so far has been limited in its scope in two respects. First, it has only been based on interviews. Use of other methods such as observations, screen dumps, and journal writing may prove to be of value. Second, the number of participants and their field of study have been limited. Studies comprising participants from other fields of studies may shed light on new insights.

We intend to address some of these short comings in the continuation of the INCITE project. This study has, however, provided us with some indication of a number of solutions that would facilitate scholars' information behaviour in the face of big data. We have already presented the application of information fusion to the problem of author name disambiguation elsewhere (upcoming). In what follows we present an example of how we intend to address another problematic area as identified by this user-study.

(b) Example: Interactive Individual Ranking

As presented above, most of the participants in the user study expressed that a somewhat comprehensive search was not feasible given the time and resource restrictions. In the INCITE project, we are investigating ways of facilitating extensive searches for more meaningful and relevant results given the known restrictions, by taking advantage of improved automated techniques in content analysis and visualization. Meanwhile, we also investigate other solutions that would improve and facilitate the current routine practices of the scholars. The example described below is one such solution.

As mentioned, it was a common practice for participants to conduct searches across multiple sources. In some instances it was a common or desired practice to include a selection of the top items as ranked by different systems in the pool of their selected items. However, the preferences for sources and the values attached to each of those would vary from person to person, and also for the same individual in different circumstances. That is, while one person might prefer information sources *A*, *B*, and *C*, a second person might value sources *B*, *D* & *E*. Meanwhile, the preferred sources and value judgments attached to each of the sources may change for the same person given different circumstances (e.g., blogs are desirable and valued highly when searching for discussions of new phenomena, but are not seen as trust-worthy and are valued low when searching for established research topics). Another problem was to keep track of the different sources and to remember (or find time) to include them in the suit of sources to be accessed. Accordingly, the interviews revealed several difficulties experienced by the scholars. The two that we will address further in this paper are: (1) that the internal ranking procedures differ from source to source, which make it necessary to be interpreted in different ways, and (2) that the scholar has certain individual judgments towards the different sources regarding, e.g., trustworthiness, comprehensibility, perceived impact of the source. Depending on the purpose of the information search that the scholar is performing, each of these attributes might be regarded more or less positive or negative.

In this section of the paper, we provide an example of how information fusion can be used to automatize this process. This will benefit the scholar in three ways. (1) He or she will get a single ranked list of all the papers found by the different sources, taken his or her personal judgment of each source into account. (2) The automatized process is able to include far more items of the ranked lists than a scholar would be willing or able to do by oneself. (3) The search can be extended to more information sources than a scholar would be willing to search in manually. Thereby this approach will improve the scholar's ability to search within the rising amount of information available.

Background – Information Fusion

Information fusion (IF) (Steinberg & Bowman, 2009) is a research field where the aim is to combine information from different sources for the purpose of achieving an effective decision support for the task at hand. The research field can be roughly divided into two subfields: (1) *low-level IF* and (2) *high-level IF*, where the former typically focuses on data pre-processing and estimation of a singleton unknown state, whilst in (2) one is interested in combining all the estimations of these singletons to determine multi-dimensional, most often also more abstract, states, for the purpose of obtaining an understanding of the current situation.

One common theme to all fusion processes is that they rely on some framework to model, combine, and perform reasoning under *uncertainty*. In fact, reducing uncertainty by using multiple sources of information can be seen as one of the main goals of an IF-system (Bossé et al, 2006). Within these frameworks, e.g., Karlsson et al. (2011), the main mechanism to model uncertainty is to encode information as *pieces of evidence* (including *counter evidence*) with respect to the unknown state of interest.

Evidential Frameworks – *An evidential framework* (Karlsson, 2010) consist of (1) a mathematical structure that models uncertainty, denoted *evidence structure* and (2) a way to *combine* evidence structures to *a joint (fused) evidence.* There are many different theories such a framework could be based on, however, one can categorize these theories into two main groups, namely (1) *precise probability* (Bernardo & Smith, 2000) and (2) *imprecise probability* (Walley, 2000), where the distinction between these two groups lies in the evidence structure and in the combination schema. In the former group, one only allows for probabilities in a precise form, e.g., as in ordinary probability theory, whilst the latter one allows for imprecision probabilities, e.g., by specifying probability intervals. The idea behind imprecision is that by using a more general structure one can obtain a better model of the different uncertainties involved in the fusion process.

Dempster-Shafer Theory – In this section, we present one of the imprecise probability theories, namely *Dempster-Shafer theory* (Shafer, 1976), which we later will use for demonstrating our approach for individual ranking.

In Dempster-Shafer theory, also known as *evidence theory*, one models pieces of evidence by so called *mass functions*:

$$m(A) \geq 0$$

$$\sum_{A \subseteq \Omega} m(A) = 1,$$

where Ω denotes the set of possibilities for the unknown state of interest. Two different pieces of uncertain information, modelled in terms of mass functions m_1 and m_2, can be combined by using *Dempster's combination operator* (Dempster, 1969), defined as:

$$m_{12}(C) \stackrel{\text{def}}{=} \frac{\sum_{A \cap B = C} m_1(A) m_2(B)}{1 - \sum_{A \cap B = \emptyset} m_1(A) m_2(B)}$$

where $A, B, C \subseteq \Omega$. This *joint evidence* can then be used to calculate *lower and upper bounds on probabilities*, i.e., the *imprecision*, for a set A by:

$$\underline{p}(A) \stackrel{\text{def}}{=} \sum_{B \subseteq A} m(B)$$

$$\overline{p}(A) \stackrel{\text{def}}{=} \sum_{A \cap B \neq \emptyset} m(B)$$

which is the reason that the theory can be regarded as belonging to imprecise probability. Furthermore, one can obtain a single precise probability based on what is known as the *pignistic transformation* (Smets & Kennes, 1994):

$$p(A) \stackrel{\text{def}}{=} \sum_{B \subseteq \Omega} \frac{|A \cap B|}{|B|} m(B).$$

Lastly, if one has additional information about the reliability or trustworthiness of the sources then this can be taken into account before constructing the joint evidence by using so called *discounting* (Smets, 2000):

$$m^d \stackrel{\text{def}}{=} \begin{cases} \alpha m(A), & A \neq \Omega \\ 1 - \alpha + \alpha m(\Omega), & A = \Omega \end{cases}$$

where $\alpha \in [0,1]$ expresses the degree of reliability of the source (0 means completely unreliable and 1 fully reliable).

One important issue when using combination operators, such as in Dempster-Shafer theory, is that the information sources need to fulfil certain types of independence assumptions (Smets, 2007), and in principle information sources should base their ranking on different types of information/features. However, even though such assumptions are not completely fulfilled, good results can be obtained, c.f. naïve Bayes (Russel & Norvig, 2003).

Interactive Individual Ranking

We will illustrate our approach with an example. In order to keep the example easy to comprehend, we restrict it to three different information sources, *A*, *B*, and *C,* and look at the three top ranking papers provided by each source.

Firstly, in order to accommodate the scholar's possible individual judgement about information sources regarding the different attributes, such as trust, comprehensibility and perceived impact, the scholar needs to state the attributes, together with his or her individual values for them, only once as shown in Table 1 where the numbers are to be translated as 1 = low, 2 = medium, and 3 = high.

Attribute Source	*Trust*	*Comprehen sibility*	*Impact*
A	1	3	1
B	2	2	3
C	3	1	2

Table 1 Individual attribute assignment to information sources

Secondly, the scholar's search is run on all three information sources in parallel, which results in three ranked lists of papers as shown in Table 2.

Source Ranking	A	B	C
1	*a*	*b*	*d*
2	*b*	*c*	*a*
3	*c*	*d*	*b*

Table 2: Ranked papers for the three information sources.

The rankings can now be translated into the mass functions m_A, m_B, and m_C over the frame of discernment containing the four found papers, $\Omega = \{a, b, c, d\}$. How this translation is done can be regarded as a research topic in itself. We will here use a simple and intuitive translation where the first ranked paper receives the mass 0.45, the second mass 0.30, the third ranked paper the mass 0.15 and the remaining mass of 0.1 is assigned to the frame of discernment. When the situation occurs that there are more papers found than rankings available, as shown in this example, where four relevant papers were found, the mass of 0.1 is assigned to the paper that an information source has not found. After that, the mass function is renormalized. The result for the example is:

$m_A(a) = 0.43$ $m_B(a) = 0.05$ $m_C(a) = 0.28$
$m_A(b) = 0.28$ $m_B(b) = 0.43$ $m_C(b) = 0.14$
$m_A(c) = 0.14$ $m_B(c) = 0.28$ $m_C(c) = 0.05$
$m_A(d) = 0.05$ $m_B(d) = 0.14$ $m_C(d) = 0.43$
$m_A(\Omega) = 0.10$ $m_B(\Omega) = 0.10$ $m_C(\Omega) = 0.10$

Combining these mass functions with Dempster's rule of combination, we receive a new mass function m_{ABC}, which is the basis of the combined ranking of all found papers as shown in Table 3 in the second column.

Rank	General	Trust	Comp.	Impact
1	b	d	a	b
2	a	a	b	c
3	d	b	c	d
4	c	c	d	a

Table 3. Ranking after different attributes

In order to let the scholar decide after what attribute the result should be ranked, e.g. trust, comprehensibility, or perceived impact, the system will translate the scholar's individual attribute values into discounting factors. The mass functions are then discounted accordingly before the combination is done. Discounting after the attribute trust, we assign a discounting factor of 1 to the most trusted source (*C*), a discounting factor of 0.5 to the medium trusted source (*B*) and a discounting factor of 0.25 to the least trusted source (*A*). After that, the discounted mass functions are combined, which results in a new ranking, as shown in Table 3 in the third column. The same can be done for the attributes comprehensibility and perceived impact, with the ranking results shown in Table 3 in the fourth and fifth column, respectively.

Figure 1 provides an overview of all four papers with regard to each individual ranking attribute. From the figure it can, e.g., be seen that paper *b* is the one believed to have the highest perceived impact. Paper *a* is believed to be most easy to comprehend, but has the lowest perceived impact and paper *d* is highly trusted, but believed to be difficult to comprehend.

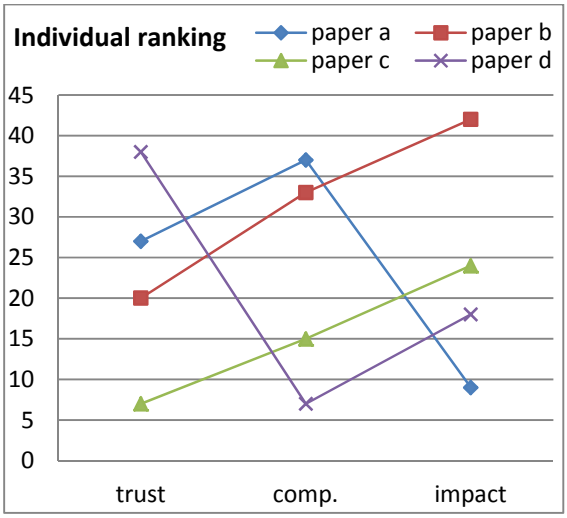

Figure 1. Comparison of papers after individual ranking attributes.

Further, the values of upper and lower bound on the probability can be used to provide more information about the certainty of the combined ranking. If, for example, two search results are combined, where their ranking differ very much, the result will be less certain as compared to when the two sources rank the papers equally. The uncertainty can be displayed by the lower and upper probabilities. Figure 2 shows the intervals for paper *a*, regarding the combined search results for trust, comprehensibility and perceived impact, depicted as vertical lines. The triangle on each line corresponds to the pignistic probability.

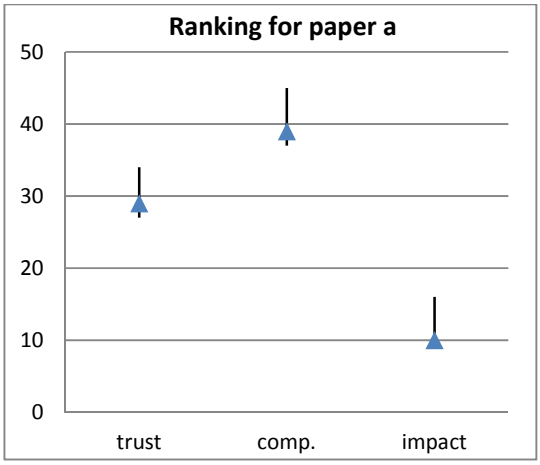

Figure 2. Combined ranking for paper a, showing the interval between upper and lower probability

Concluding remarks

The translation of the ranks into mass functions uses a very simple qualitative approach. Usually one does not know how the internal ranking process for each information source works. Therefore, it can't be known how close to each other the ranked papers are. There might be a huge gap between two closely listed papers or they might be (almost) equally ranked. The reliability of our approach would improve if the internal ranking of each information source would be known, so that the mass functions could be adjusted accordingly.

Also the discounting factors are simply provided by the three values low, medium, and high. If a finer resolution would be used, the reliability of the result should improve accordingly. This step is of particular interest when a larger number of information sources is included.

A further interactive feature to our approach would be to give the scholar the choice to manually input other sources of information that are not found on the net, e.g., a list of literature provided from a colleague.

This approach can take care of many information sources, and a vast list of ranked papers from each source, simultaneously. In order not to include every paper, a criterion needs to be implemented, either how many papers from each source are to be included.

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How we are searching cultural heritage? A qualitative analysis of search patterns and success in the european library

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Abstract

This paper describes a qualitative analysis of 509 search sessions in a digital library. Search patterns are identified and related to the success of search sessions in The European Library[1]. We explore what can be interpreted from these behavior patterns about user information needs and which system design features (could) address them.

Keywords: Information seeking, digital library, log files, query logs

Introduction

Cultural heritage information systems (CHIS) now offer the instant availability of cultural heritage (CH) resources in a digital information environment. Access through search might be a familiar interaction for most search engine users, but it is not the experience visitors commonly have with CH material, where importance is placed on the curation by trained professionals. The adoption of search engine paradigms in the CH domain puts the cognitive load on the users as they need to know what to expect and what to find before interacting with the system. Curators need to find solutions how to offer users context and insights into the material without relying on predefined access points or linear routes through a collection. While most users still rely on the simple search box adopted from other information systems, query logs from CHIS suggest that a significant amount of simple searches are not successful (Gäde et al., 2011). One explanation is that users do not know the limitations of the content or affordances of the particular CHIS. This paper underlines the limitations of current information systems focusing on search instead of discovery and exploration as primary information access options in the CH domain.

The goal of this paper is to analyze which search patterns occur in CHIS and what leads to a successful search session. We investigate search sessions from The European Library. The European Library (TEL) has been providing access to the content of 48 European national libraries since 2005.

The next section describes related work in studying query categories and search behavior with a focus on the CH domain. The analysis is describes by query categories, typical search patterns and success rates. The paper concludes with a discussion of additional interaction requirements for CHIS.

Studying User Behavior

User behavior and motivations during a search can either be studied directly by asking users through questionnaires or laboratory studies or indirectly by analyzing their actions through log files – the focus of this paper. This section provides an overview of previous studies dealing with the investigation of query logs with respect to user intentions, query categories, search patterns and search success.

Query Categories and User Intentions

The reason for trying to understand underlying user intentions is to support information systems in serving better targeted search results. Several studies conducted over the past decade looked at either query content types or query intention types. Jansen and Spink (2005) investigated several search engines logs and categorized a sample of

[1] http://www.theeuropeanlibrary.org/tel4/

queries into predefined subjects ranging from people, places or things, travel, commerce, employment, economy, computers or the internet to queries targeting sexual content. The most popular taxonomy for query intentions on general search engines was developed by Broder (2002). Based on Yahoo logs, it divides query purposes into three categories: informational, navigational and transactional. Several studies aimed at automatically extracting user intentions from queries using different features drawn from search engine logs, e.g. query popularity (He et al., 2002) or user-click behavior (Baeza-Yates et al., 2006; Lee et al., 2005).

While general web search engines have been investigated for years, only a few studies focused on the analysis of query categories in CHIS. A recent paper on identifying user goals for image search found that Broder's taxonomy and the later refinements cannot be applied for this domain (Lux et al., 2010). A study comparing queries in psychological or historical bibliographical databases showed that whereas queries in the psychology database were conceptual, they were more focused on regions, people and events in the historical database (Yi et al., 2006). These results indicate that query categorizations need to be contextual when studying particular domains. Waller (2009) performed an extensive study on search queries in a library catalog. She found that one fifth of the queries were for a specific item (a particular book) and the rest were general topic searches. She categorized the queries into 13 different broad groups, mixing intentions with content categories and even topics (e.g. business-related, books/authors and cultural practice). Gäde (2014) investigated country and language level differences using Europeana clickstream logs and exploratory categorizing French and German queries.

Because of the heterogeneity of CH institutions and their objectives, it is difficult to generate a representative typology with well defined query categories. This paper defines query content categories that are derived from TEL – showing different types and distributions of categories compared to general search engines.

Search Patterns

Analyzing search patterns can show system developers where users encounter errors and where the system could possibly interfere to support the user in formulating successful queries. Spink et al. (2000) studied Excite query logs and found that 33% of the users performed query modifications. Several studies developed taxonomies of query reformulation types (He et al., 2002; Huang and Efthimiadis, 2009; Jansen et al., 2007; Liu et al., 2010), of which most use a taxonomy based on four broad categories of reformulation: generalization, new, reformulation and specialization. The distribution of these reformulation types can differ depending on the users and the domain. A few studies extended their research across languages. Through multilingual query suggestions the user should be able to choose similar queries in other languages, thereby increasing recall (Gao et al., 2010).

This paper uses the broad reformulation categories described above, but defines more specific subcategories, including some search patterns specific to cultural heritage information systems, in particular multilingual reformulations.

Search Success

Distinguishing successful searches or sessions from unsuccessful ones is another possibility for information systems to improve their interaction paths. Detecting what search patterns lead to success can help systems suggesting those patterns to unsuccessful users or might indicate failures in the design. Several studies have investigated measures for success derived from log files. Huntington et al. (2007) analyzed BBC search logs with respect to the number of searches conducted during sessions as well as lapse time between the searches of a session. A longer time period between searches for the same topic during a session is interpreted as extensive interaction with results and therefore as satisfied information need: a success. Liu et al. (2010) also showed that successful users spend more time interacting with search engine result pages and retrieved documents. Nevertheless, lapsed time is an ambivalent indicator. When Aula et al. (2010) studied the impact of the difficulty of search tasks on search behavior, users spent more time on result pages when facing difficult tasks, indicating problems with the information system.

Log files from The European Library have already been studied with respect to successful user search patterns. Lamm et al. (2009) investigated user search performance and interactions for the TEL interface and defined actions that indicate successful and not successful sessions. Vundavalli (2008) analyzed 307 TEL users and studied the paths of the most successful and the least successful according to the impact of language on search behavior. This paper also analyzes TEL logs and re-uses some of the success indicators defined in Lamm et al. (2009) when associating them with search patterns.

Query Categories

Cultural heritage information systems respond to a vast amount of different queries from their multicultural and multilingual users. 509 queries from TEL action logs were randomly extracted and annotated (Stiller et al., 2010). A classification of query categories in the CH context was derived consisting of five categories: person, geographic entity, work title, thematic, other (including events and organizations).

The work title category represents queries for a particular title of a book, painting, musical piece or other works of art and seems to be a specific query type in the CH domain. Although searches for work titles, e.g. song lyrics, also occur in general search engines, their frequency of occurrence is much lower. The other query categories are

also found in general search taxonomies; however, the content of such a query varies according to the domain. Whereas a query for a person might ask for a celebrity or politician in web search engines, person queries in CHIS inquire after artists or historical figures. Table 1 shows the query categories and their frequency of occurrence in the sample. More than half the queries (62%) were named entity searches (person, place, work title), a significantly higher amount than in other domains.

Table 1. Query categories and frequency of occurrence

Thematic	Person	Work title	Geographic	Other
35%	34%	18%	10%	3%

Although the assigned query categories were found to represent the content type of a query, they do not necessarily determine the underlying information need, its scope or the intention of the user. For example, the query 'Shakespeare' represents a person but it is not clear whether the user wants information about the person, a picture of this person, all the works this person created or even works about this person. Even for easily classifiable queries, the user intention is ambiguous.

Search Patterns in Sessions

Session logs are rich resources to investigate search patterns in detail. They contain data about user behavior (explicit information) and implicit knowledge about user intentions. Sessions with multiple queries (particularly about the same topic) demonstrate a determined interest of the user, which should be more straight-forward for the system to support. Investigating query reformulation patterns and other actions like viewing or saving objects conducted in individual user sessions shows not only user paths and possible search intentions but also – implicitly – whether a search session ended in a success or failure to find relevant objects.

The 509 session corpus used for the query category analysis was annotated with the number of queries in a session, changes in query topics and succinct search patterns when a query is reformulated. The analyzed sessions have 14 actions (incl. 3.5 queries) on average. Table 2 shows the distribution of queries.

Table 2. Number of queries per session

1 query	2 queries	3 queries	4 queries	> 4 queries
46%	20%	9%	8%	17%

Almost half of the sessions contain only one query. One conclusion could be that many users in the CHIS are casual users just "trying out" the system. This is corroborated by sessions that include multiple queries, each with a different topic without other actions to follow up the search. Another group of users persist in their search goal (about 25% even with 4 or more queries) – these will be looked at in detail.

Topic Changes in Sessions

About 3/4 of the sessions remain on one query topic, i.e. all queries within this session have roughly the same theme or information goal. Table 3 displays the number of query topics per session.

Table 3. Number of query topics per session

1 topic	2 topics	3 topics	4 topics	> 4 topics
74%	11%	5%	4%	6%

Two thirds of all sessions with one topic also contained only one query. The distribution of categories for single query sessions showed that single topic/query sessions have roughly the same distribution of query categories as shown overall. More than half of all single query sessions (65%) are named entity searches, which are mostly known-item searches. Instead of casual searches, some of these sessions could be "one-and-done" searches, where a user performs a query, finds the required object and leaves. It is difficult to distinguish these different user intentions, but one possibility would be to look at other actions indicating a determined interest of the user like saving a particular object, here defined as "success actions".

Query Reformulation Patterns

For those sessions where a user persists with a topic – sessions that contain more than one unique query but only one query topic (27% of all sessions) - we distinguish various changes in search patterns during the session. They can give insight into particular search behaviors in CHIS, but also indicate points of action for information system developers when considering search support options. In this exploratory sample alone, 12 different search patterns grouped into specialization, generalization and reformulation patterns could be identified (table 4).

Specialization. Specialization patterns are query reformulations where a user attempts to focus the scope of the search, making the search more precise, therefore leading to fewer or more exact search results. When the user switches from simple search to advanced search or narrows the search from general to more specific terms or adding more terms to the original query terms, it leads to a shorter result list, which contains more specific objects.

Generalization. Generalization patterns are query reformulations where a user attempts to widen the scope of the search, making the search more inclusive and therefore leading to more search results. Changing the search term from a more specific to a more general search phrase or

removing terms from the query usually indicates that users cannot find what they are searching for.

Reformulation. Reformulation patterns are those query reformulations patterns where a user changes the query without changing its scope. Those reformulations are commonly a reaction to few or zero search results from searches that are expected to be more successful. Users then either repeat their query unchanged, look for errors in the query strings or move toward synonymous query terms. In the sample, users also switched fields in the advanced search (from the title to the ISBN field) or query categories (from work title to author) and corrected or changed the spelling in order to retrieve better results.

Multilingual reformulation. Interestingly, users seemed to have learned to switch their query language in order to accommodate the multilingual cultural content when a query in one language does not find results. Users performed the same queries with the query terms in other languages or multilingual synonyms or even transliterations of their search terms. These multilingual search patterns (in contrast to other information systems serving more homogeneous user populations) also seem to have an impact on the search results (or perceived search success). Expressing an information need in different languages can lead to a higher amount of relevant results especially as it enables the inclusion of local results which might not be retrieved using a query in only one language. It is not unusual that users make use of several languages during one search session. TEL does not offer cross-lingual search or query translation, but some users seem to have adapted a work-around. As this requires them to be aware of the multilingual nature of the content, there seems to be another aspect for the system to initiate more situational support.

Table 4. Search patterns and their frequency of occurrence

Search pattern	Example	Frequency
Specialization		
Simple to fielded search	"new japanese chronological tables" → title all "new japanese chronological tables"	12%
Narrower query	"caricature" → "caricature philipon"	6%
Generalization		
Broader query	"partituras" → "musica"	37%
Query reduction	"burton, dolores. 1973. shakespeare's grammatical style" → "shakespeare's grammatical style"	18%
Reformulation		
Monolingual synonyms or related terms	"sword" → "fencing"	20%
Spelling variants / corrections	"universities and collages history" → "universities and colleges history"	15%
Multilingual parallel search	„sword" (English) → „ schwert" (German) → „ spada" (Italian)	9%
Category change	"romeo and juliet" → "Shakespeare"	9%
Transliteration	"peonidis" → "παιονίδης"	2%
Multilingual synonyms or related terms	"fencing" → "fechtmeister"	1%
Exact field transformation	"cres c. Marseille" → "2753700303"	1%

Distribution of search patterns. The identification of popular user search tactics can also highlight frequent search problems that users try to rectify in their reformulation patterns. These are sensitive points in the user-system interaction, where the information system should provide contextual support. Because users switch their search tactics, several search patterns can occur during one session. In the sample corpus of 139 multi-query

sessions, 27% of the sessions contained several patterns, the rest represented one only search pattern, even if several reformulations were performed.

Almost 2/3 of the sessions show a reformulation pattern that indicates a search failure: broader query (not enough results were found), synonymous query (no or not enough results were found with the original query term) or query reduction (query terms were removed because not enough results were found).

When aggregated into pattern groups, most users chose a generalization pattern while the session progressed. Reformulation patterns without changing the scope of the topic were also used (to increase the result list numbers). One conclusion for this CHIS would be to put more effort into supporting users in avoiding low number result sets whereas help in narrowing a search (e.g. by filtering) seems not as necessary.

Over 20% of the reformulations involved a language or script change, an effect of the multilingual nature of the information system and a consequent user adaptation. An interesting example for a multilingual search pattern is the following session, where the user searches for authors and their works in exactly the language it was originally published: "peter freuchen sydamerika" (Swedish) → "eugene gallois amerique" (French) → "giuseppe guadagnini vergini" (Italian) → "vogel geschiedenis latijns amerika" (Dutch). This search pattern does not strictly follow any of the reformulation patterns described before but represents several strict known-item searches in different languages centered on a similar topic possibly representing a particular polyglot user.

Multiple Topics in Sessions

Search sessions with more than one topic are difficult to interpret. Most seem to string different topics together without an identifiable or comparable pattern. One hypothesis for this phenomenon is users randomly trying out the information system. Often, users are directed to the system via search engine results regarding a CH object and access the system's results pages without seeing the homepage or being familiar with it. They either leave or subsequently query the system with other, seemingly unconnected queries. This could be an attempt of the user to estimate the scope and extent of the content of the information system as appropriate context for their original search wasn't provided.

Rather than for focused search activities, many users of CHIS may use them for entertainment or educational purposes. The intention of the casual "information tourist" might not be to fulfill a particular information need, but rather to pass the time, to see something new and interesting or to be guided. Consequently, for these sessions, it is difficult to propose appropriate search support measures or even define clear success indicators (when is an entertainment goal fulfilled?) as the overall interaction experience of the user with the system plays a much higher role than the search support alone.

Success of Sessions

If the objective of the information system is to satisfy the information need or intention of the user, then user behavior in successful sessions can be an important signal for system developers how to guide user interactions or to support other users in following similar "successful" paths through the system. Search patterns (query content categories and query reformulation patterns) that lead to the highest number of "successful" sessions should be recommended to increase user satisfaction.

Success Indicators

In order to determine whether a session is satisfactory for a user, actions that indicate a successful session need to be determined. These should be actions that signal at least a deeper interest of the user (rather than just a superficial overview of a result list, for example) or even show the intent to further interact with an object or record. The following five actions are considered indicators for when a user might have reached an information goal and has therefore completed the session successfully.

Soft indicators. Soft indicators represent an interest of the user that goes beyond just looking at a result list, i.e. the user focusing in on one object. However, the action does not yet indicate whether the user plans to further interact with the object. A user might be temporarily satisfied because of finding a seemingly relevant object but then continues the search after discovering that object was not what they were looking for. Soft indicators cannot necessarily give a complete picture of user satisfaction. Possible actions that indicate more focused user interest are:

1. A record is looked at in detail.
2. An object is looked at in the original system or interface.
3. A link is clicked to display metadata or an object at the original system site.

Hard indicators. Hard indicators represent actions where the user not only looks at an object in detail, but interacts with it further, indicating an implicit (and positive) relevance assessment. These actions are regarded as representing a satisfied user:

4. A record or search is saved by the user.
5. A record is emailed by the user.
6. A record is printed.

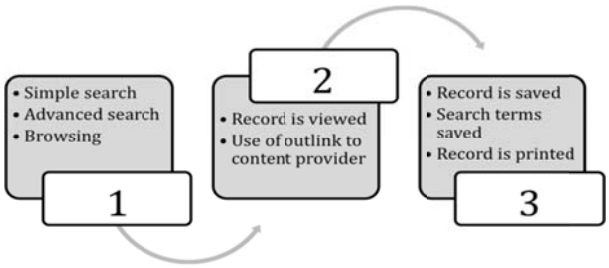

Figure 1. Successful search pattern

Figure 1 shows a typical successful session. After initial access, the user looks at relevant document in detail or uses a link leading to the content provider (2). A session with step 2 contains soft indicator actions and could be regarded as successful. In step 3, the object or the search terms are saved, printed or sent via mail. Sessions with hard indicator actions (3) can more confidently be characterized as successful.

Success Rates

With a broad success definition that includes both soft and hard indicators, 45% of all sessions are successful. More than half of the multiple query sessions (55%) included successful actions but only 33% of all single query sessions.

Table 5 shows the success rates of sessions correlated with queries of a particular content category. Sessions that contain searches for a geographic entity are above average successful (57%). One reason might be the unique names of geographic entities so that queries in this category should deliver non-ambivalent and therefore relevant objects. All other query categories achieve similar success rates. This result is somewhat surprising as we would have expected all named-entity searches (person, place, work title) to be generally more successful, because they are often known-item searches and should therefore be more easily found. It might be a particular feature of this CHIS that many casual users try out the search interface with people or titles they know, but then do not perform another action afterwards that would indicate a successful session with our definition.

Table 5. Query category and associated success rate

Query Category	Thematic	Person	Work title	Geographic
Success rate	43%	45%	46%	57%

Sessions with reformulated queries (single topic sessions) were further analyzed with respect to the correlation between reformulation pattern and success rates. Table 6 shows success rates for particular reformulation patterns sorted by success rate. Most successful were users that searched in several languages, followed by the synonymous search strategies and users that expanded the search.

Table 6. Search pattern and associated success rate

Search Pattern	**Success rate**
Multilingual parallel search	69%
Monolingual synonyms or related terms	61%
Broader query	54%
Category change	46%
Narrower query	44%
Spelling variants / correction	38%
Simple to fielded search	35%
Transliteration	33%
Query reduction	24%

Unsuccessful Sessions

Usually, unsuccessful sessions are characterized by subsequent simple searches and / or excessive result set paging (figure 2).

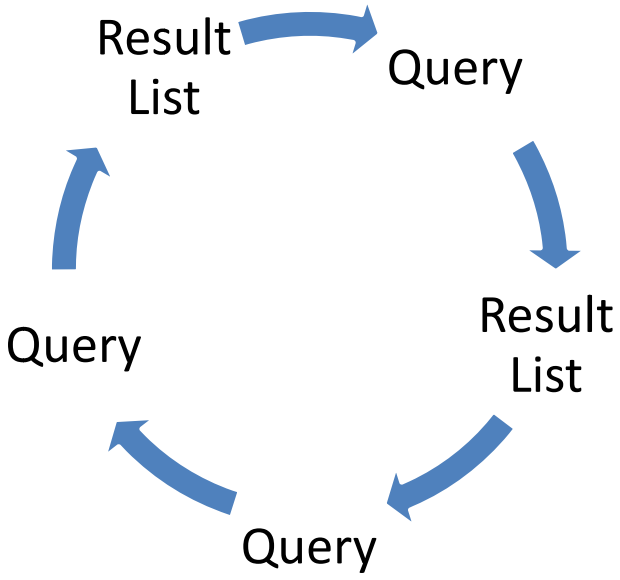

Figure. 2. Unsuccessful search pattern

Random browsing, incredulous repetitions of the same query or "flip-flopping" between broad and specific queries are other patterns identified also in the research literature (Markey, 2007) indicating unsuccessful sessions.

An unsuccessful session example is a user searching for "rembrandt", repeating the same search again, paging through brief results, going back to the initial search box and misspelling the query as "remprandt" when repeating it

again. Detecting repetitive queries might be another way to offer search support – the information system could interfere and suggest alternative or correctly spelled terms.

Conclusion - Meeting User Intentions

This exploratory and qualitative study of a cultural heritage information system suggests that transferring web search paradigms to another domain does not take specific user needs and search patterns into account. Although named entity searches comprised more than 60% of all searches, the analyzed cultural heritage information system did not place particular focus on interface options to support this (e.g. a person index) but rather emphasized different collection types. User persistence (in the form of continued interactions with the system like query reformulations) and multilingual search seemed to improve success rates for users in our sample, but most systems in the CH domain do not support either interaction (e.g. query suggestions or translations).

Even if some users seem to adapt their behavior to overcome gaps in system support, for example by individually translating their queries into other languages or manually correcting their spelling, this cannot be expected.

Many CHIS offer both searching and browsing access to their content. Whereas a search accesses the full content of the information system, browsing access is often limited to preselected content that shows only small parts of the collection. TEL offers changing virtual exhibitions prepared by professional librarians or museum curators, for example. Users must search in order to verify whether content not available through an exhibition exists in the collection. Searching is therefore the dominant access form even if it is not the most appropriate for highly context-dependent content like CH objects.

Little research exists on user needs and requirements for information systems dealing with the diversity of CH content. User groups with different professional, linguistic and cultural backgrounds need to be served and supported in experiencing a variety of CH objects expressed in different media types. To reflect an object's importance and background, it is necessary to create as much context as possible. Text retrieval and simple search boxes seem to be limiting approaches to experiencing CH objects because they can only provide fragmental insights into the collection when search results are listed in linear ranked lists. Because not all collections lend themselves to completely curated access or alternative browsing approaches (because of scale or scope), innovative ways need to be created in order to provide contextual information to users even if entering the system via an external search engine.

New access and discovery tools integrated into CHIS could lead to adapted search or exploring behavior. Already, CHIS encourage users to involve themselves with CH objects through the integration of user generated content functionalities and opportunities thereby enabling more contextualization on a personal level.

Our analysis defined search patterns that were based on more goal-oriented user intentions. Besides extending the analysis to a much larger sample of sessions, further research also needs to investigate other user intentions, especially those of the so-called information tourist or flaneur (Dörk et al., 2011), the casual user. Many users of CHIS approach the system not with a specific information goal in mind but out of curiosity or expecting to be entertained or guided. An interesting question is whether this high number of casual users is a phenomenon observable because of the domain (cultural heritage) or because of the specificity of the information system (not a general search engine). This behavior does not fit with classical models of information seeking and requires different system functionalities.

Meeting user needs requires the identification of user goals and intentions in order to adapt the system design. Because a lot of research is focused on studying existing system functionalities, perspectives on user behavior are limited to known search patterns. To develop innovative information access systems, which improve the exploration of cultural heritage resources - both for casual, serendipitous and goal-oriented users - should be one focus of future research.

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Curriculum Vitae

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How can customized IT system support qualitative methods in website validation: application for visual content analysis

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Abstract

Data gathering phase of qualitative research method in visual communication studies on website is extremely complex and time consuming. At the same time researcher should have a visual access to the web page that is being reviewed and a possibility to quantify data for given attributes. Multiple screens or split windows are possible practical solutions at hand. Although there are tools for managing data in quantitative research, none of them is suitable for visual content analysis of websites. The aim of this paper is to present a customized system providing IT support in the process of quantitative data gathering.

Main research question: How can customized IT support system enhance data integrity and reduce total research time, especially in data gathering phase? The form of the proposed IT support is a web application built using agile software development method on LAMP stack and is available online. For the specific research project the application offers three main sections: a list of websites to evaluate, a visual representation of loaded website and a list of attributes grouped by categories for quantifying the data. Proposed customized IT tool allows data export to widely accepted MS Excel format for further data analysis. Main conclusions of the research are that the use of customized IT support in visual content analysis reduces time necessary for data gathering and increases data credibility.

Keywords: customized web application, qualitative research, website validation, visual content analysis

Introduction

Content analysis is a highly flexible research method that has been widely used in library and information science (LIS) studies with various research goals and objectives. The research method is applied in qualitative, quantitative and sometimes mixed modes of research frameworks and employs a wide range of analytical techniques to generate findings and put them into context. (White & Marsh 2006).

Visual content analysis is the most common qualitative method used in visual communication and mass media research. It is an empirical (observational) and objective procedure for quantifying recorded audio-visual (including verbal) representation using reliable, explicitly defined categories (values and independent variables). (Bell 2001; Bauer 2000).

As media of communication, websites and web pages are base for content analysis (Weare & Lin 2000), which was one of the first methodologies used in web analysis (Bates & Lu 1997), and it has been employed increasingly since, although not always in traditional way (McMillan 2000).

Data gathering phase of qualitative research method in visual communication studies on a website is extremely complex and time consuming. At the same time researcher should have a visual access to the web page that is being reviewed and a possibility to quantify data for given attributes. Multiple screens or split windows are possible practical solutions at hand. Although there are many IT tools designed for the analysis of large amounts of data by helping to organize documents according to topics of interest and placing them in their larger context, there are no IT tools designed to help in visual communication research of websites using visual content analysis.

In this specific visual research, the most important thing for the researcher was to have an application that is organized in a way that allows the researcher a full visual control of a web page he is observing and the ability to mark and save his observations directly on screen. The most important feature of an application was not only the ability of editing and changing gathered data, added IP addresses, attributes and categories, but also having an option of exporting data in MS Excel format that can be easily statistically processed.

Since specific visual communication research project consisted of analyzing and validating visual elements in

large amount of web pages (1017) it was difficult to conduct research manually. Web application for the specific research project was built using agile software development method on LAMP stack and is available online. It offers three main sections: list of websites to evaluate, visual representation of loaded website and list of attributes grouped by categories for quantifying data. Proposed customized IT tool allows data export to widely accepted MS Excel format for further data analysis.

The aim of this paper is to present a customized system providing IT support in the process of quantitative data gathering. Main research questions are: How can the customized IT support system enhance data integrity and reduce total research time, especially in data gathering phase? Why none of the existing IT tools available on the market is suitable for visual content analysis of web pages?

Available IT tools on the market

Visual representation of data on the web is becoming more and more important for representing complex data. As David McCandless (author of Information is Beautiful[1]) states: the real challenge in visual information presentation is "seeing the patterns and connections that matter, than designing that information so that it makes more sense or tells a story". (Paton 2011)

A web application is characterized by three major design dimensions. Its structure describes the organization of the information managed by the application in terms of the pieces of content that constitute its information base and of their semantic relationships. Navigation concerns the facilities for accessing information and for moving across the application content. Presentation affects the way in which application content and navigation commands are presented to the user. (Fraternali 1999)

Browsing through the web and literature on this subject, it can be noticed that visual content analysis IT tools exist in two ways. First, as part of visual representation of gathered data, they are tools for easier data interpretation (Machlis 2011) and second, more relevant to this paper, as a set of tools for gathering data while performing visual content analysis in data gathering phase, for example: The Qualitative Data Analysis Program (QDAP) , ATLAS.ti, f4analyse software.

Main characteristics of IT tools above are:

- if they are free or open source software, their performance is limited
- if they are commercial software, they are expensive.

Customized IT system requirements

Since specific research project, web application was built for, was to analyze visual graphic elements of faculty and university web pages across the Europe, web application should have had these parts:

- List of faculties' IP addresses sorted by affiliation to their university in particular county
- List of attributes for visual content analysis of web pages sorted by categories and allowing validation of visual graphic properties by clicking
- Screen where the particular web page analyzed could be immediately seen visually
- Ability to save, change and export all the data obtained in the research easily
- Ability to change all the attributes in web application at any moment and therefore adjust the research, if necessary.

Customized Application

IT support was built using open source technologies: Linux Ubuntu[2] distribution as the operating system; Apache[3] as the web server; MySql[4] as Relational database management system, PHP[5] as the programing language, HTML[6], CSS[7] and javascript[8] (jQuery[9] framework) as the client side technology stack. To fulfill the requirements given by the researcher, Entity Relationship diagram was created.

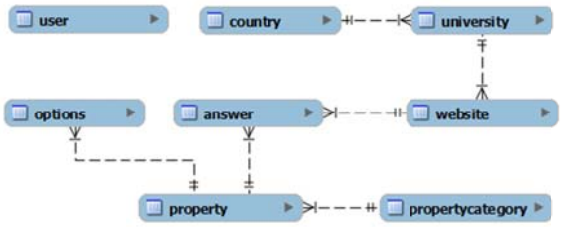

Figure 1. ER diagram for supported IT system.

Figure 1 represents an ER diagram[10] for supported IT system: Information about users authorized to use the application is stored in the table *user*. Each website used in the research is stored in the table *website* which has many

[1] http://www.informationisbeautiful.net/about/

[2] http://www.ubuntu.com/server

[3] http://www.apache.org/

[4] http://www.mysql.com/

[5] http://www.php.net/

[6] http://www.w3.org/html/

[7] http://www.w3.org/Style/CSS/

[8] https://developer.mozilla.org/en-US/docs/Web/JavaScript

[9] http://jqueryui.com/

[10] http://www.techopedia.com/definition/1200/entity-relationship-diagram-erd

to one relationship to university and the same relationship is from university to country. It means that one country can have one or more universities and one university can have one or more websites. Visual content analysis properties are stored in the table *property* and they are grouped as categories of properties in the table *property/category*. One category group can have one or more properties. *Property* can, but does not have to, have options which are stored in the table *options*. When researchers validate individual property, the answer is stored in table *answer*. Required data for *answer* are *website* and *property*. *Option* is required if there are defined options on a given property. If that is not the case, then for given combination *website* and *property* remarks are required.

Web application is deployed on the address http://oziz.ffos.hr/epub/JosipaDoktorat/. User interface is in Croatian language. After successful login, a user gets a menu of items that allow then to view, insert, change, or delete all entities mentioned in ER diagram. All these actions enable a researcher to administrate data he is validating. Figure 2 represents one of the pages in application - property page.

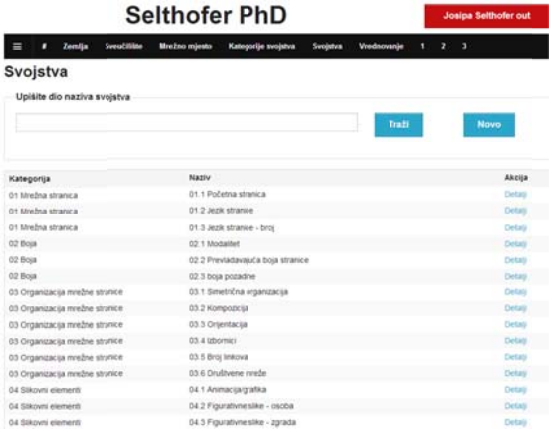

Figure 2. Property page in application.

After defining data for validation, researcher in Validation page marks each specific property for specific page. Figure 3 presents Validation page. On the left side of the page is a list of countries with sub list of universities in that country and most important sub-list of websites in universities. Website is a link. When a researcher clicks on that link, a page is loaded in the central part of the screen (using AJAX[11]) and on the right side of the screen there is property list categorized by defined categories. Researcher now can analyze the web page he is viewing in the central part of the screen and mark each attribute by clicking on the given option of the particular property or by writing remarks. Using AJAX, application stores answers immediately to the database so that a researcher does not have to click additional save button.

After validation, all data gathered in research are available for exporting. Export is obtained using comma separated value (CSV) file that can be easily edited by popular office tool MS Excel or imported in statistical software (like SPSS).

Figure 3. Validation page of the application.

LIS student`s competencies and their applicability in building customized IT tools

Building a web application customized for visual content analysis research demands specific knowledge and competencies regarding design of a web page, Relation Database Management Systems and one of server side programming languages. In LIS schools curricula, there are subjects covering all of those different areas, so it is reasonable to conclude that LIS student`s competencies after graduation are enough for building such customized web application. Many authors have done research on this topic regarding curriculum and student`s IT technology competencies and knowledge. (Hanson-Baldauf & Hassell 2009; Ashcroft 2004; Dragija-Ivanovic et al.)

Findings

To evaluate the efficiency of the application, gathering data phase in the research was obtained first manually and then through the web application. Results were then compared. For the analysis and comparison, 104 web pages of the research sample (10%) were examined. Overall time necessary for data gathering in the analysis of one web page and of all web pages was measured, as well as the features of the analysis.

Data gathering phase of the specific research project consists of:

- finding and clicking on a specific URL address

[11] http://www.techopedia.com/definition/24402/asynchronous-javascript-and-xml-ajax

- searching for visual attributes on the web page and marking them
- data importing in MS Excel format for further analysis

Table 1. Comparison of the time spent

	Manually		**Web application**	
	1 WP	**all WP**	**1 WP**	**all WP**
Finding, clicking and uploading of the specific URL address	20 sec or 0,3 min	600 sec or 10 min	5 sec or 0,08 min	500 sec or 8,3 min or 0,13 h
Searching and validating visual attributtes on the WP	1 min	100 min or 1,67 h	1 min	100 min
Marking visual attributtes on the WP	3 min	300 min or 5h	3 min	300 min or 5 h
Data importing in MS Excel format for further analysis	7 min	700 min or 11,67 h	-	-
Overall time spent in data gathering research phase	11,2 min	1110 min	4,08 min	408,3 min
	1121,2 min ili 18,7 h		**412,38 min ili 6,873 h**	

in manual and automatic data gathering

Results of the comparison conducted in the data gathering phase of the visual research are presented in the Table below. As it is shown, total amount of the time spent on data gathering phase through the web application is almost three times less than time spent when data was gathered manually. In the automatic process of the analysis, data importing in MS Excel format is skipped because of the features of the application. The time that a researcher is spending conducting visual content analysis manually is wasted and is frustrating, and the possibility of making errors is greater than in computer managed application. Also, results indicate that clicking and uploading of the specific URL address is faster using a web application, since all IP addresses are imported in the application before the analysis.

Main advantages of the customized web application for visual content analysis of web pages are also:

- the ability to edit and change added IP addresses, attributes, categories and gathered data
- the ability to export gathered data in MS Excel format
- the ability to visually present gathered data instantly on web.

Conclusion

Data gathering phase of qualitative research method in visual communication studies on website is extremely complex and time consuming. The aim of this paper is to present a customized system providing IT support in the process of quantitative data gathering. For the specific visual content analysis research of the web pages, a web application shows better results in all aspects of the data gathering phase, since none of existing IT tools for content analysis is suitable for visual content analysis of visual graphic elements of web pages.

Main conclusions of the research are that the use of customized IT support in visual content analysis reduces time necessary for data gathering and increases data credibility. Some of the main advantages of such application are the ability to edit and change added IP addresses, attributes, categories and gathered data, to export gathered data in MS Excel format and to visually present gathered data instantly on web. Clicking and uploading of the specific URL address is faster using web application and the possibility of errors is much smaller.

Another important notice is that such customized application can be built by LIS students. Part of most LIS School curricula are subjects that cover: design of a web page, Relation Database Management Systems and one of server side programming languages. In conclusion, the LIS students during their education gain knowledge and competencies necessary for building a custom web application for specific research demands.

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Curriculum Vitae

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Collaborative information use by high school students in a digital learning environment: connecting metatheory, theoretical frameworks and methodology

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Abstract

This paper reports on a qualitative study of 42 Grade 9 high school students in a public high school undertaking a collaborative research task as part of their English Language Arts curriculum. Specifically, it examines the social, cognitive and interpersonal dynamics of fourteen teams of students in a digital learning environment collaboratively using information and co-constructing a joint representation of their knowledge of their curriculum topic. The paper explicates in particular the methodology and research procedures to show the synergy between metatheory, theoretical framework, methodology, research context and approaches to data collection, and provides a brief summary of illustrative findings to date.

Keywords: constructivist learning, digital environments, collaborative learning, social justice

Theoretical Framework and Literature Review

The research reported in this paper is informed by three bodies of scholarly literature:n(1) the research-based literature on inquiry-directed instruction underpinned by a constructivist learning framework; (2) the scholarly research on collaborative learning, and (3) the curriculum reform initiatives and educational directions in the USA as presented in government curriculum documents and whitepaper directions. This body of literature clearly shapes the methodology chosen for this study, and shows the interconnection between meta-theory, theory, methodology and research procedures.

First, this study is informed by a metatheory of constructivist learning, and grounded in the Information Search Process model developed by Kuhlthau (2004). This view of learning is deeply embedded in educational tradition across the USA, and has been developed by influential 20th century educational thinkers such as John Dewey (1859-1952), George Kelly **(**1905-1967**),** Jerome Brunner (1915 -), Jean Piaget (1896-1980), Howard Gardner (1943 -) and Lev Vygotsky (1896-1934). Constructivist learning gives emphasis to an active search for meaning and understanding by learners. Common dimensions of constructivist learning include:

- students are directly involved and engaged in the discovery of new knowledge;
- students actively construct deep knowledge and deep understanding rather than passively receiving it;
- students encounter alternative perspectives and conflicting ideas so that they are able to transform prior knowledge and experience into deep understandings;
- students transfer new knowledge and skills to new circumstances;
- students take ownership and responsibility for their ongoing learning and mastery of curriculum content and skills;
- students contribute to social well being, the growth of democracy, and the development of a knowledgeable society.

Kuhlthau claims: "Two basic themes run through the theory of construction. One is that we construct our own unique personal worlds, and the other is that construction involves the total person incorporating thinking, feeling, and acting in a dynamic process of learning." Kuhlthau (1993, 15). These processes give direction to the data collection instruments and the approach to data analysis.

On this constructivist foundation, Kuhlthau's 30 year research journey to date has developed the Information Search Process (ISP), a research-tested and validated model of how students engage in an information-to-knowledge journey. Key claims based on this research are:

- The ISP presents a holistic view of information seeking from the user's perspective in six stages: task initiation, selection, exploration, focus formulation, collection and presentation.
- Information seeking and use involves interactions of three realms of experience: the affective (feelings) the cognitive (thoughts) and the physical (actions) common to each stage
- The ISP reveals information seeking as a process of construction
- Affective symptoms of uncertainty, confusion & frustration prevalent in the early stages are associated with vague, unclear thoughts about a topic or problem.
- As knowledge states shift to clearer, more focused thoughts, a corresponding shift in feelings of increased confidence and certainty.
- Affective aspects, such as uncertainty and confusion influence relevance judgments as much as cognitive aspects, such as personal knowledge and information content.
- Principle of uncertainty: Increased uncertainty in exploration stage of ISP indicates zone of intervention for intermediaries & system designers (Kuhlthau, 2004)

Based on this empirical model, Kuhlthau, Maniotes and Caspari (2007, 2012) have elaborated an instructional design framework known as Guided Inquiry, and this was the design model used in shaping the sequence of instruction and learning interventions used by the class that participated in this research.

Second, the study's methodology is informed by a body of literature from education on "collaborative learning" and "cooperative learning", and this provides a strong empirical foundation for the directions of this research, and for analyzing and interpreting the diverse scope of qualitative data. Rockwood (1995a &1995b), Dillenbourg (1999), Graham & Misanchuk, (2004) and Chin (2011) define the differences between cooperative and collaborative learning in terms of knowledge and power. Cooperative learning is viewed as a more directed, structured and controlled approach by the teacher, where group tasks focus on identifying, presenting and sharing factual knowledge. Typically in a cooperative learning task, the learning task is divided into a set of subtasks that are undertaken individually, sometimes based on negotiation of who will complete individual parts, and then the final product is assembled by bringing together the subparts – a "divide and conquer" type of approach. In contrast, collaborative learning views knowledge as socially negotiated and constructed through collaboration by group members via engagement with the expertise, skills and insights of the group participants, requiring higher levels of interdependence between group members. Typically, the group works together from start to finish, and engage in the mutual co-construction of knowledge. We hoped to capture, in a collaborative digital space, the process of students engaging in the co-construction, or otherwise, of their research task.

An emerging body of research on cooperative and collaborative learning identifies an interdependent set of factors that shape the efficacy of these approaches. These include team-building, knowledge and pro-social training (Prichard, Bizo & Stratford [2006)] and Solomon et al. [1988]); social justice dynamics (Cohen [1994], Cohen & Lotan [1997], Johnson & Johnson [1981]); distribution of cognitive load (Daiute & Dalton [1993] and Johnson & Johnson [1991]); academic achievement (Barron [2003]; Slavin [1996], Teasley [1995], Stahl [2006], and Johnson, Johnson & Stanne [1989]); team pairing (Tudge [1992]); time for group negotiation (Nystrand, Gamoran, & Heck [1993]); resolving disagreements over delegation of work responsibilities, tasks and strategies for working together, information searching, as well as what information to include in the group presentation, and time to be made available to resolve these (Chin & Chia [2004], Lazonder [2005] and Meyer [2010]). Each of these dynamics provide a set of core concepts to begin an etic approach.

Some research is now also beginning to emerge in the context of the digital environment as the learning environment. Research by Lakkala, Lallimo & Hakkaraine (2005), Lakkala, Ilomäki & Palonen, (2007), Johnson, Johnson & Roseth (2010) and Scardamalia & Bereiter, (2006) identifies the complex dynamics of collaborative knowledge building in digital spaces and the complexity of using digital spaces for negotiating, debating and creating knowledge rather than individual work. While a considerable body of research has examined the individual experiences of students undertaking a research task, little research to date has investigated how students working in teams or groups use information together through an assigned research task and produce knowledge together, and particularly in a digital learning environment. More recently, Sormunen et al (2013) identified four group work strategies as students worked together in digital spaces. These were: 1) delegation, 2) division, 3) pair collaboration, and 4) group collaboration. Overall, they found that division of work into tasks to be completed individually was the dominant strategy in searching, reading and writing.

The third stream of literature underpinning this research sets the curriculum context and specifics of learning goals to be achieved by the class being studied. Curriculum reform across the USA has seen 45 states adopt the Common Core State Standards initiative. This initiative seeks to develop the essential intellectual, technical, social and cultural skills and knowledge necessary for students to succeed in college, career, and life, regardless of where they live. Amidst the complexity of a myriad of specific

curriculum standards, the initiative gives explicit emphasis to both short focused research tasks and longer term in-depth research tasks. These tasks require students to engage with diverse texts to gain, evaluate, comprehend synthesize and present increasingly complex information, ideas, and evidence through listening and speaking as well as through media. From the earliest grades, they are required to develop the ability to write logical arguments based on substantive claims, sound reasoning, and relevant textual evidence, and to produce meaningful representations of the knowledge and understanding gained. At the heart of this is the constructivist theme of students engaging in information inquiry to construct a representation of knowledge and understanding of a curriculum topic that shows the depth of intellectual engagement demanded by the Common Core State Standards initiative. Shaping this curriculum reform are also a set of principles centering on information technology developments and their integration with and impact on educational outcomes. A key stimulus is the Horizon Report, published annually by an international community of scholars, visionaries, and educational practitioners in educational technology under the banner of the New Media Consortium. The 2012 Horizon Report identified 7 key trends that are key drivers of educational technology adoption, based on an extensive review of current articles, interviews, papers and research reports. Some of the key trends identified in this report that shaped the design of this study are:

1. People expect to be able to work, learn, and study whenever and wherever they want to. This trend places emphasis on just-in-time learning, as well as easy and timely access not only to networked information, but also to tools, resources, and expert guidance.

2. The world of work is increasingly collaborative, driving changes in the way student projects are structured. Consistent with the Common Core State Standards, the Horizon Report views collaboration as a critical workplace and life skill, where group processes, communication and teamwork capabilities and dispositions are developed in a sustained and purposeful way. Digital tools that support the co-construction of knowledge rely on tools such as wikis, Google Docs, Skype, and cloud-based storage such as Dropbox. In our study, Google Docs and a wiki space were adopted.

3. The abundance of resources and relationships made easily accessible via the Internet is increasingly challenging us to revisit our roles as educators. Given the plethora of information available digitally, the challenge is to engage students in critically thinking about the information that they access and use, and the collaborative mentoring of students by educational teams as they learn in and out of school is an integral part of this. In our study, the classroom teacher and the school librarian were deeply immersed in the mentoring of students both in the actual school environment and the digital space.

4. Education paradigms are shifting to include online learning, hybrid learning and collaborative models. The traditional face-to-face model of learning challenges schools to embrace face-to- face/online hybrid learning models have the potential to leverage opportunities for quality learning across space and time. In our study, a hybrid model was adopted, utilizing both real time class and library experiences and ongoing learning in the digital environment (Horizon Report, 2012, 4-5).

Research questions

The overall research, still ongoing, seeks to: (1) track the process of student collaborative teamwork, particularly to understand how student teams work together to build a shared representation of knowledge; (2) examine the dynamics of the co-construction of knowledge by teams of students; (3) track students' engagement with information sources and how the teams transform and co-construct text into their joint representation of knowledge; and (4) track both individual learning and group learning, and to understand the relationship between individual knowledge developed in the process and the team representation of the joint product created in the process.

Sample and Research Environment

The research involved 2 English classes of Grade 9 students in a New Jersey public co-educational high school engaged in a collaborative inquiry-based task in a hybrid-learning environment in Fall 2013. The instructional program took place in both the school library and a wiki space. Participants were 42 students organized into 13 groups. The school was selected because of the high level of classroom teacher - school librarian instructional collaboration; the instructional team having experience with students learning and working in a collaborative digital environments (wikis and Google docs); and the instructional team's expertise with implementation of an inquiry-based instructional framework based on the Information Search Process developed by Kuhlthau (2004). In essence, the learning environment selected for this study represents the coalescing of the key themes established in the literature review: a constructivist learning metatheory and theoretical framework, the Information Search Process as an instructional design framework, and the positioning of the study to reflect core directions in integrating information technology and collaborative learning as indicated in the Horizon Report directions.

In the school, Grade 9 English is based on the NJ State Curriculum standards and Common Core Standards, and focuses on the five elements of the language arts: reading, writing, speaking, listening, and critical viewing. This particular group of students was in an accelerated course offering a wide range of challenging literature in the genres of short story, novel, drama, nonfiction, and poetry. The

course stressed critical thinking and speaking skills, analytical and argument skills, and inquiry-centered research strategies. In the research task, students were assigned a novel, and given the following objective and prompt: *Objective*: Students will discover and develop ideas through research, prove a thesis and report on findings. *Prompt:* You must prove that your assigned novel is of respectable literary merit**.** To do so, you must also identify reasons for this merit and present to your classmates. This objective was built on Common Core requirements to develop the ability to write logical arguments based on substantive claims, sound reasoning, and relevant textual evidence, and to produce meaningful representations of the knowledge and understanding gained.

The assignment to the groups was random, rather than being based on student-selected groups, topic-selected groups or other means of assigning participants to groups. This was done by the English teacher, who took the view that in the workplace, people at times do not get to choose who they work with, and she saw that this was a valuable life skill for the students. Students undertook their collaborative inquiry research task in the school library where a series of lessons took place to support students with selecting and utilizing resources, and in a class wiki environment that enabled the students to discuss their research topics, establish working relationships, plan and manage the tasks, collect information sources, and work together through the process of co-constructing their products, which included a class presentation, visual display, and annotated bibliography. The wiki site also enabled the school librarian and classroom teacher to converse with students, provide feedback on progress and reflections, and help as needed for teams and individuals. The wiki environment was developed by the school librarian for the teaching enabled the researchers to capture and track their research and writing processes, their use of information sources, their interpersonal dynamics and decision-making processes, and how they went about collaboratively creating their products (Todd & Dadlani, 2013).

Data Collection

Consistent with a constructivist learning perspective, and cognizant of the research findings documented above in relation to collaborative learning, we wanted to develop research methods that enable us to examine the subjective development of jointly constructed understandings of students' curriculum topic. This subjective approach assumes that the meanings and knowledge developed are both individual and an outcome of their interactions with others, and shaped by the contexts and dynamics which enable or hinder that interaction and coordination with others. These meanings are varied and multiple, leading us as researchers to look for the complexity of views rather than narrowing meanings into a few categories or ideas.

We wanted to capture that subjectivity as it occurred naturally within the learning environment. We wanted to capture the voices of the participants. And recognizing at a broader methodological level that all measurement is perhaps infallible, we saw the importance of multiple measures and observations, each of which may possess different types of limitations and errors. We saw value in the need to use triangulation across several potentially limited sources of data to get a better understanding of what was happening in the subjective reality of the classroom.

Based on the above assumptions, qualitative data were collected through the class wiki environment, and through structures set up by the instructional team, rather than by structures imposed on the learning environment by the researchers. The wiki enabled researchers to capture naturally-occurring qualitative data from the commencement of the instructional task to its conclusion. In addition, the wiki space captured interactions and feedback from the instructional team. As part of the learning requirements, students were required to make daily journal entries during the two weeks that the classes were scheduled in the library for a range of instructional interventions led by the school librarian. Students were informed that "Topics may include, but are not limited to, the research process and/or the material you find". To this end, students were required as homework to input a journal response after the conclusion of each class into a networked Google document (1 for each day of the classes in the library) for a total of approximately 336 journal entries. Students were then required to read each other's journal responses and comment on at least one other student's journal response in the same networked Google document for each week of the process (referred to as the commentary stream). As a result, 290 reflection responses were collected, and overall, a total of 945 conversation entries were recorded. The majority of reflections were about one paragraph (5-6 sentences) long. On average, the responses to other reflections were around 2-3 sentences long, and posts that were responded to tended to receive 2-3 responses.

Students also completed a pre- and post- survey to provide insights into the cognitive, affective and interpersonal aspects of their group research and writing process. These were planned tasks integrated into the sequence of instruction and research journey of the students, and have been consistent used by the school librarian in collaborative instructional units to gather input to shape the design and implementation of the instructional unit. These was based on the SLIM "Reflection Tasks" (Student Learning Through Inquiry Measure developed by CISSL) to track both individual learning and group learning, with emphasis on the knowledge construction process, and the cognitive, affective and behavioral dimensions. The pre-survey was administered on the first

day of the library classes and asked students to first identify, via open ended answers what their research topic was, what interested them about that topic, what they already knew about the topic and what terms they might use to search for information on the topic. Students were then asked to indicate on a 5 point scale how much they felt they knew about the given topic (1 = nothing at all; 5 = a great deal). The remaining questions on the pre-survey asked students to write open-ended responses indicating what they like and dislike about research, what they find easy and hard about research and finally how they feel about working in groups. The post-survey asked students to provide open-ended responses about what they now know about research, what they found easy or difficult about their research, how they feel about working in a digital environment and how they feel about group work by the end of the project. Additionally, two Likert Style (5 point scale) questions were asked pertaining to students' perceptions of the helpfulness of the reflection journal entries (1 = no help; 5 = most helpful) as well as how much they felt they learned about their topics (1 = nothing; 5 = a great deal). The journal responses, commentary stream and the more formal pre and post measures makeup the dataset used in this study (Todd & Dadlani, 2013).

Commentary on Methods and illustrative findings

Through the multiple measures, a vast amount of data was collected. As open-ended data, this has been very time consuming to analyze to construct a window into the minds of these students. While our intent as researchers is to make sense of (or interpret) the meanings the students have constructed about their collaborative learning task, relying on this continual stream, and at the same time, fragmented stream of data, has posed complexities, one of which is driven by research deadlines.

To streamline this complexity, we employed both etic and emic approaches in our data analysis. While there are various interpretations of these terms, for the purposes of this research, the emic approach takes a grounded approach, developing emergent codes extracted from the text, and establishing categories of codes to identify core concepts and their relationships, driven by the data. An etic approach to data analysis typically starts with a predetermined set of concepts, and these become the lens though which the data is analyzed and interpreted. While this does not limit the emergence of new and fresh concepts and relationships, it does give emphasis to what the researchers consider to be important. This importance is often established by the synthesis of the literature review.

An example of how emic and etic worked together in this research centered on students' perceptions of undertaking group tasks. These findings are reported fully in Todd & Dadlani, (2013). In the analysis of the pre-and post surveys focusing on the students' perceptions of being involved in a group process of co-constructing their argument about the literary merit of their chosen novel, employing an emic approach, we identified four key concepts that surround their participation and engagement in this work. These were: (1) social justice, (2) knowledge, (3) interpersonal, and (4) project management. The majority of responses however revolved around the social justice and knowledge dimensions. From the perspective of the students, social justice was seen in terms of equity of contribution, with intellectual input and workload to complete the group task shared equally and fairly across the group. The data showed that students valued the affordances of group work in terms of "the work is split up evenly" and "work spread out among the group", and when the workload was shared amongst the group members, they believed that "no one would be overloaded". However, their perceptions at the outset of the research task were quite negative, consistently expressing concerns about equal effort, fair distribution of labor, and all team members contributing their fair share of work (as opposed to social loafing), as well as team members all receiving the same assessment credit when effort was not evenly distributed. As students said: "usually the entire group does not work together", "members tend to slack off", and this "leads to certain people in the group doing more work than others". Some students saw that it was easier to work alone: "it is easier to work by yourself so that you don't have to make sure the people that you are working with are doing their jobs", thus avoiding problems caused by "individuals in the group that are either too lazy or take complete control of the project" and thus adding "more variables that can lessen the grade" or create issues around work credit: "to grade several students on one project is unfair".

In the analysis of the post-survey responses, and again utilizing again an emic approach, three key concepts emerged. These were: (1) knowledge creation and learning outcomes, (2) division of workload and learning equity, and (3) collegiality and cooperation. There is a difference in the way that these were categorized and labeled, based on this emic approach. The division of workload concept that emerged refers to workload balances and resultant learning outcomes. Students consistently perceived that undertaking group-based research tasks was less individual work: "I liked working in a group because I could bounce ideas off of my group members and did not have to do all of the work myself" and "there is less pressure on one person because the work can be divided". Frequently stated were concerns about the uneven contribution of work by team members, and the flow-on of that to assessment: "I dislike the group project because we all get the same grade despite the amount of work that is put in by each group member and the presentation of each group member".

Based on this emic process, we have become even more aware of just how much students bring with them a sense that social justice principles will be enacted in their

learning environment, whether that be a classroom or a school library or a digital learning environment. Accordingly, using "social justice" as an example here. The emic emergence of ideas around social justice, have led us to use an etic approach to uncover more insights surrounding the social justice concept, and to engage with the conversation streams, personal reflections, and feedback commentary provided in the wiki space to do this.

Accordingly, a review of the social justice literature (Dadlani & Todd, 2014) from both a philosophical perspective for example Rawls (1971), a library and information science perspective (Mehra, Albright, & Rioux, (2006), and a pragmatic social perspective, we have been able to construct a typology of social justice concepts, as shown in the table below:

Table 1. Social Justice Concepts

Sample Category/Subcategories
Freedom of Assembly
1. Control of Work Space and Contributions a. Role responsibility 2. Collective vs. Individual Decisions a. Unequal interactions b. Social loafing c. Role responsibility
Distributive Justice
1. Equity of labor a. Social loafing b. Role responsibility 2. Role Mediation 3. Collective Engagement a. Peer Uptake 4. Division of Labor a. Balanced participation 5. Cooperative v. Collaborative Behavior a. Role responsibility 6. Leadership

Applying this etic approach, the data sets have been then analyzed to identify the presence and strength of these categories and subcategories. For example, the Freedom of Assembly category refers to those statements which speak to the individual right to come together and collectively express promote, pursue and defend common interests – such as in the ability to have and design a space (physical or otherwise) where collective "work" and congregation can occur to bolster collaboratively pursuing some informational end. Two subcategories emerged from this category: Control of Contributions and Collective vs. Individual Decisions. Some examples of relevant statements are: "I also think that my group and I will plan out a system of how we can get all of our sources when we group together tomorrow" and "My group and I have discussed our project in much greater depth than we did yesterday. Although we have limited time in the library, my group and I decided to work on the project a lot more outside of school. We will either meet up or text or just use google docs." This detailed analysis from an etic perspective is currently underway.

We believe that such a combined etic and emic approach, drawing on multiple sources of data, strengthens the confirmability of the relationship between interpretation and representational accuracy. Our goal is not to identify causal processes in the learning environment, but rather to document social constructs of students and educators through interpretations and interactions with each other. It begs the question: How can students and their lives as learners be portrayed "authentically"? In combining etic and emic approaches, we are able to pay attention to a careful and detailed portrayal of the collaborative learning experience. It gives us a multiple lens to examine the rich detail and sort though the complex layers of understanding, and to generate the "thick description", a term coined by the anthropologist Clifford Geertz in the 1970s (Geertz, 1973). Additionally, as has been stated by Mehra et al (2006), our analysis engages social justice as a metatheory for the library and information science discipline, something which has seldom been overtly expressed or systematically tested in light of extant philosophical theories of social justice.

A criticism of utilizing both etic and emic approaches together extends back to epistemological debates about objectivity and the nature of knowledge and how it is generated, as well as debates about understanding perceptions and practices, or explaining them.

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Curriculum Vitae

Dr Ross J Todd is associate professor in the School of Communication & Information at Rutgers, the State University of New Jersey., and Director of the Center for International Scholarship in School Libraries (CISSL). His primary teaching and research interests focus on adolescent information seeking and use, seeking to understand how they learn and build new knowledge from information.

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Researching bibliographic data with users: examples of 5 qualitative studies

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Abstract

Introduction. Library catalogues enable people to explore and take advantage of the wealth of library collections. However, their use is relatively low, not only because they are difficult to use but also because they lack the needed data.

Research questions. To go beyond the constraints of current bibliographic data and find potentially missing data elements, our research investigated what data is needed to help different types of users find, identify, select, obtain, and explore information in the context of fiction.

Methods. Using a combination of qualitative methods (observations, surveys, and interviews), different groups of users were investigated. For each of the groups a special study was designed to find out based on which criteria they selected books. Rounding up the series of studies, a focus group and interviews were organised with reference librarians to tap into their rich experience.

Results. Although the paper briefly outlines some of the main conclusions from the five studies, more focus is given on the study descriptions from the viewpoint of their design.

Conclusions. To improve digital or classical services, investigation of information needs is one of the key areas that can benefit considerably from qualitative research methods. Our paper provides examples of how these studies can be designed and what kind of research questions they can help us answer.

Keywords: information needs, interviews, observations, focus groups, library catalogues

Introduction

Library catalogues present the central tool that enables people to explore and take advantage of the wealth of library collections. However, their use is relatively low, not only because they are inefficient and too complicated (Calhoun et al., 2009) but also because they lack the needed data (Hypén, 2014) that would help users as well as librarians not only find, but also select, identify, and explore the desired materials. This indicates that changes are needed if libraries wish to provide valuable services and make the best use of their collections. What has often been forgotten is that it is not enough to only build more modern systems, it is essential that they are centred around users' needs and the information seeking process.

While fiction represents an important part of (public) library collections and circulation, its retrieval presents one of the major problems in current catalogues also because it often leads to long lists of results where it is difficult to distinguish between different editions of the same work or explore its various versions.

Studies (Mikkonen & Vakkari, 2012; Goodall, 1989, Pogorelec, 2004) show that only between 10 and 20 percent of adult readers use the library catalogue to access fiction. With the catalogue predominantly supporting only known-item searches, users have developed tactics for finding good fiction books without the help of library catalogue

(Ross, 2001) by scanning or browsing bookshelves, an approach that is becoming more difficult as collections grow in size (Hypén, 2014) and as more and more books becomes available in electronic form.

Current online library catalogues are thus faced with two tasks connected to fiction: a) to support tactics other than known-item search (Saarinen & Vakkari, 2013) and b) to provide all the needed data for identification and selection of fiction based on bibliographic description. Pöntinen & Vakkari (2013) point out that especially with the rise of e-book collections, it is necessary to study how readers select books by using metadata in order to inform the design of metadata for fiction. This is also true for traditional collections as users want to be able to determine a book's relevance using their computer and expect information to assist them in this evaluation (Calhoun et al., 2009). All this suggests that libraries need to make it easier for users to determine whether the items meet their needs without examining the physical copy (Chercourt & Marshall, 2013). Also Saarinen & Vakkari (2013) observe that there is a lack of studies analysing from which attributes users infer that the book is what they are looking for. Another interesting question that arises is also whether and how different types of library users view bibliographic data in the retrieval process (Tosaka & Weng, 2010).

Our research therefore set out to investigate how people select fiction based on bibliographic records and how in physical form, thus trying to elicit what bibliographic data is needed to help different types of users find, identify, select, obtain, and explore information in the context of fiction. Are all the decisive elements presented to the users or should library catalogues be enriched with additional information?

Literature review

Research on enriching bibliographic records in library catalogues has a long history (for example Cochrane & Markey, 1983; Matthews, 1983). When asked what additional features users would wish to see in a catalogue entry, they most commonly requested summary, abstract, and other content information. Also more recent studies (Calhoun et al., 2009) found that tables of contents and abstract/summaries are among the most desired data-quality enhancements for end-users. Not only significant from an informative point of view, a number of research (Dinkins & Kirkland, 2006; Morris, 2001) shows that enriched bibliographic records have an important influence on circulation. Chercourt and Maschall (2013), for example, report that there is a positive correlation between adding tables of contents and increased circulation for certain groups of items, especially older materials.

Information about some important bibliographic elements can also be found in studies that investigate how people select books they wish to read for pleasure. Ross (2001), for example, reports on 194 intensive open-ended interviews with adult readers which, among other, reveal that author, genre, cover, title, sample page, and publisher give readers important clues on the reading experience they can expect and that subject, setting, and the physical size of the book help them match their book choices to the desired reading experience. Similarly Saarinen & Vakkari (2013) looked at which attributes readers perceive as indicators of a good novel and what tactics they use to find such a book in a public library. Using observation and semi-structured interviews with 16 adult library users, one of their main conclusions was that systems should support fiction retrieval by reader typology.

Focusing on children's literature, Anderson et al. (2001) studied how parents selected books for their four-year-olds. 12 fathers and 12 mothers were asked to pick out 5 out of 14 books to read to their children in the following week and to give reasons for their selection. While the choice was somewhat dependant on the parent's gender and the gender of the child, the reoccurring criteria were also the aesthetics of the book, familiarity with the particular book or author, content, educational value, reading level, values, children's interests, and general trends.

Pöntinen & Vakkari (2013) analysed how readers select fiction in online public library catalogues and compared whether there are differences in the selection between an enriched catalogue and a traditional one. Using eye-tracking, 30 participants were tested in a between-subject experiment where the researchers examined which elements were most important to users by following their gaze. In contrary to some other studies, they observed that users' choice was based on external attributes of books, whereas the content description did not seem to be as crucial.

Using think-aloud sessions, Hoder and Liu (2013) asked 20 participants to complete 10 tasks in a library catalogue and verbalize their thoughts, specifically those relating to their use of record elements. The study showed that participants found title, author, subject, year, material type, edition, table of contents, and co-author most useful.

Chang (2012) also investigated which key points help students make a decision. Carrying out interviews and observations with 60 students, she found out students use enhanced bibliographic elements for selection and identification of needed resources and that "excerpted contents" and covers helped them make a decision between different available versions.

Besides using observations and interviews with users, some researchers also applied content analysis methods to identify attributes used not only in library catalogues but also in other services such as social cataloguing sites and online bookstores (for example Adkins & Bossaller, 2007; Šauperl, 2013). The results indicate how bibliographic records could be enriched and what information and services users might expect from the library (Spiteri, 2009).

An interesting aspect has been researched also by Pejtersen (1977), who looked at library catalogues from the perspective of reference librarians. She argued that librarians faced two main difficulties: first, the problem of identifying the user's needs, and then the problem of formulating a relevant search strategy among books which are not classified according to the needs and which classification characterizes only some aspects of the book, insufficient in the view of the multi-dimensional needs of the user. Analysing almost 300 user-librarian conversations, the author identified five main dimensions of user needs: subject matter, frame (time, place), author's intention/attitude, accessibility (readability, physical characteristics such as typography, modern/old, series, size, and volume), and other formulations (author's name, title, similar books etc.).

Research agenda: 5 studies

Many of the studies looked at more traditional elements in bibliographic records with the addition of cover and some added content summaries, but did not try to introduce other information that is not part of current cataloguing practice. Our research wished to investigate more closely a wider range of elements (not only related to content, but also to attributes) that might be important to users when they search and select fiction books. To do this, we designed studies with both users and librarians who answer users' requests on daily basis.

3 different groups of users (mothers of pre-school children, high-school students and adults looking for leisure reading) were each given a set of tasks where they operated with both bibliographic records and physical copies of the books. Observing their decisions and questioning them on how they made their choices or why they changed their decision on the book they selected enabled us to get a closer look at which elements presented the key factors as well as which elements might not be included in the current records, but were obviously important. We were also interested in how these key elements varied among different user groups and whether enriched records improved the users' satisfaction with the chosen book. Besides examining users, we also felt that librarians would be able to provide a good insight into the topic, which is why we designed a focus group and an interview study to tap into their experiences.

Mothers of pre-school children

Aim. To establish whether parents are able to find a suitable book and differentiate between different texts and editions bearing the same title solely using the information recorded in a bibliographic record.

Data collection technique. Questionnaire and observation.

Research questions. Are current bibliographic records appropriate for the selection of books for small children? Deciding among several similar books, how do parents make their selection when using bibliographic records in a library catalogue and how when they choose between physical copies in a library?

Study Design. Six bibliographic records found under a title search "Cinderella" were selected and printed from an existing library catalogue. Issued in different years, in varying sizes, with different illustrations/translators, and even as adaptations, such a set of records presented a realistic search result in a library catalogue that any user searching for a story of Cinderella would have to handle.

Procedure. 26 mothers of pre-school children (under 6 years old) with varying levels of education were included in the study. The interviews took place in July and August 2011 outside the library setting: at children's playgrounds, in the parks, on the beach etc.

After some general questions about picture books, libraries, bookstores, and library catalogues, six bibliographic records were presented to the mothers. They were asked to choose a record they found most suitable for their child and to comment which attributes the decision was based on. Afterwards they were presented with the book described in the chosen record and requested to comment on their satisfaction or dissatisfaction with the book. In the end, participants were handed all six books with a question which of them they would choose as most appropriate for their needs and would therefore hypothetically wish to borrow.

Results. In the Cinderella bibliographic records, parents paid most attention to the author, the publication year, form of work, the translator, and the extent of the book. However, when presented with the book they selected using bibliographic records, 19 out of 26 mothers were not satisfied, the main argument being illustrations and the physical condition of the copy. After seeing all the available versions in a physical form, as many as 22 mothers said that they would prefer a different version from the one they got based on bibliographic records, the main reasons being illustrations, original text, and the condition of the copy.

• In general it seemed that illustrations, content, the cover, the size of the book and the length of the story are most important when parents select picture books for their children. 21 out of 26 mothers said that it is usually important to them which version or edition they borrow.

• Interviews revealed that elements such as paper thickness (for cardboard books), cover image, sample pages (as in the case of some online bookshop catalogues, such as Amazon), font size, letter case, page layout, preservation, age appropriateness would be welcome in a library catalogue.

Comments.

• The study was not carried out in a library setting, thus including also mothers who do not visit the library.

High school students

Aim. To get an overview of bibliographic data that is important to young students when they select books for their home-reading assignments.

Data collection technique. Questionnaire and observation

Research questions: How do high school students select and identify which book is appropriate among 11 different versions of Don Quixote? Which attributes are the most important when they need books for assigned reading? Do they even use the library catalogue?

Study Design. 11 editions of Don Quixote, a work listed as required reading in high school, were selected (abridged editions, full editions in two or four volumes, different translations and additional contents such as forewords and biographies etc.). The bibliographic descriptions were not taken from existing catalogues but were created (content and form-wise) by ourselves, using traditional bibliographic elements presented in catalogues as well as some attributes and relationships of our own choice (weight, binding, colour of the cover, short description, contents etc.). All records were presented in a mindmap where the elements were logically grouped.

Procedure. 105 high school students from two different secondary schools were included in the study which took place in November 2010. Students were recruited in the school library and on the hallways during breaks.

Presented with 11 bibliographic records, students were asked to select the one that would best fit the needs of their home reading assignments. The chosen book was then handed to the participant who had to examine it and tell whether it met his expectations. In case students expressed dissatisfaction, they were asked to explain why they did not like the chosen book and were offered another chance to select among bibliographic records. Again they were offered the physical copy of the book for them to comment on their second choice. After two selections, students were offered all the books described in bibliographic records and were asked to compare their selected books with other available books, commenting why another book would be better or why the book they chose using the bibliographic record was still their preferred one.

Results. Choosing between bibliographic records, the most important elements for high school students were: a note indicating what contents are included in the edition, illustrations, intended audience, and genre. However, when deciding between different copies in a physical form the deciding attributes were: the state of the copy, newer edition and the year of publication, appearance of the book, attractiveness of the cover, the weight of the book, as well as the size and the shape of the letters.

• 68% of students were satisfied with the book that they selected using bibliographic records. When presented with physical copies of all the 11 versions, however, 49% participants would prefer a different book from the one they have chosen.

• Only 33% of participants would use a library catalogue for the purposes of home reading.

Comments.

• Interview is a time-consuming method of data collection, but it also provides more detailed and explanatory answers. In case of high school students we have seen that not only have they been willing to participate (only 5 refused to take part in the research), but were also very honest in their answers.

Adults

Aim. To get a better understanding of which bibliographic elements are important and useful for identification and selection of relevant fiction materials in case of adults.

Data collection technique. Questionnaire and observation

Research Questions. Do a different record design and enriched content have an influence on users' satisfaction with the chosen book? Which bibliographic elements play a key role when adults select among different versions of the same work using bibliographic records and when they make a choice using physical copies? Based on which elements do adults change their selection when they are given the physical copies of the books?

Study Design. Focusing on fiction, 3 works (each represented with 6 different editions) have been chosen for our test: Quo Vadis (Henryk Sienkiewicz), The Godfather (Mario Puzo), and The Catcher in the rye (J. D. Salinger). For each edition, a physical copy of the book was obtained and three different types of bibliographic records prepared: the first (type A) was copied from the Slovenian union catalogue, while the other two were designed by us and differed in form as well as the set of bibliographic elements. Record type B therefore included some information that was already present in the next generation catalogues as well as some other attributes that users might find interesting such as weight and the colour of the spine, while record type C was based on FRBR.

Procedure. The study was carried out during July and August 2012 with 108 volunteers, who were invited to take part in the study as they were departing from a public library. Each participant in the study would first answer some general questions about the library catalogue and the attributes that were important to him or her when selecting fiction. Afterwards, participants were asked to complete two tasks, first using the bibliographic records and then the actual books.

Based on the six presented bibliographic descriptions for a title, participants selected the one they felt was best for their information need and would hypothetically wish to borrow. After selecting the record, participants were presented with the physical copy of that book and asked to

comment on whether they would be happy with their choice. Then the participants would be given the remaining five editions they did not choose with the question whether they would rather select another edition based on a physical copy and why. All the titles as well as the types of bibliographic records were counterbalanced, which means that each participant would get the three titles in a random order and would be randomly given a different type of bibliographic description for each title, creating all combinations of titles and records.

Results. Author, description on the back cover, theme, genre, and the cover presented the key elements in participants' selection.

• We could also observe that in current bibliographic records, the lack of elements leads users to make assumptions based on the data that is provided (for example, linking the year to the state of the book and the modernity of language, the size of the book with the size of the letters and the density of text, the publishing house with the quality of the translation etc.).

• When participants received the book they selected using bibliographic records, their satisfaction with the book was quite high for all three record types (between 81% and 84%). However, when presented with all 6 physical copies of the book, there were again a number of participants who wanted to change their selection. With traditional bibliographic records, 43% of participants would wish to change the book, while with the enriched records this percentage was reduced: with record type B to 38% and with record type C to 29%. This indicated that even relatively small improvements in bibliographic records (adding an image of a typical page, book cover and identification of contents) could enhance users' satisfaction by letting them know more in detail what kind of book they can expect, thus closing the gap between the expected and the actual copy.

Comments. A relatively small number of people refused to take part in the study and the ones who participated showed willingness to explain their decisions. This may be contributed to the personal approach to each individual.

• Using different bibliographic records in a printed form enabled the participants to be fully focused on bibliographic data without being distracted by other catalogue functions.

• Using video recording or eye tracking could enhance the amount of data gathered in such a study.

Librarians – focus group

Aim. To establish how well current library catalogues help librarians answer users' questions and to get the librarian's perspective on what is important when users choose fiction. Using group interaction we wished to encourage a more in-depth discussion on the topics that would be provoked by sharing of experience.

Data collection technique. Focus group

Research Questions. Are current library catalogues helpful to reference librarians? What kind of questions do library users pose to reference librarians and what attributes and relationships are most important to them?

Study Design. Librarians were asked to choose from a list of adjectives the ones that best describe their opinion of their library catalogue and explain their choice. They were also asked which questions they could not answer well using the library catalogue and what were the most common user questions and requirements when searching for fiction. Each of the tasks and questions served as a starting point for a discussion.

Procedure. Conducted in January 2014, the focus group involved 5 reference librarians from a major public library. Using a combination of tasks and questions as the basis, the focus group took two hours. All the tasks and questions were designed in a way that each participant would first express her view and then the moderator would lead the discussion by presenting more detailed questions and by encouraging the exchange of views.

Results. Librarians were generally very satisfied with the current catalogue, but despite their positive and uncritical view on the library catalogue, the conversation revealed that it does not help them answer all users' questions as it does not include all the needed information and functions. Asking them to list the attributes and relationships that define user needs for certain groups revealed some interesting aspects:

- parents when searching for children books: illustration, typography, reading level
- children: illustrations, page layout
- youth: short description, cover
- high-school students: foreword, full text, abridged edition
- adults: awards, time period
- elders: print size, the weight of the book

*Comments.*Conducting a focus group study, there is always a danger that some individuals will dominate the discussion, thus preventing more quiet participants to express their opinion. Trying to avoid this problem and create a more equal environment, we also designed individual tasks which gave each participant the chance to formulate their answer which were then used as a basis for discussion.

• Focus group presented an excellent base for planning future research.

Librarians – interviews

Aim. Similarly to focus group, the interviews also aimed at tapping into librarians' experience with the library catalogue and perceptions of users' needs they encounter daily. While focus group has its advantages, it may also prevent participants to be completely relaxed and open with

their opinions as they might fear what others think of their answers, especially when related to their work. Not really familiar with the method, librarians were also not that keen on participating in a focus group study, but were happy to accept an invitation to an interview about their work.

Data collection technique. Interview

Study Design. Retaining the same main questions from the focus group, interviews aimed at the same goal but instead of drawing on group dynamics they focused on gaining a deeper understanding of an individual librarian.

Procedure. 6 interviews took place in three public libraries during April 2014. The answers were recorded using a tape recorder.

Results. Librarians described the current library catalogue as useful, informative, and convenient. However, the conversation also revealed that when the catalogue is not useful, librarians tend to use various recommendation lists on their webpages or search the web for more information.

• Selecting among different versions of the same work, users will choose the one that looks nicer on the outside, but typically a librarian would present all the available versions to the users, leaving the final choice to them.

• Library users most often search for continuation of a book, parts of a series, or movie adaptations. For different reading levels and purposes, librarians pointed out the following attributes:

- parents when searching for children books: genre
- children: illustrations
- youth: thickness of book
- high-school students: foreword
- adults: genre, language, reading level
- elders: print size

Comments. Compared to the focus group, the answers to our questions were shorter, but participants would also elaborate more on the questions they deemed important. As with the focus group, the interviewer needed to keep a close eye to make sure that the conversation did not drift too far from the main theme.

Discussion

With the longstanding cataloguing practice, it seems that neither librarians nor other users ask (anymore) if the library catalogue gives all the needed information or whether some things are missing. Talking to the participants in our studies it became obvious that librarians as well as users assume that there was something wrong with their search strategy or with their lack of knowledge about bibliographic data. When, for example, one participant chose a different book when she was given all the books in a physical form, she commented: "It all says in the record, it is just that I don't make out what it means". Similarly, a librarian in a focus group pointed out that "everything can be found with UDC, it is just a bit complicated". The conviction that the library catalogue is fine as it is and that the main problem lies in user's knowledge of the system is a big barrier towards creating a more efficient catalogue. We have made some important steps forward with better display of data, navigation and web 2.0 tools, however, it is the quality and the structure of data that are the prerequisite for a useful catalogue, a catalogue that would be better employed by its end-users.

Although a simple questionnaire would be less time-consuming and easier to analyse, we felt that investigating our research agenda by combining user observation and personal interviews would help us discover information that would otherwise remain hidden. With interviews it was possible to get a better understanding of participant's choices that in turn gave us the answer to the question which bibliographic elements are important to certain user groups. With our initial research we could see that users' answers on questions about bibliographic data differed from what we could then observe when users were working with real bibliographic records. That is why our later studies even more carefully and deliberately included various bibliographic records with different bibliographic data for users to work on the chosen tasks.

Two studies, on the other hand, looked at reference librarians as another distinct group of catalogue users. With the intention to encourage a more in-depth reflection on the usefulness and efficiency of a catalogue as librarian's basic reference tool, a focus group was carried out to engage participants in a discussion. Having some difficulties in recruiting librarians to participate in the focus group, we decided to carry on with the same set of questions and tasks using individual interviews. This way we could also gather opinions and experience from librarians that would otherwise not be able to take part in a focus group due to different factors (distance, nature of their work). While the gathered information from both studies gave a better insight into user's needs and preferences as viewed through the lens of experienced librarians, we feel that additional studies such as observations at reference desks or tasks similar to the ones we have to other user groups would provide even more information.

Conclusion

Libraries are part of a changing environment and continuous research on what different user groups need is essential if libraries wish to detect and quickly respond to these changes. However, simply asking users what they require or how they select books usually does not give very comprehensive results as people may not consciously recognize the elements they pay attention to; we have seen that even for librarians such questions were difficult to answer as they limited their thinking to the currently available systems and bibliographic data. In case of our

studies, observing users as they performed and commented on specific tasks yielded much richer information compared to questionnaire type of answers provided at the beginning of the study.

While our observations were not done on the field, we feel that the tasks were close to a real-life situations (for example, a user at home writes down the books he wishes to borrow, but realises in the library that the desired book or edition is not what he had expected) and therefore reflect some of the issues users are faced with as they use the library catalogue.

Besides author and title there are differences among different user groups in the needed bibliographic elements. We have observed that next to more objective data such as the size of the book or the number of pages, users often selected a specific copy based on more subjective aspects that are not always easy to determine, for example the reading level and the condition of the copy.

In our studies we also observed a substantial gap between the choices made using bibliographic records and those using physical copies. The fact that so many participants would select a different edition if they were choosing among physical copies is a clear indication that more user studies on this topic are needed in order to design more informative bibliographic records. Such research will be needed also for e-book collections where some attributes will become irrelevant (weight, letter size) while other will retain their importance (for example, is there a foreword or a biography included in the book).

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Quality school library – how do we find out?

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Abstract

School libraries are agents of current education and an essential part of development of future life-long competences. In order to evaluate the work of school libraries, we need to establish criteria which take into account all factors affecting their quality. Center for International Scholarship and School Libraries (CISSL) at Rutgers University (USA) has developed a model of quality school library. From the point of viewof our paper, which is of methodological nature, the essential part is the development of the methodology which resulted in the model and to see how this methodology can be applied in researching the quality of school libraries in two neighboring countries, Slovenia and Croatia, where school libraries have until 1991 developed according to the same standards, guidelines and regulations, but followed different paths since then. Therefore, in the paper we discuss methodological issues related to identification of the sample of good school libraries and the possibilities of testing the CISSL model of quality school library in the two countries. We expect that the research and use of the CISSL methodology in two countries in question provide findings on possible futire research also in other countries.

Keywords: school libraries, Slovenia, Croatia, qualitative research, methodology

Introduction

Dynamic and quality school libraries enable development of information literacy competences, which are essential in the information society. Students from the earliest age need to systematically develop these lifelong learning competences to be able to learn and act as informed and responsible citizens. A quality school library plays an indispensable role in this process. There is considerable attention internationally as to what constitutes a "quality" school library, and a lot of studies have been made. These issues are made even more complex being accompanied by questions about the future sustainability and roles of school libraries as they have historically developed, and as they transform in digital environments. The ongoing development and testing of quality assessment models and frameworks are very important, in fact critical, for the school library profession.

School libraries, fundamentally equal to other libraries, have important additional tasks in the formal education and are the only libraries visited by everyone, at least during the compulsory part of their schooling. In this paper we will dedicate attention to school libraries in two neighboring countries, Slovenia and Croatia, which were until 1991 part of the same country Yugoslavia. Therefore, Croatian and Slovenian school libraries have until 1991 developed according to the same laws and standards which regulated the educational system and librarianship field. Since then the development has been partly different. But, it is reasonable to assume that even though the school libraries in the two countries differ, their development is still based on the same theoretical findings thus following the same fundamental professional guidelines. However, this is only an assumption, as no formal comparison or assessment has been made.

The question, which we are asking here, is what methodology is needed (and how it can be developed) for investigation of the quality of existing school libraries, having in mind the parameters which will enable comparative analysis in respective countries. Methodological issues, which should guide quality empirical research, too rarely come into discussion. It is more often that methodology is developed through small-scale research – its results (perhaps too limited) then serve

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as a baseline for the development of theories and concepts, and consequently also indicators of quality.

Theoretical framework and literature review

Among the educational goals according to European White Paper on Education and Training (1995), which is a base for several later documents in respective countries and on European level, special emphasis is given to competences for lifelong learning, continued personal and professional growth of individuals, and development of civic competences needed for life in the democratic society. All these competences are acquired through formal, non-formal and informal learning which today is dramatically changing in relation to development and use of ICT's. Access to and processing of information are changing, which especially influences formal education. For successful learning it is essential that learners are guided through the learning process from information acquisition to knowledge production. Studies of accessing and using information for learning undoubtedly show positive links between learning achievements and quality school library (Kuhlthau, Maniotes and Caspari, 2007; Todd, 2006; Todd and Gordon, 2010; Novljan, 2010). This means that an appropriately equipped, resourced, and staffed school library can with its program contribute to desired teaching outcomes and to better learning achievements of pupils (Znanjem do znanja, 2005; School libraries work!, 2008; Todd, 2012). Novljan (1996) proved that a school library with a professional librarian (compared to a school library with a teacher without LIS competences) helps the pupils to better learning achievements.

Standards regulating the area of school librarianship in both countries (Standardi ..., 1995; Standard ..., 2000) state that school library should be integrated in the learning / teaching and should act as an information-communication center of every school. However, it is questionable, how much school libraries actually operate in accordance with these statements and what are their actual outcomes. Identification of factors of quality should go beyond such general principles.

We are aware of grounded theories which clearly define quality factors of school libraries (Todd & Kuhlthau, s.a.), while in Slovenia and Croatia no comprehensive studies have yet been done to verify these theoretically grounded factors of quality. Due to lack of such studies, we decided to lean on a model of quality school library, developed by CISSL, US (Center for International Scholarship and School Libraries), as a result of innovative research approach in which key quality factors were identified through in-depth research of intentionally chosen good libraries (Todd & Kuhlthau, 2005a and 2005b; Todd, 2004; Todd, Gordon and Lu, 2010, 2011). The model is interesting particularly because it took existing good libraries as a starting point for its development. This approach differs from traditional research where samples of libraries are investigated in an attempt to determine which factors could affect their quality. Therefore, as Tepe and Geitgey (2005) and Todd and Kuhlthau (2005a) present, the first element in shaping the model of a good school library was making a selection of excellent and effective schools which was done on the basis of ratings based on their proficiency scores, attendance levels, and graduation rates. Only schools, which rated excellent and employed a certified library media specialist – thus being considered to offer an "effective school library program", were qualified to participate in the study. Additionally, the project team formed a set of criteria based on the Ohio School Library Guidelines (Library Guidelines, 2003), and set up an International Advisory Panel (consisting of nine members which were distinguished scholars and leaders in school librarianship) to help shape the final set of criteria for selection of effective school libraries which were considered for further research. The criteria are shown in Figure 1.

The research resulted in the model's development, not vice-versa. The foundations of the model are not theoretical, but have roots in practice, being supported by contemporary theory. Therefore we could call it practice-based research, stemming from the term 'evidence-based practice' (i.e. educational practices based on scientific research), frequently being recommended as the best approach for school library work (see for example USA DOE, 2002). Its characteristic is that researchers empirically investigate the existing practice, and link it to theoretical findings, in order to assess it and make recommendations for improvements.

Once established, the methodology can be replicated for longitudinal research in the same environment, or used in another context. As argued by Todd (2003), evidence-based practice in school librarianship is the process of carefully documenting how school librarians make a difference in student learning. This evidence can then be used to support the argument on the roles, responsibilities and overall importance of school libraries.

Due to the methodological nature of our paper, we will here focus on the methodology of the preparation of this model, not the actual subsequent findings of the studies in which the model was used. The methodology of the preparation of the model was described by Tepe and Geitgey (2005), and Todd and Kuhlthau (2005a). We will use that approach to investigate if and how the model can be applied (probably in an adapted form) in another context. We assume that the circumstances which influenced the development of school libraries in Slovenia and Croatia – two countries being historically, culturally and economically very different from USA – will dictate certain changes/additions to the methodology

which enabled a model's development. The same methodology was applied and the model tested in Australia (Hay, 2005, 2006), but with a different approach, because they used Australian qualitative data, not as a illustrations of the quantitative-based findings, but as a baseline for a picture of school library based on students' experiences and expectations.

The schools in Ohio that met the criteria, described in Figure 1, were then invited to apply for participation and to provide substantive documentation addressing the criteria. Finally, an Ohio Experts Panel, consisting of 11 leaders from the school library and educational community in Ohio, who had in-depth knowledge of a range of school libraries across Ohio, was constituted to make the final selection of participating 39 schools, using the principle of judgment sampling. The characteristics of the school libraries of these schools were analyzed to see how students benefit from them by looking at the "conceptions of help", i.e. the extent to which the students perceived to have received help from the library in various areas (such as learning, getting or using information, etc.). Two key instruments were used: for students and for staff, each of them provided their own perceptions of helpfulness of the library to students.

Selection Criteria

Any school (building) in Ohio may be selected for the research project if it meets the established criteria.

Minimum requirements:

- ✓ The school building includes at least one of the K-12 grades.
- ✓ The building library program is managed by a full time, certified library media specialist
- ✓ The school library media specialist and the library program are instrumental partners in a systematic information literacy instruction program taught within the school.
- ✓ A physical school library exists within the building
- ✓ A 2002 Ohio School District Report Card rating with supporting data must be available.
- ✓ The school must have a building IRN registered with the Ohio Department of Education.

The following areas (adapted from the January, 2003 draft of the Ohio Effective School Library Guidelines) will be used to evaluate the prospective school with regard to selection for the research project.

Criterion 1: (School Goals and Leadership)-Effective school library media programs support the mission and continuous improvement plan of the school district.

Criterion 2: (Curriculum)-Effective school library media programs support and enhance the curriculum and are an integral part of teaching and learning.

Criterion 3: (Information Literacy) (Including technological and media literacies)-Effective school library media programs provide information literacy skills instruction.

Criterion 4: (Reading)-Effective school library media programs promote and encourage reading for academic achievement and life-long learning.

Criterion 5: (Technology Resources)-Effective school library media programs provide, integrate, and utilize a technology rich environment to support teaching and learning.

Figure 1: Selection criteria for effective school libraries (Tepe & Geitgey (2005, p. 59)

This resulted in a three-part model of the school library as a dynamic agent of learning (Todd and Kuhlthau, 2005a), presented in Figure 2. As the authors (ibid., p. 6) explain, " The model posits that as a dynamic agent of learning, a school library's intellectual and physical infrastructure and output centers on three essential interrelated and iterative components: informational (the information resource and information technology infrastructure; transformational (the instructional interventions, reading and related initiatives, and other student engagement initiatives), and formational (learning impacts and student outcomes)." Further present in the model are *the school librarian*, acting as an information specialist and a learning specialist, as well as curriculum partner-leader, and *the school library*, which is not only an information place but also a knowledge space.

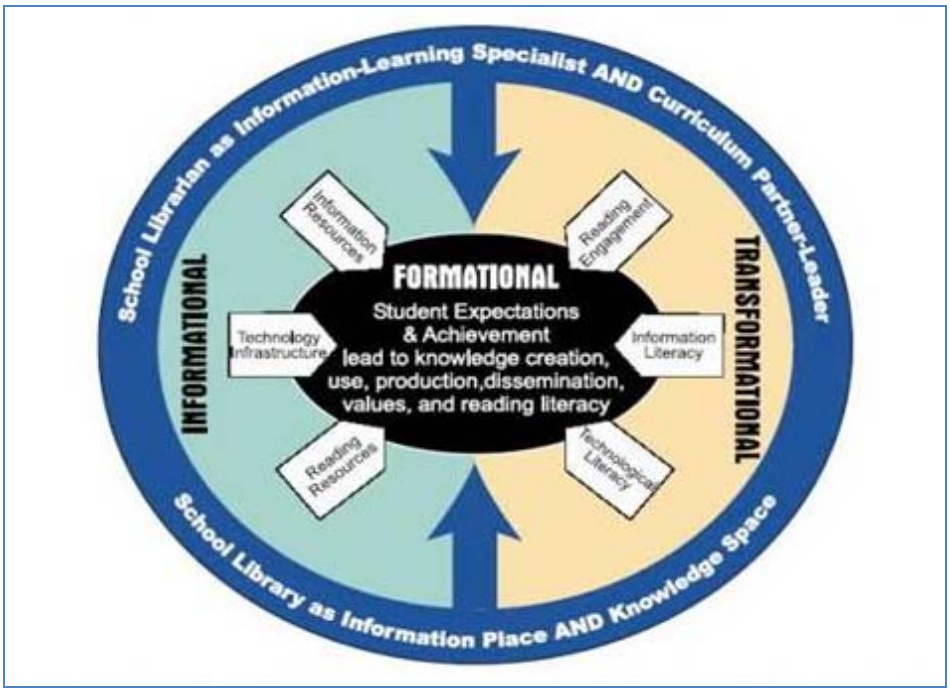

Figure 2: Model of the school library as a dynamic agent of learning (Todd & Kuhlthau, 2005a, p. 6)

Research questions

This paper is one part of a wider study which aims to investigate, whether (and to what extent) the original CISSL model of quality school library functions in any context. Our goal here is to explore the methodology used in developing the CISSL model and to develop the methodology for building model(s) of quality school library in Slovenia and Croatia. In a wider sense we would like to see, if (or how much) the model(s), which will be the result of such methodology, correspond to the original CISSL model. It needs to be emphasized that for the purpose of this paper we are not testing the model itself; instead we are exploring the methodology which was used in its creation. But, based on the findings which will show if the situation in these two EU countries generates different models (different from each other and/or also different from the original model), it will be possible to estimate, if and how this methodology can be used for formation of models in other countries/contexts.

For the purpose of this paper, which is of methodological nature, we are focused on the following questions:

1. Which criteria can be applied in choosing effective libraries on which the quality of school library will be explored; which will further serve as a comparison with the CISSL model?
2. Which parts of the research methodology from the CISSL research can be adopted and what should be changed according to the context?
3. Which methods will/could be applied in investigation of the school libraries in Slovenia and Croatia?

Discussion

In order to be possible to test the CISSL model in Slovenia and Croatia, the starting point in the development of the methodology of researching the quality of school libraries should be the (re)framing of criteria for identification of effective libraries on which the research will take place. However, we believe that the second part of research, which is based on exploring how the school library helps the students in their learning, can be applied unchanged. The results which are based on the student's and staff's perceptions of the "help concept" will show what constitutes a good library and whether (and to what extent) it differs from what the CISSL model is based on. It is important to note that this research does not test the existing CISSL model, but the methodology on which the CISSL model has been developed. On the basis of this methodology we will explore the perceptions of school library of the students, teachers, librarians and school management, and then, on the basis of the results, verify how (if) the model(s) of quality school library differs (or doesn't differ) from the CISSL model and what causes potential differences.

In answering these research questions, we first need to look at the two countries in question. Namely, it is not possible to simply transfer a model which has been developed in a particular setting, and apply it unchanged. Furthermore, it is not possible to transfer or apply the same criteria in identifying the sample – good school libraries. Since school libraries are part of educational system and, consequently, influenced by the social, economic and political system, these elements need to be considered in the methodology. USA DOE (2002) warned about some problems regarding scientifically-based research, namely that not much of it is done and that school authorities are not as familiar with the scientific approach to research as they are with other approaches. The same issues can be observed today in Slovenia as well as in Croatia. Not only that there is considerable lack of scientific analyses of school practice, there is also a worrying lack of interest from the school authorities. As already warned by Novljan (1994), the development of school libraries reflects its tight relation to the goals, principles and tasks of educational process. In fact, the actual educational system influences the development more than professional guidelines. School libraries have lived much more in line with guidelines and recommendations of library profession in those countries where actual democratic spirit has been pursued, where educational contents and methods have connected with social changes and where students were educated for life. These school libraries, undoubtedly, are advanced, follow changes, even cause them.

To establish the criteria for identification of good libraries we will analyze, using the method of content analysis, the documents regulating school librarianship in the two countries. The analysis should take into consideration national, as well as international documents. The basic documents are shown in Table 1 (with titles translated into English).

Even though the documents and guidelines/standards in both countries emphasize the role of school library in learning, development of literacy and reading, the level of learning achievements in these areas are not satisfactory. The development of school libraries reflects the literacy of the citizens and vice versa. In Slovenia and Croatia results of PISA 2012 (Programme for International Student Assessment) tests have revealed a worrying level of students' reading literacy which is lower than OECD average, and has not improved since 2009 (Pedagoški inštitut, 2013; Ministarstvo obrazovanja, znanosti i sporta Republike Hrvatske, 2013). This has raised a fierce debate about the entire school system, which will, hopefully, also influence the awareness of the importance of school libraries.

We have already said that the main methodological question in researching the quality of school libraries in Slovenia and Croatia, should we follow the CISSL methodology, is how to set the criteria to choose good libraries. If we take as a starting point the criteria based only on the documents and regulations which govern education and the role of school libraries in the respective countries, this would not give the real picture, since the school management, as well as school librarians, know these documents and try to apply them in their work; but in reality the practice and the overall situation often differ from what has been prescribed. These documents emphasize the role and operations of school library as part of educational process and as support of learning, but on a very general level. Additionally, the problem is that in both countries there are no systematic studies of school libraries and no exact indicators to show to which extent the libraries follow the requirements stemming from the legislation, guidelines and other documents. Also, there are no unique data which could give the exact indicators related to the criteria used in the CISSL study.

In creating the criteria to define the sample, besides the regulating documents, we need to start from the theoretical foundations, which clearly state what constitutes the quality of the school library, as well as from the general criteria used in the CISSL study. On the basis of all these, we need to develop unique criteria which are not general but very precise and which take into consideration the context. Namely, if the criteria are not operationalized in detail, measurable and comparable, school management and school librarians might show the picture of what is *desired/required*, not of the real condition.

Table 1. Documents included into content anaysis

Basic Slovenian documents regulating school librarianship	**Basic Croatian documents regulating school librariansip**
Zakon o knjižničarstvu – *Law on librarianship* (2001)	Zakon o knjižnicama – *Law on libraries* (1997; with changes 1998, 2000, 2009)
Zakon o osnovni šoli – *Law on elementary school* (2006) Zakon o organizaciji in financiranju vzgoje in izobraževanja – *Law on organization and financing of education* (2007)	Zakon o odgoju i obrazovanju u osnovnoj i srednjoj školi – *Law on education in elementary and secondary school* (2008; with changes 2009, 2010, 2011, 2012)
Standardi in normativi za šolske knjižnice – *Standards and norms for school libraries* (1995) Idejni načrt razvoja slovenskih šolskih knjižnic – *Development plan for Slovenian school libraries* (1995)	Standard za školske knjižnice – *Standard for school libraries* (2000)
Kurikul Knjižnično informacijsko znanje – *Curriculum Library and information knowledge* (2008) Curricula for other elementary school subjects	Nastavni plan i program za osnovnu školu – T*eaching plan and program for elementary school* (2006)
International framework and guidelines	
The IFLA/UNESCO School Library Guidelines (2002) IFLA/UNESCO School Library Manifesto (1999)	

Even though this assumption is more speculative than exact, in creating these criteria we need to take it into account, since the schools and libraries in Slovenia and Croatia have until now not seen such research, which could mean that their intention will be to show the library in the best possible way. An indication of this is an established practice of demonstrating examples of good practice, which is especially encouraged at meetings and conferences of school librarians. Many school libraries in both countries can show certain examples of good practice in their work, which can create an appearance of positive trends, but a question is how much individual (or a few) examples from one library (or some libraries) can reflect the overall quality of library work in all segments. On the other hand, it can be expected that the schools, aware of the problems which face them (inadequate space, ICT equipment, unreadiness of the teachers and/or librarians for joint development of curriculum, inadequate support of the library by school management, etc.), would not be ready to participate in this research, since they do not want to be ranged according to the quality of their libraries.

Due to all of these reasons, it can be expected that the most demanding part of the research of the school libraries' quality will be the identification of the effective school libraries in which the second part of the research should take place – exploration of school library practices.

It is evident that, before asking the students how the school library helps them in their learning in the widest possible sense, we need to use various research techniques to explore the context in which school libraries in the two respective countries operate, as well as the perception of those stakeholders who significantly affect their quality. Besides investigating the existing school library practices via usual methods (such as surveys, interviews, observations, etc.), it is needed to investigate:

- The attitudes of the authorities towards school libraries, which could be done by employing the content analysis method to analyze the curricula, legislation, formal documents of educational institutions (statutes, regulations, etc.), or even surveying or interviewing relevant bodies (both professional and legislative);
- The contents of existing educational programs (formal, permanent) which are available to school librarians, again by means of content analysis of their curricula.

When data is collected, it will be, of course, useful for analysis of the situation in each country. However, to assess the situation in both countries, we need to employ comparative analysis. Only this will show, whether the model of a quality school library is valid for both countries, or should it be reframed in one or both countries, and also, are the differences too big, which would require different adaptations of the model for each country.

In line with the current need of establishing the school libraries (virtually in any country) as indispensable partners in the teaching and learning process, we also need to try to position our discussion in a wider, possibly more international context. We believe that similar approaches could be used to further verify the CISSL model.

Conclusions

Evaluation of school libraries needs to be based on the methodological apparatus which takes into account theories and models, and also the context in which the libraries operate along with their stakeholders. The main motivation of this paper was the development of an appropriate methodological approach for investigation of a quality school library in two neighboring countries. The major challenge is to set up criteria which will guide the choice of effective school libraries which will then be included in further research. However, this methodology can also serve as a basis for other similar research and enable further application and possible reframing of the CISSL methodology, as well as testing of its model of quality school library in various international contexts.

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BibEval – a framework for usability evaluations of online library services

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Abstract

From the perspective of users three aspects are essential for the quality of library online services: the performance, the usefulness and the usability (Tsakonas & Papatheodorou, 2006). The usability expresses the quality of interactions between users and a system. For conducting usability evaluations a wide spectrum of methods can be used. A good overview of usability evaluations of library websites is provided by Kupersmith (2012). Also Fagan (2010) provides a literature review about usability studies of faceted browsing, which is a common feature of modern online catalogues. According to those papers heuristics are a widely used instrument to assess the usability of library websites (e.g. Aitta et al., 2008; Yushiana & Rani, 2007; Manzari & Trinidad-Christensen, 2006). However, such heuristics are usually kept rather generic. Therefore extensive knowledge in the field of human factors is needed to use them effectively. In order to give library staff the possibility to conduct evaluations by themselves, the SII developed a criteria catalogue which is specifically tailored to evaluations of online library services. Its development was based on three different sources. First, a literature review was conducted to identify suitable evaluation criteria. Following that, a best-practice analysis of library websites was carried out in order to gain more insight about the current state-of-the-art. Based on these findings an initial version of the criteria catalogue was generated, which was then further refined by the results of a focus group (library staff, web designers, usability experts). The criteria catalogue uses a modular structure, so that it can be applied for comprehensive evaluations of a library's entire online services as well as for evaluations of only selected areas of a website. It is available in form of an interactive web application. For supporting evaluations a project administration tool is available which guides users step by step through the usage of the application.

Keywords: evaluation, heuristics, usability

Introduction

Libraries have always been places that serve the preservation and intermediation of knowledge. In doing so, for a long time the focus was on collecting and indexing printed materials. However, modern libraries can not only be judged based on their physical collections anymore. Due to the growing popularity of the internet, the increasing digitization of knowledge and the development of new technologies (e.g. e-book readers, AJAX, apps) the environment in which libraries operate has changed considerably. In this context libraries are facing a number of challenges.

In particular libraries should take care, that their resources are represented in the places where typical users do their work. Attracted by the simplicity and the immediate availability of content many users have shifted their information discovery to internet platforms such as Google Scholar, PubMed or Amazon (OCLC, 2011a). This is not at least reflected by the usage statistics of different information services. For instance a survey conducted in 2010 by OCLC (2011b) among library users from Australia, Canada, India, Singapore, the UK and the USA found, that the percentage of respondents, who begin their search for information on library websites, tends to zero.

This indicates that solely indexing information resources and even the mere provision of content is not sufficient. Due to new technologies such as AJAX (Asynchronous JavaScript and XML), which allow to develop more sophisticated user interfaces than ever before, nowadays

users have higher expectations regarding the design, the functionalities and the overall quality of websites and web-based services. As Kelly (2011) points out, one of the most essential characteristics of our digitalized world is the fact that copies of every (digital) object can be made at almost no costs. So in fact the value of having or owning such a copy is becoming more and more negligible. Therefore, libraries should also focus on providing services beyond just providing access to their resources. In order to support users in their information discovery, they should try to provide relations between seemingly unrelated pieces of information. Recommendation services such as provided by Amazon are a good starting point for that.

It is not surprising that the IFLA (International Federation of Library Associations and Institutions) emphasizes this issue in their strategic planning for the years 2010-2015. IFLA is encouraging all its members to work together with partners and users to tap the full potential of digital technologies, in order to provide a seamless and open access to cultural assets and information resources (IFLA, 2010).

Since libraries lost their near-monopoly as information providers they once had (Lehman & Nikkel, 2008), it is essential for them to adapt their websites and especially the provided search functionalities to the needs and the workflow of their users. The aim should be to offer the same ease of use, robustness and performance as internet search engines and similar services combined with the quality, trust and relevance traditionally associated with libraries.

Great effort has already been made in this direction. An indication of this is the large number of projects dedicated to the development and provision of so called “next-generation library catalogues” or “discovery tools”. But there is still room for improvements and a lot of libraries still have to take that step.

User perceived quality of library online services

From the perspective of users three aspects are essential for the quality of library online services. Tsakonas and Papatheodorou (2006) have summarized them in their interaction triptych model. This model consists of the three levels usability, usefulness and performance.

Usability expresses the quality of interaction between users and a system. According to ISO 9241-11 this term is defined as "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use.”

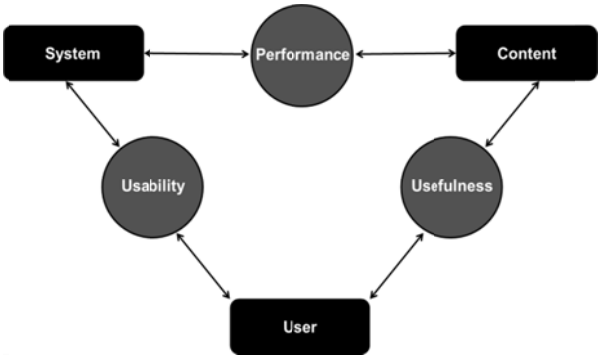

Figure 1: Interaction triptych model (Tsakonas & Papatheodorou, 2006)

Usually it is associated with the functionalities and in particular with the user interface of a product and assesses how users interact with it. In doing so, personal impressions such as satisfaction, helpfulness, benefits, frustration and self-efficacy play an important role (Bertot et al., 2006). Regarding the functionalities themselves it is crucial to focus on those which are really needed by the users in order to fulfil their tasks. For that purpose, profound knowledge about the users and their information needs is necessary. Clearly defined priorities about the “who" and "what" provide the base to implement systems that offer an ideal task support (Battleson et al., 2001).

Usefulness is in the field of human-computer-interaction generally considered together with usability as an integral part of a holistic approach. However, regarding online library services it has to be interpreted slightly different. In this context, usefulness refers mainly to the provided content and its relevance for fulfilling the users’ information needs.

Finally, the performance which is located between system and content describes the systems' efficiency. This aspect strongly depends on the formats, structures and representations of the content (Fuhr et al., 2007).

Aspects concerning the usefulness and performance are not further investigated in this work. Instead the focus of this paper lies on functional aspects and the usability of these components.

When users cannot handle an online service intuitively, they will potentially classify it as useless and avoid using it again. Therefore, usability is a key factor for the success of library online services. And it is crucially important for web applications, where a differentiation to competitors cannot be achieved by the offered content or functionalities.

In addition to pure usability aspects, over the last years also the so called joy-of-use has gained in importance. Nowadays users expect that the usage of a website should not only be efficient but also fun. Therefore, the term user experience has gained more and more attention. Whereas the concept of usability refers exclusively to the actual

usage situation, user experience extends this concept to the anticipation or respectively the assumed use of a product as well as the processing of a usage situation (Geis, 2010). ISO 9241-210 defines user experience as "a person's perceptions and responses that result from the use or anticipated use of a product, system or service".

It is important for libraries to strive for the best possible user experience, when they're implementing new services or re-design existing ones. Unfortunately, while the objectives are clearly defined, at the moment there are no detailed guidelines for libraries about how to ensure this and make the most out of newly developed services.

Usability evaluation methods in the context of libraries

There are some aspects that make it more challenging to ensure the usability of library websites. First, it has to be considered that library users are very heterogeneous (Battleson et al., 2001). This makes it difficult to adapt the site to the preferences and skills of all users in order to deliver an ideal task support. Also library websites provide access to a vast amount of different databases, all with their own search functions. This results in inconsistencies in the look and feel, so it is understandable that users are attracted to one-box-search-everything types of sites. Another fact is that librarians have a special terminology which often is also used on their websites. However, typical users are not familiar with those expressions. Usability evaluations help to counteract these problems (Lehman & Nikkel, 2008).

For conducting usability evaluations a wide spectrum of methods can be used. Those can mainly be categorized by two criteria: when does the evaluation take place and who is involved in the assessment. In relation to when the evaluation is conducted, a differentiation can be made between formative and summative evaluations. The formative evaluation will already take place during the development process. Such evaluations focus on finding opportunities for optimizing a product. For that purpose in particular qualitative data such as verbal protocols play an important role. In contrast, summative evaluations are used for the analysis of a finished product and aim to assess the overall quality of it (Nielsen, 1993). Here the focus lies on quantitative data (e.g. task processing time, error rate, etc.) According to who is involved in the evaluation of a product, a distinction can be made between user-oriented (empirical) methods and expert-oriented (analytical) methods.

A well-known example for an empirical evaluation method is formative usability testing. As part of such a formative usability test, real users are observed using a prototype or a finished product, while performing realistic tasks in order to achieve a set of defined goals (Dumas & Redish, 1999). The probably best known analytical method is the so called heuristic evaluation. Heuristic evaluation investigates the conformity of interface elements to established usability principles (Nielsen, 1994). Based on these guidelines one or more reviewer examine a user interface for potential usability problems. As it is easy for a reviewer to overlook a problem, the best results are achieved when several evaluators inspect a product independently and consolidate their results afterwards (George, 2008).

Other popular evaluation methods are focus groups, card sorting, cognitive walkthrough or the use of standardized questionnaires, such as the User Experience Questionnaire (UEQ), AttrakDiff or IsoMetrics. All those methods have been applied for the evaluation of online library resources. Since specific knowledge and experience are of great importance for the goal-oriented planning and accomplishment of such studies, they are often carried out by specialized consultants. This is especially true for smaller libraries which do not have the necessary know-how by themselves. However some larger libraries have their own specialized working groups which care about consulting and evaluating the library's web resources and services. Examples are the Library's Usability Group at the University of Michigan, the User Experience Program at the University of Washington or the Indiana University Libraries Working Group. These provide useful information and evaluation reports on their websites, so that also other libraries can benefit from their experiences. Apart from that also many papers about usability evaluations of library resources can be found. A good overview of usability evaluations of library websites is provided by Kupersmith (2012). He summarizes the key findings of 51 usability studies with a focus on best practices for reducing cognitive barriers which are caused by terminology. Fagan (2010) provides a literature review about usability studies of faceted browsing, which is a common feature of modern online catalogues.

According to the list of usability studies from Kupersmith (2012) the method which is used most often are usability tests or respectively user observations. This is not surprising, since such tests investigate the behaviour of real users, whereas by using analytical methods only assumptions about the user behaviour can be made. But since formative usability tests are time consuming and therefore expensive, heuristics are a cheaper alternative to identify usability issues of a product. Heuristic evaluations are especially useful in early stages of development. They allow to identify and to correct common problems prior to usability tests with users (Kirkwood, 2008). For instance the results of heuristic evaluations allow identifying problems with consistency issues and the visibility of links. Also the need for help documentation may be uncovered.

Therefore, heuristics are a widely used instrument for the evaluation of websites in general and also in the context of library websites. For instance Manzari and Trinidad-Christensen (2006) present a study in which a combination

of heuristic evaluation and formative usability testing was used for an iterative redesign of the library website at the C.W. Post campus of Long Island University. Aitta et al. (2008) used the classical list of heuristics from Nielsen (1994) to assess 15 public library websites. Yushiana and Rani (2007) applied the same heuristics to evaluate the usability of a web-based OPAC from an academic library.

Heuristics for the evaluation of online library services

Although some authors (e.g. Warren, 2001) criticize, that using heuristic evaluation results in focusing on local issues and micro features rather than the big picture, this method is useful in identifying usability issues (Blandford et al., 2004). However, commonly used heuristics, like the ones from Nielsen (1994) are rather generic and even more specific ones, which were developed especially for websites (e.g. "Guidelines for Designing Web Navigation" by Farkas & Farkas, 2000) cannot be used effectively without extensive knowledge in the field of user interface de-sign (Blandford et al., 2004). Thus libraries could benefit from heuristics, which are particularly tailored to their needs. Of course such evaluation criteria cannot replace the experience of specialized consultants or tests with real users. But nevertheless they can help to avoid common pitfalls and provide information about which aspects should be considered in the implementation or the redesign of library online services - even to persons without an in-depth experience in the field of human factors.

In order to give library staff the possibility to conduct evaluations by themselves the Swiss Institute for Information Research (SII) developed such a specified criteria catalogue (BibEval). It can be used in form of an interactive web application which is going to be described in the following sections.

Development of the criteria catalogue

The development of BibEval was based on three different sources. First, a literature review about usability evaluations of library online services was conducted. The aim was to identify suitable evaluation criteria. Additionally, a best-practice analysis of library websites was carried out, in order to gain more insight about the current state-of-the-art. Based on these findings, an initial version of the criteria catalogue was generated. This draft was then analysed and further refined by the results of a focus group with experts from the fields of library, web design and usability engineering. This resulted in a modular useable, hierarchical structured list of evaluation criteria. In this context modular means, that with regard to the functionalities of a website, a differentiation was made between which components or functionalities are indispensable for users and which are rather "nice to have" (classified as "must" and "optional"). This modularization aims at maximizing the applicability of the criteria for libraries of different size and type. Whereas small institutions with little resources for evaluating their websites get the chance to focus on the most relevant features, larger institutions can use the criteria list for performing more comprehensive and detailed analysis of their services.

Web application

As already stated above our criteria catalogue (http://www.cheval-lab.ch/en/usability-of-library-online-services/criteria-catalogue-bibeval/) is available in form of an interactive web application. The application was implemented as a typo3 extension based on MySQL, PHP and JavaScript/AJAX and is available both in English and German. Institutions can use it free of charge, in order to create customized lists of questions for their usability evaluations. There are two variants to use the application. The first option is to use the tool without registration/user account. In this case individually arranged criteria catalogues cannot be stored in the web application. Also no preliminary results of evaluations can be stored in the application. Therefore, this variant is preferably only used for small evaluations with just one expert and a short list of evaluation criteria. For larger projects it is recommended to create a user account. In this case a project administration is available which supports the accomplishment of evaluations with several experts as well as the storage of preliminary results.

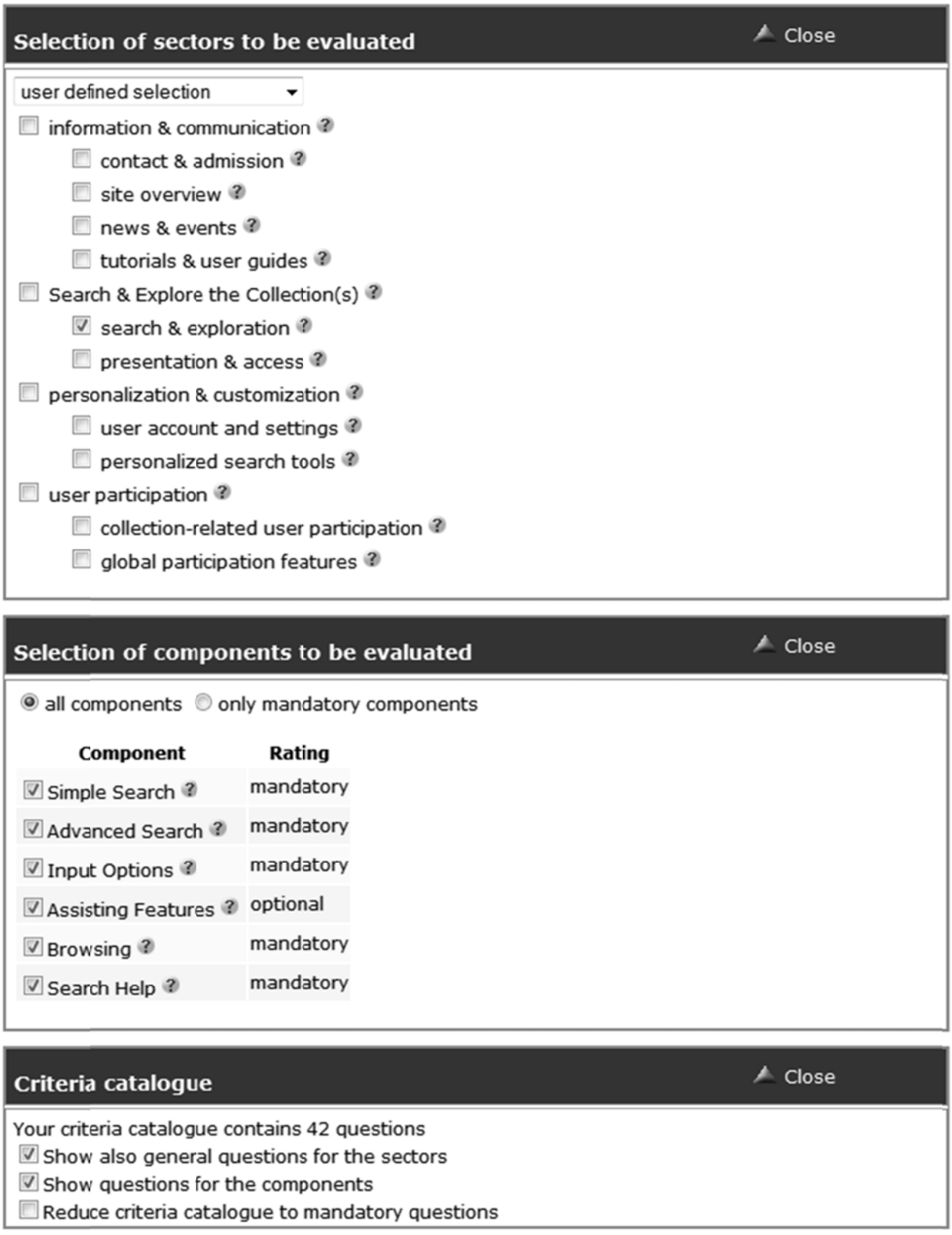

Figure 2: Overview and structure of the web application

Basic design and use

The criteria catalogue as well as the corresponding web application can be divided into three areas. At first ("selection of sectors") users have to define which parts of a library website they want to evaluate:

"Information & Communication" covers all aspects of information dissemination and user support (e.g. contact form, site map, etc.).

"Search & Explore the collection(s)" includes all functionalities related to searching, browsing and accessing the library's collection(s).

"Personalization & Customization" contains all features that allow users to adjust the settings of the online service to their individual preferences.

"User participation" encompasses all functions that enable users to participate in the processes of creating, exchanging and sharing information.

Apart from that individual selection of sectors also some pre-configured versions of the criteria catalogue are available. They can be accessed via a drop-down menu at the top of the application (see figure 2).

In a second step ("selection of components") users can refine the scope of their evaluation. For that, according to their selection of sectors such as "Information & Communication" a list with components/functionalities is provided. By marking checkboxes users can decide which of those they want to consider in their evaluation. For this selection also two radio buttons are available above the list of components/functionalities. Those can be used to define whether all components should be included in the users' individual criteria catalogue or only those which were classified as mandatory based on our best-practice analysis.

In the third area ("criteria catalogue"), users find their individual list of evaluation criteria and have again the possibility for further refinements. By using the option "Show also general questions for the sectors" some more general criteria related to the four top level sectors (e.g. "Information & Communication") will be added to the list of evaluation criteria. If the corresponding checkbox is not marked, only the criteria for the components/functionalities themselves will be taken into account. There is also an option for conducting just a rather basic evaluation of a web-site. For that purpose users can simply deselect the checkbox "Show questions for the components". By doing so the detailed evaluation criteria for the individual functions of a website are removed from the criteria catalogue. Finally, there is also an option for refining the list of evaluation criteria for the individual components/functionalities. Analogue to our classification of components into "mandatory" and "optional" we did the same for the criteria themselves. The reason for that is that there are requirements which have to be met in any case and others which don't have such a big impact on the user experience.

After customizing, the criteria catalogue can be used for the evaluation of the chosen service. For each criterion there is a drop-down list to make an assessment. For this we have oriented ourselves on the severity rating according to Nielsen and just slightly adapted the scale (see table 1). If users want to enter additional information they can click on the button "Add comment". By doing so an input field appears which can be used for comments on a particular criterion.

Regarding the use of our tool, for sure conducting the rating is the most difficult part. But users should keep in mind that the objective of the severity rating is not primarily an exact classification. It is more about defining priorities for the elimination of identified shortcomings. Altogether it does not matter much whether a problem has been classified, e.g. as a "moderate usability problem" or as a "severe usability problem". Since every problem user encounter in dealing with a website reduces its perceived quality, all shortcomings should be eliminated anyway. In order to obtain reliable severity ratings, it helps to conduct an evaluation using several experts.

At the end of an evaluation, users have the option to generate an evaluation report. This report includes the customized criteria catalogue, the results of the severity rating as well as any comments made during the evaluation. Reports are available in two export formats: as a PDF document or as a CSV file. The latter can be processed further, e.g. by using MS Excel. CSV export has the advantage that the file is editable, e.g. amendments can be made later on if necessary. By using this option users have the possibility to create an individual evaluation guide and to export it directly without making any ratings. Based on the CSV file, they can perform the evaluation "offline" afterwards.

Table 1: Severity rating (adapted from Nielsen, 1994)

Rating	Interpretation
not applicable	A question or a specific evaluation criterion does not apply to the analysed website (however, there is no problem and no mandatory component is missing).
no usability problem	Everything works and is easy to use.
minor usability problem	"Cosmetic problem" – something is unsightly and not implemented well but this shortcoming does not impair the service.
moderate usability problem	The identified shortcoming may result in operational errors, but does not necessarily prevent users from achieving their objectives.
severe usability problem	The shortcoming prevents users from completing their tasks or from achieving their objectives.
not implemented though required	A feature or component that would be helpful and which therefore was classified as mandatory is missing.

Project administration

Since the end of 2012 an additional project administration is available, which makes working with BibEval more comfortable. It is designed to lead users step by step through the process of an evaluation with our tool. To be able to use the project administration a registration or respectively a user account is necessary. The main advantage of using the project administration, rather than to use our tool without a registration is that it allows to save preliminary results during an evaluation and to re-use previously created criteria catalogues for subsequent evaluation projects.

After the login the project administration can be accessed on our website via the corresponding menu item. There, users have the opportunity to start own evaluation projects as well as to access evaluations to which they have been invited as an expert/evaluator. For the creation of a project initially only a title and a URL must be provided. After that an overview page for the created project will be shown. On the one hand, on that page all steps, which have to be performed with the tool, are listed. On the other hand, this page also provides an overview of the current project status by visualizing which activities have already been carried out and which steps are still open. At the bottom of the page there is a possibility to define further project assistants. This is an optional step. In this context it is important to state that the project administration is based on a role concept, in which the three roles project manager, project assistant and evaluator can be distinguished. The project manager and the project assistants are responsible for the administration of the evaluation but do not necessarily take part in the study itself. The assessment is made by the evaluators, which can be defined by the corresponding tab. If also the project manager and project assistants shall take part in the assessment, they have to be invited to the study explicitly.

The navigation within the application is realized in form of tabs, whereat the application consists of five dialogues. After the definition of the basic project data and if necessary additional team members in a second step the specific criteria catalogue for the project has to be defined. The procedure for doing that is the same as described previously. However, by using the project administration individual criteria catalogues can be saved and made available online to other evaluators. During the setup of an individual criteria catalogue intermediate results can be saved. When the compilation of the list of criteria is completed, it must be released for evaluation. Without releasing no evaluators can be invited to the study. After the release adjustments on the criteria catalogue are still possible - but only for so long as no evaluators have started their assessment.

For the invitation of evaluators e-mails are used. For that purpose there are already pre-configured text blocks stored in the system. On the one hand, there is a signature field. This data is inserted automatically at the end of each of the sent emails. On the other hand, three different types of e-mails are supported by the system. One type is used for the invitation of the evaluators. The second types are reminder e-mails. They can be used to send a message to those experts, who have not yet completed the questionnaire before the end of the defined evaluation period. Last but not least the third type of e-mail is used to thank the evaluators for participating in the study. This mail will be send automatically as soon as an evaluator has completed the evaluation. As already mentioned, for these messages there are default texts in the system, which can be adapted to the individual needs. When doing so, one should keep in mind that in the default texts at some passages variables are used (indicated by brackets). Examples are the evaluators' names or the URL of the website which is going to be analysed. These fields should preferably not be deleted or overwritten.

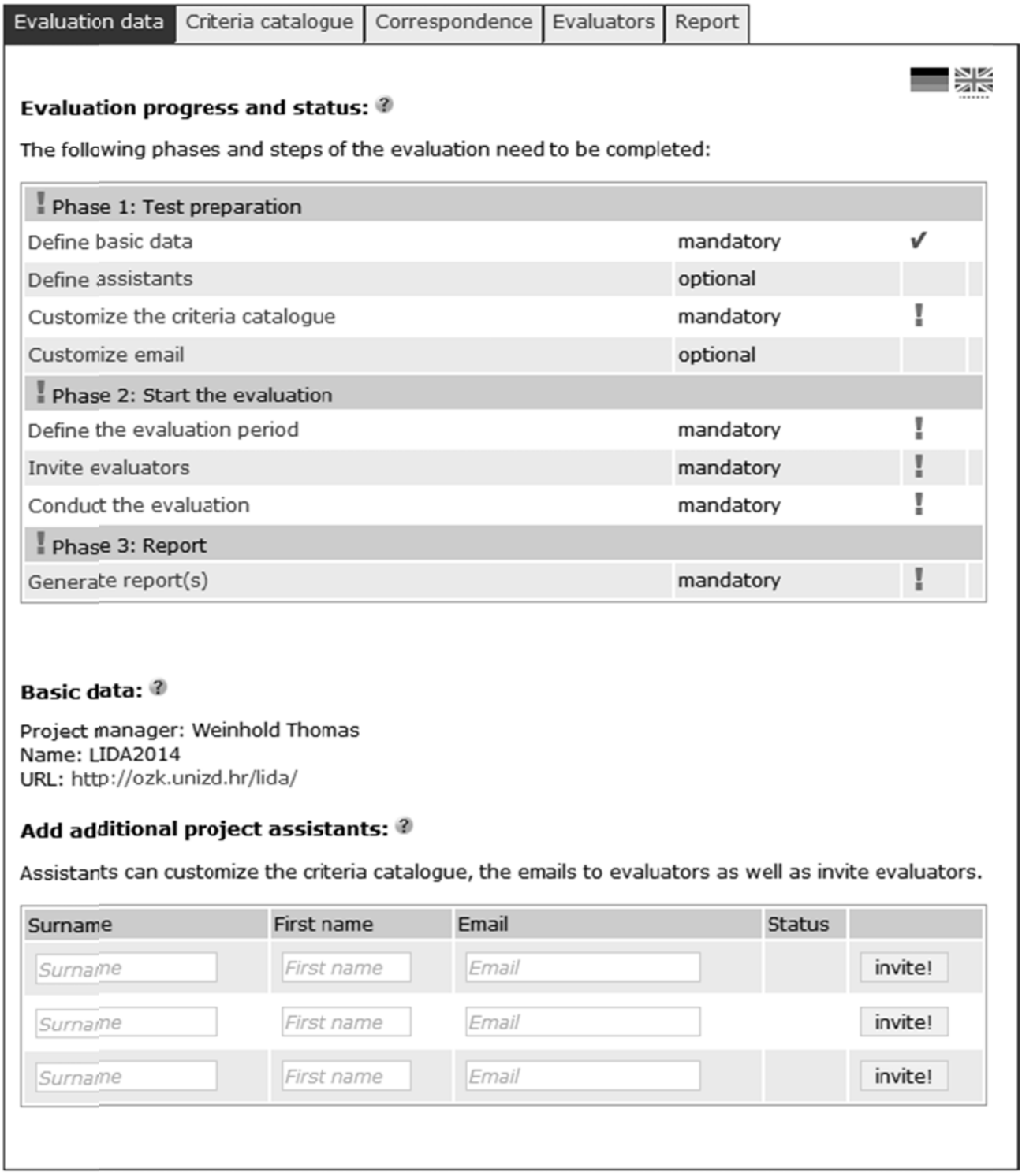

Figure 3: Project administration

Subsequently, in the tab "evaluators" the period in which the evaluators have access to the individual criteria catalogue has to be defined. This can be done either directly by entering a start and an end date in the appropriate field or by using the provided date picker. Below the evaluators can be invited for the study. For that purpose, only the name of an evaluator and an e-mail address must be provided. By clicking on the button “Invite evaluators” the previously described invitation e-mail will be sent. It contains a special token, to ensure that only invited persons get access to the project. These tokens are also valid only once, so that they cannot be passed to third parties.

The last tab is used for the analysis of the evaluation results. There tables are provided which give an overview of who has already fully or partially finished the evaluation and who has not started yet. On this page also evaluation reports can be generated. As within the basic version PDF and CSV are available as output formats. In addition, an HTML-view of the results can be used. This is particularly suitable to get a quick overview of preliminary results. It has to be mentioned that the reports generated within the project administration include an additional part, which is not integrated in the reports of the basic version. The reports of the basic version are only connected to one evaluator, whereas the reports generated with the project administration usually summarize the results of multiple evaluators. In order to be able to provide an overview of the expert group of a project, the invited experts have to fill out a short pre-test questionnaire before they get access to the criteria catalogue and can start their evaluation. In the pre-test questionnaire some demographic information is requested. These data are summarized at the beginning of a report in form of tables and simple diagrams.

Conclusion

With regard to the literature about heuristic evaluations of library online services, it can be noticed, that the majority of studies is limited to the application of Nielsen’s ten heuristics. Nevertheless there are some studies which tried to develop library specific heuristics. For instance, Clyde (1996) has proposed a list with ten recommendations for the design of library websites. Clausen (1999) also developed criteria for the evaluation of library websites. Based on a best-practice analysis Raward (2001) has created a checklist of design principles for library websites consisting of 100 items. Aitta et al. (2008) have used Nielsen’s heuristics to create a version of these guidelines which is tailored to libraries. Kirkwood (2008) also presents two examples of library-specific heuristics. The Web Usability Team at the University of Virginia adapted Nielsen's heuristics. Their list of heuristics is divided into three categories (“Information Structure and Navigation”, “Content and Design”, “Specific to Search Forms and Data Manipulation”). The Web Site Support Team of the Purdue University developed a more detailed list consisting of seven categories (“Clarity of Communication”, “Accessibility”, “Consistency”, “Navigation”, “Flexibility and Minimalist Design”, “Visual Presentation”, “Recognition Rather than Recall”).

However, most of those heuristics are kept rather generic. They can be regarded as flexible guidelines and not as specific rules (Kirkwood, 2008). Therefore, for using them a certain level of experience in human factors is necessary, as it is the case with the general heuristics of Nielsen. With the library specific catalogue of evaluation criteria the SII wanted to provide something more comprehensive, which can also be used by library staff without that specific knowledge. Since the criteria catalogue includes a wide spectrum of contemporary functionalities and features used in modern library websites or other online services, also developers can use it as a guideline.

The related web application is a flexible usable tool, which supports evaluations with different levels of detail. One advantage of the chosen approach is the separation of the actual evaluation criteria, which are stored in a database, from the application logic. Thus, the list of evaluation criteria can be further refined and updated at any time. Here, we hope to get support from the community. Since our criteria catalogue is available under a creative commons license, it would be great if other institutions would share their experience in order to help to improve it further.

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THEME 2

Altmetrics – new methods in assessing scholarly communication and libraries: applications, results

Chair:

Professor **Blaise Cronin**

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Assessing educational research – an information service for monitoring a heterogeneous research field

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Abstract

The paper presents a web prototype that visualises different characteristics of research projects in the heterogeneous domain of educational research. The concept of the application derives from the project "Monitoring Educational Research" (MoBi) that aims at identifying and implementing indicators that adequately describe structural properties and dynamics of the research field. The prototype enables users to visualise data regarding different indicators, e.g. "research activity", "funding", "qualification project", "disciplinary area". Since the application is based on Semantic MediaWiki technology it furthermore provides an easily accessible opportunity to collaboratively work on a database of research projects. Users can jointly and in a semantically controlled way enter metadata on research projects which are the basis for the computation and visualisation of indicators.

Keywords: research project, indicator, semantic MediaWiki, visualization, research monitoring

Background

In recent years, educational research has been focused by social and political discourse. On the one hand, this awareness derives from educational policy objectives jointly agreed by member states of the European Union, e.g. Bologna Process, Lisbon Strategy (Lifelong Learning, harmonisation of Higher Education Area, exchange in Vocational Education and Training). On the other hand, large-scale international student assessments have contributed to the development, e.g. TIMSS (Trends in International Mathematics and Science Study) or PISA (Programme for International Student Assessment). Germany has regularly participated in such studies since 1995, and findings from the international comparisons revealed deficiencies of education systems. A need to strengthen research on education was consequently identified to gain evidence for the improvement of education. As a result, educational research in Germany has

recently received more attention than it had "for the past 35 years", (Tillmann, 2006).

Educational research is characterised by its multidisciplinary nature. Besides traditional core disciplines of educational science, psychology and social sciences, the field encompasses subject didactics as well as many other disciplines concerned with investigating education systems. Heterogeneity of the field has evolved in consequence of the diversity of different disciplines and science theoretical principles, methods, structures and types of communication. The entire scope of humanities, social sciences and even natural sciences approaches is involved.

Against this background, the project "Monitoring Educational Research" (Monitoring Bildungsforschung (MoBi))[1] targets the analysis of research projects and publications in educational research since the mid-1990s with the aim to develop indicators that highlight structures, developments and types of communication in educational research. The project focuses on assessment of research projects stored in the SOFISwiki[i] database edited by GESIS, where research projects from different social sciences disciplines are systematically recorded, thus, providing a good means of exploring the broad field of educational research. Project outcomes were applied to conceptualise a web-based prototype that provides a visualization of indicators and allows users to run a visually enhanced monitoring of properties and dynamics of a field under study. The paper presents a description of some indicators used for the analysis of the research field (chapter 2). Moreover, technologies and methods applied to the implementation of the developed monitoring prototype are described (chapter 3).

The role of indicators in scientific research

In science, assessment of developmental processes is generally based on indicators which present reality in terms of numerical relations (Hornbostel, 1999). Indicators can achieve different levels of complexity ranging from simple figures to relative numbers and complex indices (Meyer, 2004). Input figures such as material equipment or human resources are correlated with measurable outcomes, e.g. prizes, publications, doctoral degrees, stipends, informing on activity, structure and quality of a field of research (Hornbostel, 1999). Several factors bear an impact on the validity of indicators: type and scope of available data, research approaches and characteristics of the matter under investigation. Depending on the approach taken, the number of funded projects might serve as an indicator for research achievements, such as success in competitively acquiring funding. From another perspective, external funding can be interpreted as simple input of financial resources. Moreover, assessment of an external funding indicator needs to consider in how far the acquisition of external funding is common to a research discipline: Block, Hornbostel and Neidhardt (1992) have demonstrated that external funding is far more wide-spread in natural sciences than in social sciences, hence, external funding has a different meaning in the disciplines, which should be reflected in a comparison of research domains. The relevance of indicators is furthermore affected by characteristics within the disciplines. Hornbostel (2001) characterises educational science as a discipline that is comprised of humanities, social-scientific and empirical traditions and a part specialised in delivering practical services. In each of these parts within the discipline, a particular indicator plays a different role and it bears a different meaning.

To analyse the research projects we selected such indicators that cover the structure as well as the content of a research project. Existing data did not allow for construction of complex indicators. Against this background, we perceive indicators as metadata that according to their respective character describe different features of a field of research. "Research activity" (Forschungsaktivität) models the development of a field of research as a basic indicator. Taking into account that since the 1990s research funding is predominantly governed by external sources (Schubert & Schmoch, 2010) and, thus, the acquisition of research funding is increasingly gaining importance, the indicator for "research funding" (Förderart) reflects the development in educational research. Development regarding obtainment of degrees, subsumed in the indicator "qualification" (Qualifizierungsarbeiten) demonstrates the state of training for academic research which is highly relevant for the continuity of a discipline and plays a pivotal role in strategies for strengthening educational research (Hauss et al., 2012). The indicator "disciplinary area" (Disziplinbereich) models the subject discipline a project is assigned to, it serves to ascertain what disciplines are active in educational research and reflects the diversity of access to the field. Beyond these indicators, for which an implementation in the web prototype is exemplified below, we examined other indicators such as cooperation, research methods and objectives, biographical aspects and target groups.

Monitoring Prototype

The aim of the monitoring prototype is to visually present indicators of the development of educational research and

[1] The official project title is "Entwicklung und Veränderungsdynamik eines heterogenen sozialwissenschaftlichen Feldes am Beispiel der Bildungsforschung". It was funded by the Leibniz Association, subject to the SAW procedure (SAW-2011-DIPF-3), from May 2011 to July 2014. The following institutions have collaborated in the project: GESIS – Leibniz Institute for Social Sciences; Leibniz Centre for Psychological Information and Documentation (ZPID); Institute for Research Information and Quality Assurance (iFQ); German Institute for International Educational Research (DIPF). http://www.dipf.de/de/forschung/projekte/monitoring-bildungsforschung-mobi

to offer a tool that informs about the changes of a research field over time

Database and technical background

Technologically, the monitoring prototype is based on the online platform SOFISwiki. This community platform enables storage and search on social sciences research projects from different fields such as education sciences, psychology, political sciences, from German-speaking countries in Europe (Germany, Austria, Switzerland: D-A-CH). So far, SOFISwiki contains 53,702 project records. The monitoring prototype uses a subset of 9,122 records out of SOFISwiki which contains only completed educational research projects dating from 1995 to 2009.

SOFISwiki is based on the Semantic MediaWiki (SMW)[ii] technology. SMW is a version of MediaWiki, extended by semantic technologies of the platform used by many Wiki applications such as Wikipedia. The purpose of this extension is to enable quick semantic search and discovery of data in a Wiki system (Krötzsch et al., 2007). Therefore, not only pure text pages are stored in a Wiki page, but pages enriched with additional information. These so-called attributes describe the relationship between Wiki pages. Hyperlinks are used to create direct connections between these pages. The page relation is realised either by typed references and/or by values of the attributes. Page names in a MediaWiki system consist of a namespace and a selected name. Namespaces are structuring concepts that are used to group pages. MediaWiki has, for instance, the following namespaces: category, attribute and template. Category[iii] allows the classification of pages. A page can be assigned to one or more categories. The assignment of a page to a category is effected by the following syntax: *[[Category: Category name]]*. The Wikitext *[[Category: MoBi]]* indicates for example that MoBi (Monitoring Educational Research) belongs to the Namespace "Category" and, hence, that "MoBi" is the name of that category. All MoBi-Projects are assigned to the category "MoBi and Projects". They will thus appear at the end of the page of each project as follows: *Categories: MoBi | Projects*. Attributes[iv] are treated as categories for values in Wiki pages, by which semantic data are grasped. The users are allowed to create attributes themselves following this simple scheme: *[[attribute name: attribute value]]*. This Wiki syntax assigns the given attribute "attribute name" the value "attribute value" and displays this value in the respective location on the page: e.g. [[year::1997]]. Using these attributes, a lot of information about the single pages can be explicitly displayed on semantic Wiki pages. They can be used for various kinds of data such as numbers, dates or geographical coordinates where each attribute is assigned a data type; otherwise annotations in unfitting types will simply be ignored. For attribute values, many different data types exist, e.g. String, Page, Number. The property "persons" of a research project is for example an attribute of the type String. Each Wiki page has a list of various attributes and their values, which is referred to as metadata schema. Two types of representation exist for this schema, i.e. user and developer view. Figures 1 and 2 represent screenshots of the attribute list of a Social Science project. The user view (Figure 1) only displays the most important information that is used to describe a project and that is relevant for the user. These include the metadata of the project (title, author, year, etc.), the abstract, and the institutions and research institutions involved. If the project is funded, the sponsor is displayed, too. In addition, the methods used in the project (empirically, empirically-quality, etc.) and tags are shown.

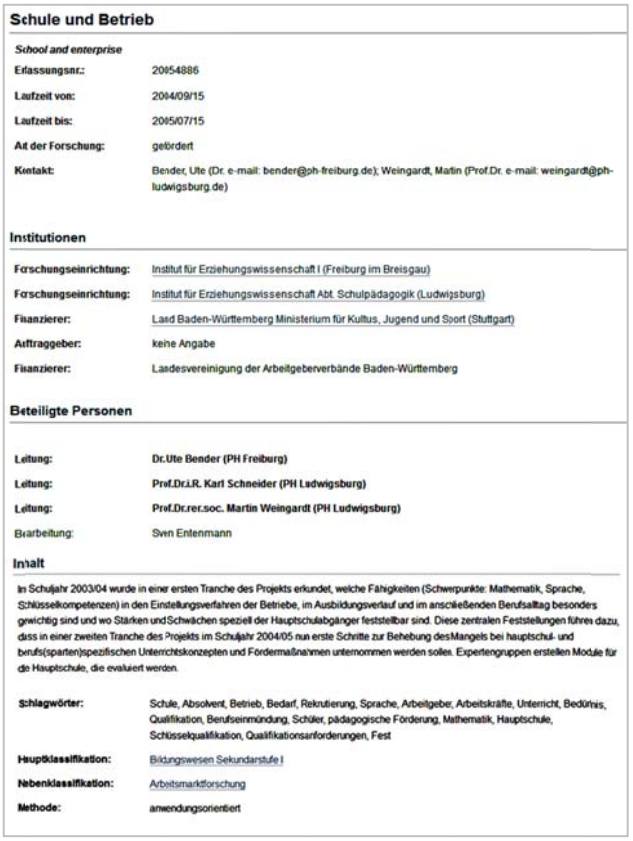

Figure 1: User view in SOFISwiki, displaying metadata on research projects

The developer view (Figure 2) instead contains a lot of information presented as clickable search icons that enable quick discovery of pages with identical annotations in queries. This view consists of two columns. The First column (left) lists the existing attributes while the second one (right) shows the associated attribute values. Templates[v] are ordinary Wiki pages that - according to the transclusion principle - are modules that can be integrated into other pages (for commonly used elements). They serve MediaWiki as tools used for example to create attributes of

the same annotations. The syntax of the use of templates is *{{Template: page name}}*.

Figure 2: Developer view in SOFISwiki, displaying the internal representation of attributes

Visualisation of the indicators

To evaluate the indicators on the basis of the SOFISwiki structure we selected certain attributes in the developer view, values thereof serve as the basis for the visualisation of these indicators. Regarding the indicator "disciplinary area", the SOFISwiki field "main classification search" ("Hauptklassifikationsuch" in the developer's view) was queried and evaluated. For the remaining three features of "research activity", "type of funding" and "qualification" new attributes needed to be generated from existing ones based on templates and additional PHP extensions. For the visual representation of the indicators, the visualisation extensions available from Semantic MediaWiki were used and adapted accordingly (e.g. Sparkline, D3, jqPlot)[vi]. The implementation required technical programming adjustments based on templates.

The prototype concept assumes that the user wishes to make some selections on the project data corpus. Therefore, it is possible to reduce the visualisation to a certain status of projects (completed, starting or current) and geographical area (Germany or the complete corpus, i.e. Germany, Austria and Switzerland). This feature is supported by a self-developed PHP extension which is set up as a special site. As the dataset used in MoBi exclusively contains completed projects, only these were considered by the implementation (see Figure 3).

Figure 3: Project selection criteria by project status and geographical area

After selecting project status and geographical area users can select the indicator to be visualised (Figure 4, in descending order: research activity, discipline area, type of funding, qualification).

Figure 4: Selection list of indicators and time slice

Furthermore, users should be able to determine a time slice (selbstdefinierter Zeitraum) or to view the default time period (Gesamtzeitraum) (Figure 4). Therefore, we developed a PHP extension allowing the selection of years to be used for the chosen indicators (Figure 5).

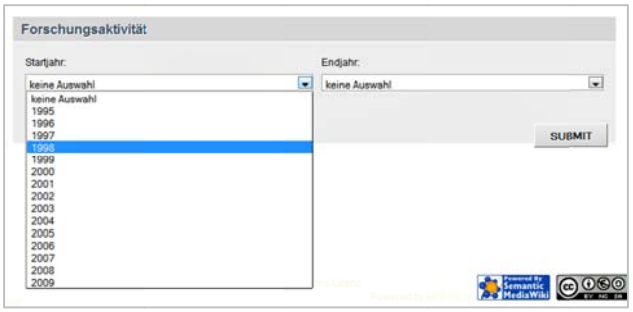

Figure 5: Selection by year

Research Activity

The "research activity" indicator informs about the number of projects per year, defined as the number of completed projects in MoBi. The SOFISwiki field "Year End" (Jahrgang Ende) was hence generated with a Wiki template. The respective value of the attribute is extracted from a SOFISwiki field, "duration until" (Laufzeit von) by a template and a respective figure is inserted into the newly created field. Diverse outcome formats of the Semantic MediaWiki were tested for the representation of this indicator, e.g. Sparkline and jqPlot. Figure 6 shows the result of a jqPlot[vii] presentation in a bar chart.

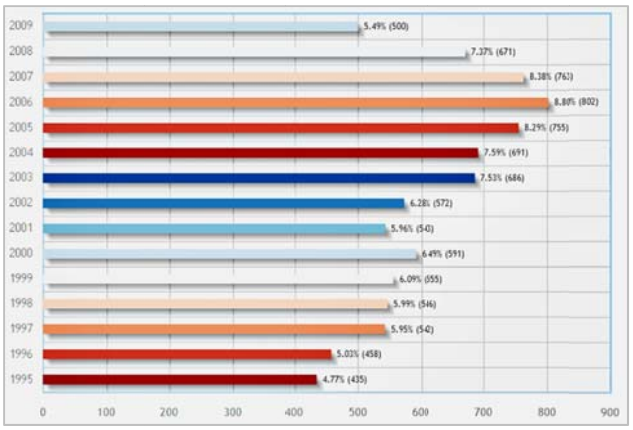

Figure 6: Bar chart visualisation of research activity (number of completed projects per year)

The project scope was highest in 2006; i.e. in 2006 the highest annual number of educational research projects was carried out looking at the period from 1995 to 2009. The share of the projects changes over time and is not linear.

Disciplinary area

To provide a disciplinary distribution of the field the indicator "disciplinary area" relates all research projects to one of 12 areas based on the Social Sciences classification[viii] and is determined from the SOFISwiki attribute "main classification search" (Hauptklassifikation-such). These are:

- Social Sciences and Humanities
- Sociology
- Population Science
- Political Science
- Education
- Psychology
- Communication Sciences
- Economics
- Social Policy
- Labour market and occupational research
- Interdisciplinary Subjects
- History

To visualise the indicator "disciplinary area" we used the following display options provided by Semantic MediaWiki: Sparkline, jqPlot, D3 and Tag cloud. For example, Figure 7 displays disciplines as Tag clouds[ix].

Figure 7: Tag cloud visualisation of discipline distribution

The font size indicates how strongly a discipline was represented in the period from 1995 to 2009. In this time period, education (Erziehungswissenschaft) is the most frequent discipline, followed by psychology.

Type of funding

To investigate influences of the funding and financing of the projects, a distinction is drawn between institutional (in-house) projects, third-party funded research and contract research. The type of funding is determined from the SOFISwiki attribute "type of research" (Forschungsart). In SOFISwiki the attribute can include nine possible features or their combinations:

- Contract research
- Third-party funded research
- In-house project
- Expertise
- Doctoral project
- Habilitation project
- Other exam thesis
- Other
- Unspecified

By using the self-developed PHP extension and the Wiki template, the new field "type of funding" was generated by extracting the rate of each of the three features “in-house projects” (Eigenprojekt), “third-party funded research” (Gefördert) and “contract research” (Auftragsforschung) from the nine possible features. The extensions D3[x] and jqPlot served to generate the results as shown in Figure 8 (D3: bubble chart and treemap, JqPlot: pie and donut).

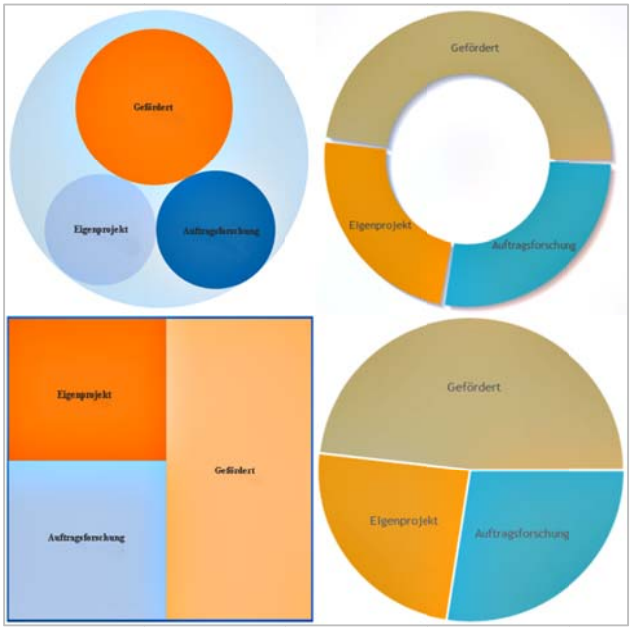

Figure 8: Different ways of visualising type of funding

To visualise the indicator over time, the jqPlot series[xi] extension was applied to the processed funding types. Results are shown in Figure 9.

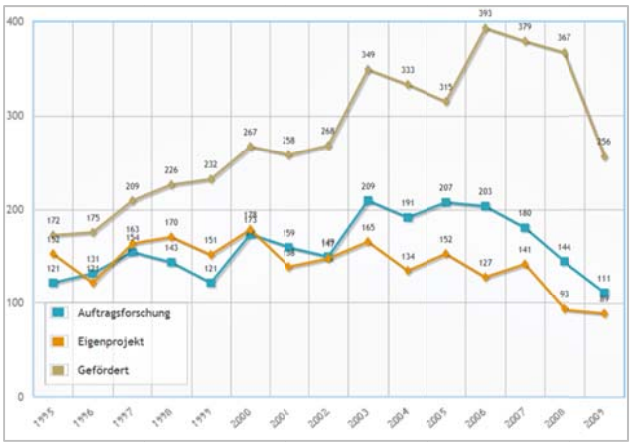

Figure 9: Number of different types of funding per year

Between 1995 and 2009, the number of third-party funded projects far exceeded the number of projects assigned to the other two funding types. Over time, a continuous decrease of institutionally (in-house) funded projects is observable, while since 1997 the proportion of contract research has been rising. From 2006 on, a significant decrease is evident for all types of funding.

Because it can be assigned to more than one funding type, one and the same project might be defined as an “in-house project” as well as a “third-party funded” or “contract research”. It is thus impossible to allocate projects to just one type of funding, therefore, we only present absolute figures and refrain from calculating relative figures.

Qualification

The qualification of young scientists is an important indicator in the evaluation of research organisations and is based on the number of completed theses. To distinguish between doctoral and habilitation theses the indicator “qualification” was introduced. These values are programmatically read from the SOFISwiki field "type of research" (Forschungsart) and are inserted in the newly generated field "qualification". In its visual presentation, the same visualisation extensions were used as for "type of funding". Figure 10 shows how the proportion of doctoral and habilitation theses changed in the course of time from 1995 to 2009.

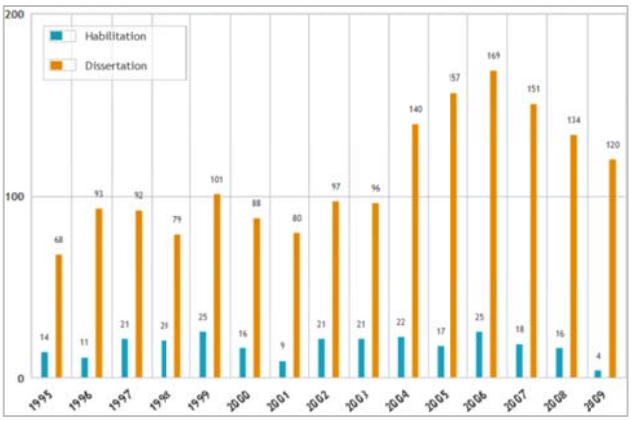

Figure 10: Bar chart visualisation of qualification theses per year

Overall, the results of the analyses show a strong increase of doctoral theses and a decrease of habilitation theses.

Conclusions and discussion

Visualisation of information is challenged by the requirement of effectively presenting informational content and giving users optimal access to information. This can be enhanced by using colours and structural elements, thus, the human-computer interaction can be improved. For each

parameter, the type of visualisation must be chosen in a way so that specific informational content is adequately presented.

Semantic MediaWiki is a powerful software for the visualisation of various data sets, yet, it is not sufficiently flexible to meet the specific requirements required by MoBi. We therefore had to expand functionalities by introducing our own scripts and templates to reach the desired results. In the MoBi prototype, difficulties emerge from the fact that some indicators are assigned to more than one value: the existence of different counting models poses specific demands as to the assignment of one respectively more than one value.

Other critical issues concern the idiosyncratic database from which the corpus of educational research projects was extracted. To our knowledge, no international database exists that would be comparable to the content area and metadata structure of SOFISwiki. It is thus impossible to draw a comparison based on comparative external data.

In a next step, the prototype will be expanded by lifting the limitation imposed by the restricted corpus for the MoBi project and including the entire SOFISwiki corpus. We will include projects that are still in their beginning and current projects as well as other geographical areas. Visualisation of significant deviations or anomalies across time is targeted as well.

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i http://sofis.gesis.org/sofiswiki/Hauptseite

ii http://semantic-mediawiki.org/

iii http://semantic-mediawiki.org/wiki/Help:Editing

iv http://semantic-mediawiki.org/wiki/Help:Properties_and_types

v http://semantic-mediawiki.org/wiki/Help:Semantic_templates

vi http://semantic-mediawiki.org/wiki/Help:Result_formats

vii http://semantic-mediawiki.org/wiki/Help:Jqplotchart_format

viii http://www.gesis.org/fileadmin/upload/dienstleistung/tools_standards/Kassifikation_Sozialwissenschaften_Stand_Juli_2013_dt_en__2_.pdf

ix http://semantic-mediawiki.org/wiki/Help:Tagcloud_format

x http://semantic-mediawiki.org/wiki/Help:D3_chart_format

xi http://semantic-mediawiki.org/wiki/Help:Jqplotseries_format

What do researchers think about altmetrics and are they familiar with their abilities?

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Abstract

The rise of the Web 2.0 (Social web) has given the main incentive to the creation of altmetrics, which are social web metrics for academic purposes. They can, theoretically, be used in an evaluative role and as an information seeking aid, both tasks reserved until recently for traditional bibliometrics. If altmetrics are to be trusted then the claims about both of these tasks must be acceptable and verifiable. Regarding the growing number of scientific publications on altmetrics and its methods, researchers in the field of scientific metrics are now trying to assess this possibility as well. The question is which parts of these new metrics are acceptable for a scientific community? Decades were needed to establish a reasonable confidence in classical bibliometrical methods, such as citation analysis, so how long will it take for altmetrics to gain the same level of trust? This is an important although quite neglected topic. The paper presents a continuation of a survey on information behaviour of Slovenian researchers in 2011 on a random sample obtained from the complete list of researchers in Slovenia. The results confirm the already detected low level of use and acceptance of Web 2.0 tools among Slovenian researchers. On the other hand, the results also show a strong interest in altmetrics and the possibilities for alternative evaluation. This interest calls for further research into the possibilities offered by these new metrics. We need to explore the applicability, use and acceptance of altmetrics and its various possible sources and indicators in the scientific community. Also, we need to inform the scientists about these new possibilities. This should be an important task for all who are involved professionally (research or otherwise) in the field of scientific research evaluation.

Keywords: altmetrics, social web, bibliometrics, evaluation, scientific research

Introduction

Scientific research can be defined in different ways, depending on which segment of the process someone would like to highlight. Science is primarily a foundation beyond what is today called production of (new) knowledge in the society and the basis of its progress and welfare. Science can also be underlined as a driver of economic, technological and social development, or a process of discovering the new and unveiling the hidden. Scientific research can be defined as an activity through which we educate top experts and professionals, who are capable of the most demanding jobs and tasks in the society.

There is another possible definition of scientific activity: an information activity. Scientist use "information" , which they obtained through their research work, together with the information that was received from work (usually published) of other scientists and researchers as an evidence for justification and support of the findings. Therefore, the science can now also be understood as information activity: collection, processing and dissemination of information. The basic characteristic of this information process, which is often described as the

process of scientific information and communication, is its form, scientific publication. This is normally held and runs through the publication of scientific results, which enables verifiability and repeatability of research and thus the reliability and accuracy of the results thus obtained. This contributes to the development of science, and, consequently, to the technological, economic and social development, and also to general scientific knowledge.

Scientists present their results mostly as papers in international scholarly journals which publish only a small part of the received articles. The manuscripts are peer reviewed through evaluation procedures before publication. The second part of the evaluation and quality control of scientific research is the use of these publications by other scientists, which is reflected in citations. All areas of social services need a system of performance evaluation and quality control. In scientific research, such control is systematic, constant, and above all, independent and transparent. This is done despite the fact that scientific research is not a routine activity, and therefore the results can not easily be measured and evaluated. This is possible by very clear rules of scientific excellence, which are both international and universal. This of course would not be possible without global integration of science that allows virtually unlimited international integration and cooperation.

The debate on how to measure scientific quality and quality of scientific research has been going on for decades. Using citations as an absolute proof of quality has been frequently labelled "controversial", either if used as an indicator of assessing the quality of research work, both directly (citations individual papers and other publications) and indirectly (journal impact factors -JIF, SJR, SNIP…) or in relation to other related criteria used in evaluation procedures of science. This is precisely what excites controversy and debate, as it is a mechanism that can affect success or failure of individual researchers in obtaining research funds or achieving promotion, and similar events, important in a professional career. Therefore, bibliometric methods are often a topic of discussion not only among bibliometricians, but also in a science community as a whole. An important question in this ongoing debate is what is understood as content or feature of scientific research.

Bibliometrical methods have in recent decades developed as one of the principal research methods in information science (library and information science). In many ways it is abandoning its connection to the base in social sciences base is becoming more technical, empirical and objective. This trend ignores the fact that science is a social phenomenon, as are, for example, citations. Contemporary trends in bibliometrics, linking classical bibliometric exploration of social networks in science (Cronin, 2008) and altmetrics are important harbingers of new trends, which might bring social dimensions back into the bibliometrics' research.

Literature review

Evaluation studies of research and scientific advances focus increasingly on calls for greater investigation of the various types of web-based utilities, suggesting that this will promote a finer-grained image of influence (Cronin, 2001). The rise of the Web 2.0 (social web) thus offers bibliometricians valuable opportunities to apply and adapt their techniques to new contexts and contents. Its' significance from a bibliometric perspective goes well beyond enhanced opportunities for citation and link analysis. The web might challenge even some of the assumptions that have underpinned the established scholarly communication system. That is why some authors speak about a hybrid scholarly social network in the sense that it mirrors scholarly norms to some extent, and also general social networking normsso the use of it and similar sites should be seriously considered by the academic community **(**Thelwall, Kousha 2013).This has given the main incentive to the creation of altmetrics, which are social web metrics for academic presentations. It can, theoretically, be used in an evaluative role and as an information seeking aid, both tasks reserved until recently to traditional bibliometrics. If altmetrics are to be trusted then the claims made about both of these tasks must be reasonable and verifiable. Researchers in the field of scientific metrics have sensed an opportunity for new exploration, given the growing number of scientific publications dedicated to altmetrics and its methods. Altmetrics criteria calculated on the basis of activities in social media environment have recently emerged as an alternative way of measuring scientific impact (Priem et al, 2010), although ideas to measure the impact and visibility of research results and publications in the way that shifts from popular bibliometric tools, such as the analysis of citations, appeared before the rise of social media (Martin & Irvine, 1983). Altmetrics is the study and use of scholarly impact measures based on activity in online tools and environments. The term has also been used to describe the metrics themselves–one could propose in plural a "set of new altmetrics". Altmetrics is in most cases a subset of both scientometrics and webometrics; it is a subset of the latter in that it focuses more narrowly on scholarly influence as measured in online tools and environments, rather than on the Web more generally (Priem et al 2012)

One of the fundamental problems of citation analysis as the basis and the ground for evaluation of the impact of research results is that citations reflect only a limited picture of its effects. Authors cite only selected parts of information sources. Potential readership of such resources, however, consists not only of authors (researchers who publish) but also other professionals, for

example practitioners and course students. Since the social web is widely used outside of science, it has the potential to inform on scientific developments more widely. Following the above, citations from the social web may indicate a different kind of value than that indicated by traditional citations and are more oriented towards applications than utility to science (Mohammadi, Thelwall, 2013).

Another area that altmetrics address and challenge is the traditional way of publishing the results of a research. Today we focus on measuring the impact of peer-reviewed publications, such as papers from scientific journals. Social networks generate potentially different forms and tools for presenting research results, published in blogs, comments, or tweets. It seems very likely that publications which are frequently mentioned in social networks are important. More evidence of that importance is needed if altmetrics is to be taken seriously in the process of evaluation. The methods of altmetrics also need to be evaluated. Namely, articles may be mentioned in the social web for negative reasons, such as to criticise them (Shema et al. 2012), to accuse the authors of fraud, or because they have funny or provoking titles.

Some altmetrics studies sound pragmatic. Citations take time to accumulate so their impact as a research evaluation measures shows up only after a few years after publication. So the question is if altmetrics indicators can be used as an early indicator of impact. A very large study compared 11 altmetrics indicators with Web of Science citations for 208739 PubMed articles (3 676 242 citations) with at least one altmetrics reference. The conclusions are: more research – quantitative and qualitative – is needed to identify who cites or refers to academic articles on social web sites (e.g., students, researchers, general public), and why they use them. Results must be taken into consideration when applying different altmetrics in research evaluation and information retrieval (Thelwall et al, 2013). One of the earlier studies found a significant and sizeable correlation between citations and downloads in physics and mathematics (UK ArXiv.org mirror site) (Brody, Harnad, Carr, 2006). Moderate correlation between downloads (usage impact factor) and JIF, strong between downloads and citation of individual paper was shown on the case of oncology journals (Schloegel, Gorraiz, 2010). Caution was suggested in drawing conclusions on the frequency of paper downloads form formal citation patterns (Moed, 2005). Another study found that given the usage data of a newly published paper in a short time, e.g. 7 days/15 days for Nature papers, it was possible to predict future expected total usage counts (Wang et al. 2013).

Recent review paper "Evaluating altmetrics" (Sud, Thelwall, 2014) discusses altmetric valuation strategies, including correlation tests, content analyses, interviews and pragmatic analyses. It recommends that the methods for altmetric evaluation should focus on identifying the relative strengths of altmetrics as new metrics. In addition to assess why some individuals post cites in the social web it is also important to understand who are the users of social web and respective citations. More generally, it would also be useful to know who uses the social web for scholarly purposes and which parts they use. The question is how much of this new metrics is acceptable for a scientific community? Decades were needed for the establishment of a reasonable trust in classical bibliometrical methods, such as citation analysis, so how long will altmetrics need to gain the comparable level of trust?

The other important question is the correlation between peer review and new metrics. Peer review is still at the heart of most academic evaluations, even when the key quantitative indicators have been based upon citations. Proven links between peer reviews and quantitative bibliometric indicators have been important in accepting the practice of bibliometric indicators (van Raan, 2006, Juznic et al 2010) and its use in support to the monitoring of the peer-review process from a scientometric perspective (Hörlesberger et al, 2013). The most common technique to help evaluate a research-related metric has been to calculate the correlation between them. If the new metrics and peer review both reflect the quality of publications then the rankings should be related, giving rise to a positive correlation coefficient. In a hypothetical case that the two metrics both measure the same parameters then their correlation would be somewhat positive. These metrics might be tentatively introduced into the system. The potential use must be based on feedback by different stakeholders on its utilization. This process needs time and might be the weakest link in introducing altmetrics methods and its indicators as a possible measure.

Although altmetric indicators and data sources used for evaluation purposes are increasingly discussed, little is known about the users of such social media platforms or how researchers integrate them into their research environment. Understanding how scientists use social media tools and for which purposes should also be important in evaluating practical applications of altmetrics. This research is surprisingly rare, even having in mind the established social science methods such as interviews and questionnaires. It is also extremely surprising that most of the research presenting their arguments about the extent of the use and importance of social web simply quotes user statistics obtained from administrators of different social networking websites. This is hardly an argument or an indicator of its real use. Such data provide only very general and superficial information.

The rare studies of the actual use of the social media tools presents results that require some caution. In reality,

the uses and possibilities of altmetrics are perhaps more limited then the »enthusiasts« and promoters of altmetrics would like to admit. Web survey among scientific staff of the Heinrich-Heine-University Düsseldorf, Germany has found that the use of at least one social networking service was reported by barely one half of all respondents (53.7%). Only one third (30.1%) of respondents claimed to be active users. Others are only passive users. Web 2.0 achievements seem to play a minor role in academic work (Wikipedia excepting) (Weller et al. 2010). Similar study in Slovenia found the Slovenian researchers to be strong users of web search engines and websites, especially e-journals. Web 2.0 social networking and professional networking sites used for research purposes, however, are almost non-existing: social networks were never or almost never used by 85% of respondents. Age was not a factor, as this was a general characteristics of this population (Vilar et al 2012). A rare study was conducted on a specific scientific community - bibliometricians (Haustein et al 2014). The results presented mixed opinions on altmetrics' potential. Majority (72%) valued download counts, while only third saw potential in tracking articles' influence in blogs, Wikipedia, reference managers, and social media. 70% were on LinkedIn, 23% had public Google Scholar profiles, and 16% were on Twitter, which they used both personally and professionally. Coverage of bibliometricians' articles varied: 82% of articles published by sampled bibliometricians were included in Mendeley libraries, while only 28% were included in CiteULike.

The results, evaluation of altmetrics methods by bibliometricians, are reflected in many studies about correlation between journal papers downloads and citation received. The possibility of connecting journal paper downloads and social bookmarking services as it is presented on websites such as CiteUnLike is also proposed. Study of 168,109 scientific articles published in 45 physics journals between 2004 and 2008, has shown some interesting but limited possibilities (Haustein, Siebenlist, 2011). For example, those who read or scan new articles on the day of publication may subjectively select the most interesting parts to tweet or blog about, archive those in a reference manager site (for example Mendeley.com or CiteULike), mention details in a social networking site or discuss the articles in an online forum.

Some studies paint positive picture and offer promising outlooks. Study using semi-structured, 30- to 45-minute interviews on a sample of 28 academics examined researchers' attitudes and practices relating to twitter citation. They used Twitter to cite articles, however, these citations differed from traditional citations (Priem and Costello 2010). On the basis of these results, authors proposed that Twitter citations could be automatically harvested and analyzed, although this study leaves open the question of the actual extent of the use of Twitter among researchers. Study using questionnaires and interviews with Ph.D. students and academics in the UK found that adoption of social web services was fragmented and not overwhelming at all (Procter et al. 2010). Another study on the small group of science bloggers focused on the fact that these bloggers achieved significant feats with limited resources. The conclusions were also very broad, stating that the impacts of science blogging community remain uncertain, although with the novel and potentially significant practices (Riesch, 2013).

To find out more about the possibility of altmetrics, we have to explore the applicability, use and acceptance of altmetrics sources and indicators in the scientific community. Since it is still unclear how and to what extent the social networking platforms are used, by whom and for what purpose, the objective of this study is to assess the representativeness and validity of altmetrics' indicators with the help of scientific community. We see this as an important task for everyone who is involved professionally (research or otherwise) in the field of scientific research evaluation.

Research

The principal objective for this research is to investigate whether Slovenian researchers essentially use social networking sites and precieve them as an important part of their professional work as social networking is regarded as a part of possible new metrics. The objective was to answer the following research questions:

1. Do younger researchers use social networking tools more than older researchers?
2. Does the period of three years present an important difference in the acceptance of social networking tools among researchers?
3. Do the researchers regard altmetrics as alternative methods for evaluation of their research work?

We perceive the Slovenian researchers to be, on average, similar to other European researchers although comparative data (Peclin, Juznic 2012, Demsar, Juznic 2013, Gorraiz et al. 2011) show that their scientific output is above the average of the European Union, evaluated by the number of published papers in international scientific journals if contrasted to BDP, research funding or the number of inhabitants.

Sample and methods of data collection

The paper presents the continuation of the survey of information behaviour of Slovenian researchers in 2011 on a random sample obtained from the complete list of researchers in Slovenia. The study as a whole aimed to provide better insight into their patterns of information behaviour, thus facilitating the activities of research organizations, information providers such as libraries, or providers of publicly funded information sources such as

public research agencies. The results were presented at LIDA 2012 and contributed to better understanding of research processes, their evaluation, as well as support planning for the future (Vilar, 2012 et al). The aim of this new study is to explore opinion of researchers in Slovenia toward Web 2.0 tools in recent years as a part of their information behaviour and their attitudes toward bibliometrics and altmetrics indicators. As research was done on the same sample of respondents, it can be also seen as a longitudinal one, particularly in the issues which had already been explored in 2011.

We again prepared a web survey, this time with 16 questions (10 content questions (Likert-type) and 6 demographic questions). In this paper we present the analysis of the questions dealing with the availability of time for research-related activities, the use of web 2.0 tools for research-related activities, and awareness and attitudes regarding various altmetric methods.

Random sample of all currently active and officially registered researchers in Slovenia was used. Contact details were obtained from Slovenian Research Agency (ARRS), which governs all publicly funded research in Slovenia. Sample consisted of every eighth researcher, an email invitation was sent on April 7th, 2014 to a random sample of all active researchers in Slovenia (n=592). By May 2nd (the date of the analysis for this paper) we received 93 questionnaires (15.7%), of which 73 (12.3%) were sufficiently completed to be used in the analysis. Little more then half (58%) of the respondents were male, 40% were aged between 31-40, 30% between 41-50, 11% between 20-31, 10% between 51-60, and 9% were over 60 years. Majority, a quarter of respondents came from Natural Sciences, as can be seen from Table 1 which shows distribution between research areas.

Table1: Research areas of respondents

	%
Natural Sc.	25%
Technical Sc.	17%
Humanities	17%
Social Sc.	13%
Medicine	10%
Interdisciplinary	9%
Agriculture	8%
TOTAL	100%

Results and discussion

We asked researchers to report their use of Web 2.0 tools, for example Facebook, Twitter, Web forums, blogs and also tools like Mendeley, CiteULike, ResearchGate and LinkedIn. Facebook and Twitter are used very rarely, with 10% and 5% respective users. Mendeley and CiteULike received similarly low preference. ResearchGate and LinkedIn, scored somewhat better - more researchers reported using them than researches not using them. The most frequent answer for ResearchGate was »occasionally« and »almost never« for LinkedIn.

There were some differences among disciplines: researchers from medicine have been frequent users of ResearchGate and occasional users of CiteULike. Also, social scientists, in relation to users representing other other sciences, are more frequent users of CiteULike, LinkedIn, web forums and blogs. In general, researchers in the humanities are less frequent users of Web 2.0 tools.

Age and gender were not an important factor. Because of a small sample, the differences can not be generalized, but can nevertheless be mentioned: the youngest researchers use Mendeley more than other researchers; LinkedIn seems to be the preferred tool of the researchers between 31 and 40. The two oldest groups of researchers more than other researchers seem to prefer the CiteULike, while researchers between 51 and 60 seem to favour the use of web forums. More women than expected and fewer men than expected use Mendeley occasionally, and never use ResearchGate or LinkedIn.

In another question we asked the respondents to provide their opinion on the uses of altmetrics in the evaluation of scientific research. Three possible answers were offered.

- I am familiar with
- I am not familiar with but I'm interested
- I am not familiar with and I'm not interested

Less then 20% of respondents (mostly male) reported on their familiarity with altmetrics. Surprisingly many (two thirds) said that they are not familiar with it but are interested. Age is not an influential factor. Gender, on the other hand, apparently has some more influence. Research discipline also has some influence. On average, fewer Natural scientists and more Medicine researchers are familiar with it; more technical scientists are not familiar with it and are not interested.

We also wished to investigate the possible acceptance of different altmetrics' indicators on the part of the researchers as a measure for evaluation. Number of downloads of articles from scientific journals/publications was the indicator agreed or partially agreed upon by the majority of respondents. Only 12% disagreed. Similar answers were obtained related to the possibility of using the number of downloads of publications from repositories, although these received somehow more answers related to “No opinion”. References to research results in mass media also received same very positive acceptance. Two other indicators, references to research results in social networks and statistics from the programs

such as ResearchGate and Mendeley are less popular, as expected. Namely, the researchers themselves are not very regular users of such applications even though they do not completely reject such a possibility. In fact, most researchers partially agreed with this option. Gender played no role. More researchers than average, in the age group of 41-50, oppose the idea of using the indicators from social networks and statistics from programs such as ResearchGate as an instrument for evaluation. Researcher form the Humanities are more in favour of using the data on downloads, as expected. Namely, they usually oppose the use of citation data. No other important differences were found.

There were also some correlations between the awareness of altmetrics tools and the use of Web 2.0 tools. Many of those who claim to be familiar with altmetrics often use ResearchGate and LinkedIn, and occasionally use Facebook and Twitter. Among those who would like to know more about altmetrics, there is an interesting division: they often use and never use ResearchGate more then average

Although these are only some selected preliminary result, on a limited sample, they are nevertheless interesting. Before trying to answer the question wether Slovenian researchers act in a traditional way or are only just adapting to the new ways of communication we must look at the broader context. Slovenia has a very sophisticated system of tracking the publication patterns of scientists, and the respective citation impact, which is also very transparent as it is publicly available through two interconnected systems - COBISS and SICRIS. The motivation for the updates on publishing activities is very strong among the researchers. They regularly access COBISS and SICRIS, also in order to follow the publishing activity of their colleagues and associates. The system is connected and employs citation data both from WoS and Scopus (Bartol et al 2014). So the researchers are more familiar with 'classical' bibliometric indicators which are employed regularly and are also readily available. This is obviously not an obstacle to the acceptance of and interest in the more recent alternative methods as offered by altmetrics. Nevertheless, whilst it may seem plausible that articles which are downloaded or mentioned in the media and social web are important, more research into its applicability is needed if altmetrics are to be taken seriously and accepted as a tool for evaluation.

A weak use of social networking tools does not seem to prevent the researchers from being open to the possibilities of employing new methods of research evaluation. Such non-use is more related to the lack of time in a highly competitive world of science, and also to pragmatism. If the scientists do not precieve some concrete benefits, either in a better quality of information resources or improved prestige, they will not use such tools. At this point, it would be probably too early to look for other motives.

Conclusions

The expansion of the social web and its adoption by scholars has led to the creation of altmetrics, which are social web metrics for academic publications. These new metrics could, in theory, be used in an evaluative role, to give early estimates of the impact of publications or to give estimates of non-traditional types of impact. But there is one possible trap. We might agree that in the future more and more researchers are going to use Web 2.0 tools to mediate their interaction with the information sources. In doing so, they will be leaving behind valuable tracks, which will also be showing paths of influence. This influence might be of the same origin as the impact measured by classical bibliometric indicators. Thus, they should be perceived as good, or perhaps even better by the proponents of altmetrics. But can we predict what will happen if we start to use them as evaluation indicators. Numerous studies have documented that the scientists actually do base their actions on the criteria and indicators applied in evaluations (Bornmann, 2010; Erno-Kjolhede, Hansson 2011; Demsar, Juznic 2014). That should warn us not to rush too fast. Some authors argue that we should not limit ourselves only to those metrics that have been validated, as we will find that we are quickly outpaced by changes in technology (Stuart, 2014, p 172). That involves another danger for science – to go for popularity over quality.

Our results show that researchers are interested in the new evaluation tools, which can provide a foundation for an active approach towards altmetrics. We also believe that a very cautious approach should be applied towards using specific tools and indicators, not only across all disciplines, but also in different national environments. In the societal impact area it will be unlikely to find any indicators, such as publication and citation counts, which can be employed across most disciplines and institutions and which can be measured easily and on uniform principles. We can agree with the statement that more than a mere scientific impact measurements, the assessment of societal impact research is badly needed as the new set of indicators (Bornamann, 2013).

Our future research will follow two tracks. One is to increase the number of respondents which will permit a more confident generalization on why the usage of Web 2.0 tools among Slovenian researchers is still so weak and if there is a significant interest in altmetrics.The second is to focus on a selected research discipline with a strong applicative component and find out more about their understanding and acceptance of altmetrics indicators. This will also measure the societal impact of research rather than pure scientific aspects.

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From webometrics to altmetrics: one and a half decades of digital research at Wolverhampton

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Abstract

This article describes and summarises the contributions of the Statistical Cybermetrics Research Group (SCRG) at the University of Wolverhampton in the UK to the information science specialisms of Webometrics and altmetrics. In both cases the group created free computer programs for data gathering and analysis. In Webometrics the SCRG developed counting methods for hyperlink analysis and assessed them for collections of different types of website. In addition, it also developed methods for automatically gathering and analysing text on a large scale, both for web citation analysis and for more general social science purposes. It also developed two Webometric theories. In altmetrics, the SCRG analysed the validity of a range of indicators, including counts of tweets and Mendeley readers for academic articles, finding evidence that they associated with citation counts and hence that they had value as altmetrics. The dual purposes of this paper are to give an overview of a range of methods and free tools for Webometrics and altmetrics, and to give a historical overview of the evolution of one information science research group in the hope that others can learn from its successes and failures.

Keywords: altmetrics, webometrics, scientometrics.

Introduction

The SCRG was created in December 2000 with the School of Computing and IT at the University of Wolverhampton in response to a perceived need for more computing technologies within Webometrics to address some of its central concerns. Over the next 12 years the group created two computer programs, the web crawler SocSciBot, and the data collection program Webometric Analyst, and used them to investigate Webometric issues. About half way through this period the group attempted to engage a wider social science audience for its methods and software by publishing in journals and conferences outside of information science and my customising some of its software for tasks unrelated to traditional Webometrics. In particular, the group developed methods and software for gathering and analysing tweets and for sentiment analysis. With the advent of altmetrics the group modified Webometric Analyst to gather relevant altmetric data, such as information from Mendeley, and began to investigate altmetric topics. This hagiography summarises some of the research produced by the SCRG, with a focus on altmetrics.

Webometrics

Primarily created by Tomas Almind and Peter Ingwersen in Copenhagen (Almind & Ingwersen, 1997), the research field of Webometrics was concerned with "quantitative aspects of the construction and use of information resources, structures and technologies on the Web drawing on bibliometric and informetric approaches" (Björneborn & Ingwersen, 2004). It began as an attempt to develop a citation analysis of the web using hyperlinks instead of citations and extending the scope of the hyperlink citation analysis to non-academic topics. This ambitious goal was triggered by the observation that one of the major search engines at the time, AltaVista, had become a citation index (Ingwersen, 1998; Rodríguez i Gairín, 1997) for web hyperlinks through its introduction of methods to search for hyperlinks online. New research was needed, however, to assess the accuracy and comprehensiveness of AltaVista's results and the results of other search engine that followed AltaVista's lead (Bar-Ilan, 1999; Rousseau, 1999). The SCRG attempted to contribute to this debate by developing the web crawler

SocSciBot to crawl academic websites and to report the number of hyperlinks between websites in order to help check search engine results, and later also in an attempt to improve on them (Thelwall, 2002).

A second technological development by commercial search engines then changed Webometrics: The provision of Application Programming Interfaces (APIs). These allowed programmers to gain automatic access to search engine results and made it possible to automate the gathering of data for webometric purposes. In response, the SCRG developed a new computer program, LexiURL Searcher (now called Webometric Analyst and also used for altmetrics) to interface with the major search engines to automatically download webometric data. This made much larger scale studies possible using APIs from Google, Microsoft and Yahoo! (e.g., Kousha, & Thelwall, 2008a).

Data gathering for Webometrics became more difficult when the commercial search engines withdrew some or all of their facilities. Currently, no major search engine allows useful hyperlink searches and so it is no longer possible to conduct automated hyperlink data gathering from a major commercial search engine. Moreover, only Bing now offers free API for searches. In response, the SCRG resumed development on its web crawler SocSciBot and developed new types of query for Webometric Analyst that identified citation-like types of inter-document connection that could be searched for automatically in Bing and used as substitutes for hyperlinks. These URL citations were mentions of the URL of a target page or website in another website (Kousha & Thelwall, 2007; Stuart & Thelwall, 2006). For example the following query matches pages within the University of Wolverhampton website (www.wlv.ac.uk) that mention the URL of any page in the main BBC News website (news.bbc.co.uk):

```
"news.bbc.co.uk" site:wlv.ac.uk
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The SCRG developed and applied link analysis for assessing the impact of websites (e.g., Thelwall & Harries, 2004) and also for creating networks of websites built through the links between them (e.g., Thelwall & Zuccala, 2008). In support of the software and methods, the group also introduced a theoretical framework for link analysis theory to guide link analysis research by specifying a minimum set of analyses needed to generate a meaningful link analysis study (Thelwall, 2006). For example, the Framework included content analysis of a random sample of links in order to be able to infer meaning from the network diagrams or link counts generated in a study. The link analysis methods were applied, sometimes in conjunction with other researchers, both inside information science (Barjak & Thelwall, 2008; Eccles, Thelwall, & Meyer, 2012; Mas Bleda, Thelwall, Kousha, & Aguillo, 2014; Tang & Thelwall, 2004) and in the wider social sciences and humanities (Park & Thelwall, 2008). In the latter case the SCRG's goal was to expand Webometrics to analyse "web-based content with primarily quantitative methods for social science research goals using techniques that are not specific to one field of study" (Thelwall, 2009).

In addition to variants of link analysis, the SCRG developed text analysis methods for the web, such as a technique to extract trends from news reports delivered from blogs and news websites in RSS format (Thelwall & Prabowo, 2007), later adapting the same methods to identify trends in Twitter (Wilkinson & Thelwall, 2012). At the same time, the SCRG collaborated in the creation of a new theory, that of Information-Centred Research, which posited that information scientists should explore new web-based data sources in order to identify the disciplines in which they may be useful and the methods that may be useful for extracting data from them (Thelwall, & Wouters, 2005; Thelwall, Wouters, & Fry, 2008). This theory essentially argued that information scientist could be pro-active librarians for the web, directing researchers to useful tools and data sources for their problem.

An increasingly important strand of research within webometrics was the generation of metrics for the impact of academic articles using evidence from web searches for mentions of them (following from a previous person-mention approach: Cronin, Snyder, Rosenbaum, Martinson, & Callahan, 1998). These web citations allowed web-based citation analyses to be conducted on a much larger scale and with more data than had been possible with earlier hyperlink-based citation studies. The first research used general searches to look for web citations to academic articles from any web page (Vaughan & Shaw, 2003). Later investigations instead constructed searches for specific types of web page, such as online PowerPoint presentations, blogs or course syllabuses in order to get web indicators for specific types of impact, such as educational impact (Kousha & Thelwall, 2008ab; Kousha, Thelwall, & Rezaie, 2010). At the same time, Google Books was assessed for its ability to report citations from books to books or journal articles, with the findings suggesting that it was possible to automatically extract useful book-based citations from this source (Abdullah & Thelwall, in press; Kousha & Thelwall, 2009; Kousha & Thelwall, in press; Kousha, Thelwall, & Rezaie, 2011).

Altmetrics

The field of altmetrics was created by a group of US and European researchers led by Jason Priem in to study the potential to develop indicators for aspects of the impact or uptake of academic articles through indicators extracted from the social web, using APIs (Priem & Hemminger, 2010; Priem, Taraborelli, Groth, & Neylon, 2010).

Altmetrics had become possible because reference sharing sites, such as Mendeley, and social network sites like Twitter were being used by significant numbers of people to share research, creating a large public body of data about the use and sharing of academic articles. Moreover, the companies owing the social web sites often made data collection from them by computer programs possible by offering public API access. Given that academic articles are normally evaluated on a large scale by counting citations to them, two of the key promises of altmetrics were that they could reflect wider uses of articles than just those that led to citations (e.g., educational uses, and uses by practitioners) and that they could be collected much more quickly than could citations, so that altmetrics could be used as indicators for articles soon after publication even though citations might take a year to start to accumulate. This is particularly important for information retrieval since people are often most concerned with research that has been recently published (e.g., for horizon scanning).

The SCRG started to investigate altmetrics as a logical extension of its web citation analysis research, mentioned above, and incorporated citation search facilities into its free Webometric Analyst software (http://lexiurl.wlv.ac.uk) for the social reference sharing site Mendeley via its API, as well as features for monitoring Twitter via its API. These facilities were then used to test altmetrics. As for web citation analysis studies, the default initial method to test a new altmetric was to correlate its values against citations from an existing citation database, such as the Web of Science or Google Scholar, with a statistically significant positive correlation being taken as some evidence that the results were not random and were related to scholarly activities in some way, even if not through a cause-and-effect relationship (Sud, & Thelwall, 2014). The correlation method was used to demonstrate the existence of an association between Mendeley "readers" of an article and its citations (Li, Thelwall, & Giustini, 2012; Mohammadi & Thelwall, in press), for citations from blogs (Shema, Bar-Ilan, & Thelwall, 2014), and for scores from the Faculty of 1000 website (Li & Thelwall, 2012). These Faculty of 1000 scores were later shown to be capable of revealing articles that were medically useful despite not attracting many citations, hence performing a useful research evaluation task (Mohammadi & Thelwall, 2013).

The correlation method was found to be inappropriate for some altmetrics because the increasing use of social web sites like Twitter for academic purposes meant that younger articles tended to be mentioned (e.g., tweeted) more due to the increasing use of the site. In response, an alternative method was developed to identify an association between altmetrics and citations that would not be affected by the increasing use of social web sites. This method was used to demonstrate that more tweeted articles tended to be more cited across a range of journals (Thelwall, Haustein, Larivière, & Sugimoto, 2013).

Future work

In addition to Webometrics and altmetrics, the SCRG also conducts sentiment analysis (Thelwall, Buckley, Paltoglou, Cai, & Kappas, 2010; Thelwall, Buckley, & Paltoglou, 2012; Thelwall, & Buckley, 2013; Thelwall, Buckley, & Paltoglou, 2011) and traditional scientometric research, such as into collaboration (Levitt & Thelwall, 2009; Levitt & Thelwall, 2010; Thelwall & Sud, 2014) and factors associating with high impact articles (Didegah, & Thelwall, 2013ab; Levitt, & Thelwall, 2011). A recent trend within the group that is likely to continue in the future is to use more sophisticated statistical techniques in order to analyse data with multiple simultaneous factors in order to identify which factors are important and which seem to be important because of their association with other factors. For example, one study found evidence that international collaboration tends to be more highly cited not because of the involvement of multiple countries, as had previously been thought, but because of the involvement of additional authors, at least in biochemistry (article currently under review). In addition to the inclusion of more statistical approaches, in the future the group will continue to seek opportunities to exploit new websites or changed in the web for research purposes.

Summary

Overall, the SCRG has attempted to combine (a) an element of web computing in the sense of writing (and sharing) computer programs to gather and analyse data from the web, and (b) simple statistical methods to analyse the data in order to address web-related research questions related to scholarly communication. The purpose of most of the research has been methodological: to develop and assess new methods. In contrast, relatively few articles have focused on discovering something using web data that is irrelevant to the web. Hence the research has had a strong methods focus. Whilst some of the early research described above has become obsolete because of changes in the web and in the services provided by search engines, the overall strand of research has managed to survive through developing existing techniques to address new challenges, such as the rise of the social web and the introduction of altmetrics. As predominantly methods-oriented researchers, however, the success of the group is in the uptake of its methods by others and only time will reveal the extent to which this happens.

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What is a journal article and does it really matter?

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Abstract

The paper presents the results of two Bradford analyses conducted on two different types of journal articles produced by departments at Uppsala University, Sweden. The two types of journal articles studied are "refereed" and "other (popular science, discussions, etc.)". The results show that the rank ordered lists of departments vary a lot, and thus that results of Bradford analyses are depending in part on the types of journal articles included in the study. The results are discussed and connected to problems and challenges related to concept operationalization.

Keywords: Bradford's law; Document typology; Operationalization.

Introduction

Bradford's law (Bradford, 1934; 1948) concerns a regularity observed in published information: Articles on a given subject are published unevenly by journals. A few journals publish a relatively high number of the articles whereas many journals publish only one or a few articles each. Burrell (1988) notes that although Bradford's law strictly speaking is about articles and their concentration/dispersion in journals, it is customary to speak in terms of a population of sources producing items. Moreover, a number of studies have shown that Bradford's law applies to other sources and items than just journals and articles. A few examples: Worthen (1975) demonstrated that Bradford's law also conforms to publishers and monographs, Kirby (1991) successfully applied Bradford's law to the study of journals and book reviews, and Tonta and Al (2006) studied theses and dissertations and found that the distribution of citations to foreign journal titles fitted Bradford's law. The possible applications of Bradford's law may well include many other types of sources and items (Wallace, 1987).

According to *the received view on Bradford's law*[1], this bibliometric law may help to solve many of the practical problems facing the practitioners of our profession. The basic assumption of the advocates of the received view is that Bradford's law functions as a neutral and objective method. However, in two previous publications Professor Hjørland and I questioned the neutrality and objectivity of Bradford's law (Hjørland & Nicolaisen, 2005; Nicolaisen & Hjørland, 2007). We demonstrated empirically that the way one chooses to operationalize the concept of subject, when conducting Bradford analyses, will influence on the results of the very same. Consequently, Bradford's law does not automatically function as a neutral method. On the contrary, the results of utilizing Bradford analysis as a method for identifying the core information sources of any subject, field or discipline will depend in part on the way "subject" is operationalized. We also demonstrated empirically that selection of information sources based on Bradford-distributions tends to favor dominant theories and views while suppressing views other than the mainstream at a given time. Thus, Bradford's law does not function as an objective method either. The initial finding that led us to these discoveries was the finding that although Bradford's law is said to be about the scattering of journal articles on specific subjects, nobody had investigated the consequences of different conceptions of "subject" for Bradford's law. This despite the fact that the meaning of the term "subject" (and related terms such as aboutness, topicality, and theme) as applied in subject indexing, classification and knowledge organization, has been investigated in our discipline for more than a hundred years! Inspired by these findings, this paper takes a closer look at another element of Bradford's law and the consequences of its actual operationalization: *The journal article*.

According to Bradford's law, sources (e.g., journals) producing items (e.g., articles) on a given subject can be divided into different parts (usually three), each containing

[1] The received view (a definition suggested by Nicolaisen & Hjørland (2007)) on Bradford's law is the view put forward by the majority of textbooks (see e.g., Evans, 2000; Nisonger, 1998).

approximately the same number of items: 1) a core of sources on the subject that produces about one-third of all the articles, 2) a larger group of sources containing about the same number of articles as the core group, and 3) a third and even larger group of sources containing about the same number of articles as the two others respectively. But what is actually meant by "articles"? Is it only articles producing new knowledge? Is it limited to peer reviewed articles? Or is it all kinds of articles including broader discussions and those intended for broad public consumption? The literature on Bradford's law has thus far not addressed these questions. Why? Perhaps because they are seen as practically irrelevant. It could be that the way one chooses to operationalize the concept makes no difference. The results of a Bradford analysis may be the same whether one includes only primary journal articles in the analysis or whether one limits to broader discussions and popular science articles. In order to find out whether it actually makes a difference or not, an empirical study is needed. This paper presents the results of a Bradford analysis of different kinds of journal articles produced by departments at Uppsala University, Sweden. The method is outlined below. Results are presented in a separate section, and followed by a discussion and conclusions section.

Method

A Bradford analysis includes three steps (Diodato, 1994):

1. Identification of items representing the object of study.
2. Registering sources publishing items in rank order beginning with the source that produces the most.
3. Division of the rank ordered sources into groups or zones (usually three) that produce roughly the same number of items.

In this study, items are journal articles and sources are departments at Uppsala Universy, Sweden. DiVA[2] was used to identify journal articles produced by the departments. DiVA indexes three kinds of journal articles:

- Refereed
- Other academic
- Other (popular science, discussions, etc.)

[2]"DiVA is Uppsala University's system for electronic publishing and for registering publications as well as providing the basis for decisions about the allocation of research funds and for statistical analyses. It is mandatory for researchers and staff at the university to register their publications in DiVA"

(http://www.ub.uu.se/en/Service/Publish-and-register-in-DiVA/).

The study was limited to refereed journal articles and to other (popular science, discussion, etc.), and the publication counts of these two categories of journal articles produced by departments at Uppsala University was found searching DiVA[3]. The retrieved publication counts of each department were then listed in two separate rank orders, and the two lists were finally divided into three groups (Bradford zones) of departments producing roughly a third of the journal articles in each journal article category.

Results

Results are shown in the figures and tables below.

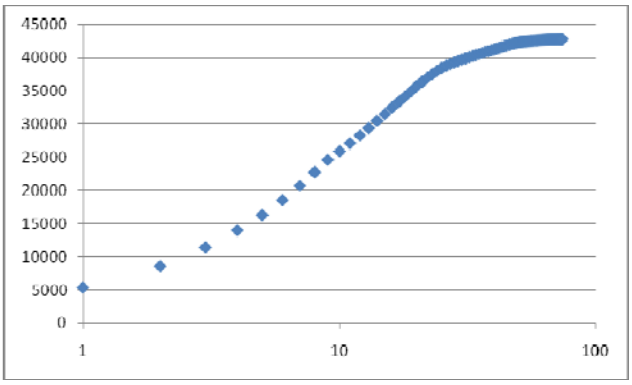

Figure 1: Bradford analysis of refereed journal articles produced by departments at Uppsala University, Sweden.

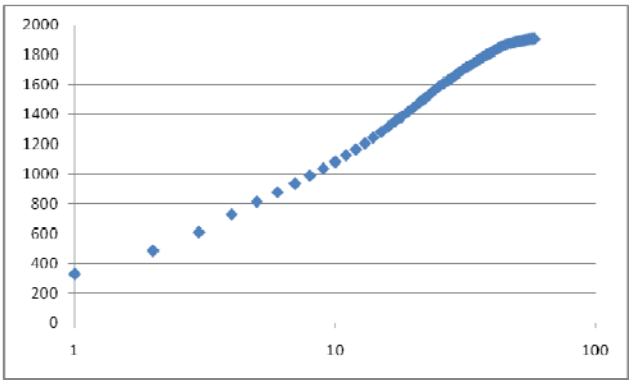

Figure 2: Bradford analysis of other (popular science, discussions, etc.) journal articles produced by departments at Uppsala University, Sweden.

Both figures show graphs that correspond to the expected Bradford curves: "an initially rising or convex curve, representing the nuclear zone of exceedingly productive [sources], turns rather abruptly, at a certain critical point,

[3] All searches were conducted May 10. 2010 and verified December, 2013.

into a straight line running smoothly toward the zones of decreasing productivity" (De Bellis, 2009: 97-98).

Table 1. Bradford analysis of refereed journal articles produced by departments at Uppsala University, Sweden.

Departments in rank order of productivity	F.
Dept. of Medical Sciences	5.377
Dept. of Surgical Sciences	8.587
Dept. of Neuroscience	11.410
Dept. of Public Health and Caring Sciences	13.986
Dept. of Oncology, Radiology and Clinical Immunology	16.285
Dept. of Genetics and Pathology	18.569
Dept. of Engineering Sciences	20.696
Dept. of Earth Sciences	22.757
Dept. of Women's and Children's Health	24.636
Dept. of Pharmaceutical Biosciences	25.920
Dept. of Information Technology	27.132
Dept. of Medical Biochemistry and Microbiology	28.334
Dept. of Medical Cell Biology	29.432
All	42.829

The tables show the departments in the first two Bradford zones of the two rank ordered lists. Cumulated publication counts are listed in the F. columns.

The cumulated publication count of all refereed journal articles equals 42.829. A third of this count equals 14.276. There are consequently five departments in the first Bradford zone and eight in the second.

The cumulated publication count of all other (popular science, discussions, etc.) journal articles equals 1.908. A third of this count equals 636. There are consequently four departments in the first Bradford zone and eleven in the second.

The four times two departments that are marked in grey are those that are found in the first two Bradford zones in both rank orders. Note that the overlap is zero for the first Bradford zones.

Discussion and conclusion

The results of the two Bradford analyses of different types of journal articles produced by departments at Uppsala University, Sweden clearly show that the resulting distributions depend on the types of journal articles that are included in the analyses. Limiting to refereed journal articles produces one rank ordered list of departments; limiting to other (popular science, discussions, etc.) produces another rank order of the same departments.

Consequently, the operationalization of the concept of "journal articles" has practical consequences.

Table 2. Bradford analysis of other journal articles produced by departments at Uppsala University, Sweden.

Departments in rank order of productivity	F.
Dept. of Scandinavian Languages	329
Dept. of Theology	485
Dept. of Literature	610
Dept. of Archaeology and Ancient History	730
Dept. of History of Science and Ideas	814
Dept. of Economics	879
Dept. of Cultural Anthropology and Ethnology	936
Dept. of Medical Sciences	989
Dept. of Earth Sciences	1.037
Dept. of History	1.082
Dept. of Linguistics and Philology	1.126
Dept. of Neuroscience	1.166
Dept. of Surgical Sciences	1.206
Dept. of Modern Languages	1.245
University Library	1.283
All	1.908

Publication counts are increasingly used as an indicator of research performance. Limiting such counts to some publication types while excluding others will thus have consequences for the affected institutions and departments. Keeping in mind that universities in Sweden are bound by law to engage in discussions of interest to society at large and to communicate their research to the broader public, make it obvious that a performance indicator based solely on refereed publications is at best ill advised.

Bibliometric studies (including Bradford analyses) typically rest on the tacit assumption that knowledge is the result of interpretation of information gathered from the analysis of raw data. Thus, there is tacitly believed to be a logical hierarchy where knowledge is on top, information is in the middle, and raw data is on the bottom.

Raw data are consequently seen as something purely given. In this sense, raw data are naked facts that are analyzed with the purpose of uncovering repeating patterns (information) that can be interpreted into knowledge. The problem is, of course, that this logical hierarchy is a "fairytale" (Rafael Capurro, cited from Zins, 2007, p. 481). Data are never "raw". Data are always theory laden. The same goes of course for the journal article data of this study. A categorization of journal articles as either "refereed", "other academic", or "other (popular science, discussions, etc.)" is the result of a more or less tacit theoretical understanding of what constitute such categories. A refereed journal article is not a purely given thing. There are different theories or beliefs about what constitute such a thing (Weller, 2001). The dividing line between "other academic" and "other (popular science, discussions, etc.)" is neither purely given, but the result of some (tacit) understanding that could be different. Thus, the results of bibliometric studies including Bradford analyses, and the Bradford analyses presented here are partly determined by the operationalization of the objects under study. Bradford's law as well as other bibliometric laws can therefore not be said to function as a neutral and objective method. This, however, does not imply that we should stop conducting bibliometric studies. But we need to conduct them properly. As argued by Hjørland (2009), the process of operationalization must be done using an iterative approach during which the researcher's own pre-understanding, underlying values and goals are made explicit. The empiricist ideal must thus be abandoned and replaced by a more hermeneutic oriented approach.

Some might argue that this is all self evident. That it is obvious that Bradford analyses conducted on different types of journal articles will produce different rank orders of sources, and so on and so forth. In reply one could ask why? Why is it self-evident that such analyses will produce different results? The answer would most likely be that there are disciplinary differences when it comes to publishing behavior that affect the outcome of such analyses. If the analyses had included book chapters, then departments from the Arts & Humanities would have benefited as they typically produce more publications of that kind. If the analyses had included conference papers, then other departments (e.g., Dept. of Information Technology) would have benefited as they typically use that platform for communicating their research. It is like the popular saying: "You become what you eat". Most of us are aware of this. By "us" I mean us who in one way or another are studying Science, scientists, research communication, etc. The problem is, however, that we are not alone. Bibliometric studies are also conducted by other groups of people. In these years, many countries are for instance working on developing their own research performance indicators. The people engaged in this work are often practitioners (administrators and others) without the same knowledge and understanding. It is consequently important to inform this group of practitioners about the disciplinary differences that affect the outcome of bibliometric studies. In order to do this we need systematic documentation that demonstrates these differences.

Epilogue

This paper is/was presented at the LIDA 2014 conference in Zadar, Croatia. The theme of (the second part of) the conference is/was "altmetrics - new methods in assessing scholarly communication and libraries: issues applications, results"[4]. The two anonymous reviewers both noticed that the paper does not directly address the theme of the conference – i.e. altmetrics, and they asked the author to discuss the broader implications of his findings and to relate them to the conference theme. This epilogue is the author's attempt to comply with the reviewers' instructions.

Altmetrics is short for alternative metrics. It is an alternative to traditional metrices such as bibliometrics (and scientometrics). The standard definition of bibliometrics stems from Alan Pritchard (1969: 348-349) who defined bibliometrics as "all studies which seek to quantify processes of written communication" and "the application of mathematics and statistical methods to books and other media of communication". Altmetrics aims to measure Web-driven scholarly interactions (Howard, 2012). Following Pritchard (1969), altmetrics could thus be seen as part of bibliometrics. Yet, what to some extent distinguish altmetrics from bibliometrics are the media and processes that are quantified and measured. Bibliometrics has predominantly been concerned with quantifying and measuring entities like e.g., books, journal articles, references, and citations. Altmetrics focusses instead on e.g., how often research is tweeted, blogged about, liked, or bookmarked (Howard, 2012). Regardless of the entities quantified and measured, both metrices share a common challenge. The entities that are quantified and measured are not quantified and measured for their own sake. Basically, nobody is really interested in knowing e.g., how many times a book is cited or how many times some papers have been bookmarked. The reason why these entities are quantified and measured is because they are believed to represent interesting concept and phenomena such as quality, impact, productivity, etc. Bibliometrics and altmetrics consequently share the common challenge of adequately operationalizing such concepts and phenomena.

The present paper is an example of such operationalization and the consequences of the same. The phenomenon under study is productivity (or more precisely the productivity of university departments). In the present paper, publication of journal articles operationalizes the productivity

[4] http://ozk.unizd.hr/lida/themes/

phenomenon. Whether this operationalization is suitable or not is open for discussion. That is how it is with any operationalization. Does it really represent what it is supposed to represent? Is it flawed? Could the phenomenon under study have been operationalized differently? Would that have made a difference? Those are questions that could and should be posed to any operationalization. As altmetrics share the operationalization challenge with other metrices (including bibliometrics), the same questions could and should be asked to altmetrics operationalizations. Why? Because that would qualify and strengthen the altmetric yardsticks employed.

Although altmetrics has introduced new methods for assessing scholarly communication and libraries, the challenge remains the same. Do these new methods really measure what they are intended to measure? Take for instance the so-called 'likes' or 'upvotes' that are used on many social media. Is it not quite obvious that counting the number of such entities equals measuring quality? Is that really something to investigate or question? A recent study published in *Science* clearly proves that also seemingly clear-cut operationalizations like this one need to be carefully addressed. Muchnik, Aral & Taylor (2013) conducted a randomized experiment on a social news aggregator platform and online rating system. The experiment and findings were later summarized by Hendricks & Hansen (2014: 1):

> *On an unidentified crowd-based opinion aggregator system ostensibly "similar to Digg.com and Reddit.com", the status of 101.281 comments made by users over a 5 month period with more than 10 million views and rated 308.515 times, was monitored. In collaboration with the service, the researchers had rigged the setup in such a way that whenever a user left a comment it was automatically rendered with either a positive upvote, a negative downvote or no vote at all for control. Now here is a key of the experiment: If a comment received just a single upvote, the likelihood of receiving another upvote for the first user to see it was 32% relative to the control group. Additionally chances were also higher that such comments would proliferate in, or lemming to, popularity as the upvote group on average had a 25% greater rating than the control group.*

What the experiment seems to reveal is that upvotes are susceptible to social information phenomena variously described as herding, lemming-effects, cascades, bystander effects, group-thinking, and collective boom-thinking (Hendricks & Hansen, 2014). Similar citation chain reactions have been reported in bibliometric studies (Frandsen & Nicolaisen, 2013).

Strictly speaking, it is true that the present paper is a bibliometric paper and not an altmetric paper. Yet, the focus on operationalization and its consequences is (or should be) shared by all metrices. Thus, the conclusion that the process of operationalization must be done using an iterative approach during which the researcher's own pre-understanding, underlying values and goals are made explicit, also applies when it comes to altmetric operationalizations.

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Curriculum Vitae

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Where and how knowledge on digital library evaluation spreads: a case study on conference literature

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Abstract:

Scholarly communication has not remained unaffected by the advance of the social networking culture. The traditional bibliometric paradigm is strongly questioned as a tool that accurately portrays the impact of research outcomes. New metrics, such as download or view rates and shares, have been proposed as alternative ways for measuring the impact of digital content published in the form of articles, datasets, etc. Mendeley's Readership Statistics are one of these metrics, based on the assumption that there is a linkage between a paper in a collection and the interests of the collection owner. The current study explores the 'altmetric' aspects of the literature of the digital libraries evaluation domain, as it is expressed in two major conferences of the field, namely JCDL and ECDL. Our corpus consists of 224 papers, for which we extract readership data from Mendeley and examine in how many collections these papers belong to. Our goal is to investigate whether readership statistics can help us to understand where and to whom DL evaluation research has impact. Therefore the data are analyzed statistically to produce indicators of geographical and topical distribution of Mendeley readers as well as to explore and classify their profession. Finally it derived that there is a loose correlation between the number of Google Scholar citations and the number of Mendeley readers.

Keywords: altmetrics, digital library evaluation, Mendeley, conference literature

Introduction

The proliferation of sophisticated tools that improve scholarly communication through advanced social connectivity, collective bibliographic management, personal collection development and integration to research practices forms a new environment [Hull et al., 2008]. Dependent on large-scale infrastructures, that manage big data and knowledge, it also involves alternative ways of

content provision (repositories), alternative/supplementary versions of the content (articles, datasets) and alternative calculations (downloads, views, shares) of its impact. In this environment, the traditional bibliometric paradigm is strongly questioned as a tool that accurately portrays the impact of research outcomes and therefore new metrics, such as download or view rates, have been proposed.

Among the numerous social networking tools, online reference management systems, such as CiteULike, Zotero and Mendeley, are emerged as the most suitable ones for use by academics and researchers, as they convey familiar concepts, such as the bibliographic information of research outputs. Several other similar systems, such as Academia or ResearchGate, provide social networking capabilities, yet with limited effects in the collective building of bibliographic collections. One of the most challenging questions is how these systems can provide reliable data to be used for research assessment, either as a replacement of current metrics, which are critiqued as obsolete, or as an extension of them.

In previous studies [Tsakonas et al., 2013; Afiontzi et al. 2013] we examined how concepts of digital library evaluation are intertwined in two major conferences of the field, namely JCDL and ECDL. In this study we try to investigate how to estimate the impact of this part of literature with the use of altmetrics. In particular we question:

- Can altmetrics, in the form of the readership statistics of Mendeley, reveal knowledge diffusion patterns? This would help to understand the dynamics of a venue and in particular the dynamics of JCDL and ECDL in terms of in-between differences and similarities.
- Can data from altmetrics in combination with traditional metrics, such as citations, and other indicators help us create quality profiles of conference papers? This would identify the impact of scientific assets at the lower level (paper) with vital information from a higher level (conference).

Background

Altmetrics: alternative and complementary

Altmetrics are proposed as a new portfolio of metrics, which is based on web interactions and transactions that can be automatically processed and produce indicators for the advancement of a different assessment mentality than the existing one. The 'altmetrics manifesto' [Priem et al., 2010] concentrates its critique on almost all aspects of the traditional scholarly communication system, from the peer-review performance rates (questioning also its role in sustaining a conservative scientific system) and the citation counting and analysis norms to the prominent venue assessment factors, such as a journal's impact factor.

The mechanics of altmetrics are both intriguing and challenging. The calculation of altmetrics is immediate, giving an instant view on the spread and the adoption of ideas of a scholar, while the multi-dimensionality they provide can address different notions of acceptance and impact. On the other hand, the current toolkit needs a lot of effort to be truly functional and commonly acceptable. Some metrics, such as a Facebook 'Like', are repealable, while other actions, like monitoring in Twitter, need careful planning, e.g. a setup for hashtag mentions. Eventually this leaves margins for controversy on the reliability of the processes. Despite this controversy, newly established services, like altmetric.com have been inaugurated aiming at systematically calculating the attention a paper attracts based on persistent identifiers, like DOI or PubMed ID. According to its inventors "...we try to sum up the online attention surrounding a journal article by automatically counting all the relevant mentions from a set of online sources (covering mainstream news outlets, social media and more)." [Lie & Audie, 2013].

While the term 'alternative' suggests a contradiction with the existing system of calculation and assessment, one of the most interesting topics is the relation of altmetrics with citations. Many researchers have focused on the investigation of relations between citations (traditional) and other web-based metrics. In the study of Thelwall et al. [2013] it was found that "... six of the eleven altmetrics (tweets, Facebook wall posts, research highlights, blog mentions, mainstream media mentions and forum posts) associate with citation counts". The authors further elaborated that "... the coverage of all of the altmetrics, except possibly Twitter, is low (below 20% in all cases and possibly substantially below 20%) and so these altmetrics may only be useful to identify the occasional exceptional or above average article rather than as universal sources of evidence". A study by Bar-Ilan et al. [2012], which focused on the visibility of the Leiden STI Conference presenters and used data from Scopus, Mendeley and CiteULike, revealed medium type correlations between the number of Mendeley readers and Scopus citations. As in the case of citations, there exist differences between the various disciplines. In a recent study by Mohammadi and Thelwall [2014] it was found that the existing correlations between citation and readership figures are stronger in the cases of 'hard sciences' than of those of the humanities.

According to Priem et al. [2012] "... citations only reflect *formal acknowledgment* and thus they provide only a partial picture of the science system" (emphasis on the original). This 'formality' supersedes the concept of what the use of a citation might mean, and extends to the prominent use of traditional publication venues, such as journals. Despite their recent efforts in covering conference literature, the well-known databases hardly cover events that can be considered as primary means of expression for vivid scientific communities. Conferences are often hard to

index due to the differences in periodicity, the unavailability of a commonly agreed quality system, and the superabundance of events. Therefore altmetrics can be indeed one tool to address the challenges posed by the venue types.

Conferences as publication venues

Nowadays the model of scientific publishing seems to be in transition. A journal article does not consist the 'Ithaca' for the output of scientific research, but one of the numerous available options. Some researchers have a very positive opinion about the proceedings' role in the scholarly communication ecosystem and they envisage them as a journal paper's alternative [Goodrum et al., 2001], while others reject the opinion that they host incomplete or works in immature stages [Drott, 1995]. Their dynamic is based on the notion that "proceedings are a medium of more recent knowledge than are all types of literature in general" [Lisée et al., 2008], despite phenomena of quick obsolescence. Anderson and Haley [1984] attempted to identify the impact of proceedings in the citations of three major marketing journals during 1975-1982. The number of conference citations was steadily growing, but the overall percentage remained at the levels between 3 to 6%. Today the aforementioned type of scholarly communication seems to be consolidated to higher levels. In fact, approximately 9% of the published papers in the field of Information Science are proceeding papers and their citation impact is considered as high, not only because of their scientific importance, but also by the fact that the amount of references per paper has been increased in recent years [González-Albo & Bordons, 2011]. Journal publications delays make conferences contribution the ideal opportunity for Computer Science researchers to publish their work as they gain more citations, preferring to avoid republishing them as articles [Bar-Ilan, 2010]. This remark is in line with opinion that proceedings "represent the intended end product of research rather than a stepping stone to future journal publications" [Goodrum et al., 2001]. The proceedings citation impact is clearly a domain specific issue, as researchers' communities in different fields have different behavior [Zhang & Glänzel, 2012; Lisée et al., 2008].

Proceedings remain valuable means of expression of research communities, with strong characteristics of rapid information dissemination. Song, Heo and Kim [2014] employed the Markov Random Field based Topic Clustering technique for topic evolution in bioinformatics using as dataset related conferences from DBLP. Daud et al. [2009] applied Latent Dirichlet Allocation in order to highlight conference topics, temporal topic trends and conference correlations. Wuehrer and Smejkal [2012] analyzed proceeding from the Academy of International Business conferences for the year 2006-2011 in order to examine its topic research interests.

Mendeley's place in the altmetrics quiver

Mendeley is a reference management system that enables its users to participate in a collective development of a bibliographic database. It is also a social networking activity that involves numerous users around the world that share and contribute records. Despite being organic in its collection development, Mendeley is a quite comprehensive resource of bibliographic data, which currently hosts 420 billion records, while around 500,000 records are added every day. According to Gunn [2013], Mendeley performs periodical diagnostic tests that trace and identify duplicate records; then it processes them to create one canonical record. Based on this record one can calculate its readership data, which apart from the number of readers include (a) the countries of the readers, (b) their professional or academic status and (c) their discipline. Apparently these readership statistics are based on the assumption that there is a linkage of interest between a paper in a collection and the collection owner. This interest might be translated to the use, adoption or rejection of notions and positions in a paper, but certainly it is an indication of interest and potential usefulness of the paper. Moreover the interest is based on the profile information of the Mendeley users. Since not all members have complete profiles, these data might be impartial. Furthermore the shortlist of three entries in each of the Mendeley Readership categories limits its statistical representation.

Despite these limitations we chose Mendeley, because in comparison to other well-known and established databases, such as Web of Science or Scopus, it holds records from many conference events, some of which are covered way back in time. Therefore it stands as a promising option that can provide access to altmetrics data and help us avoid partial sampling. Mendeley's coverage, especially in cases of very specific venues, has proven to be very broad. Bar-Ilan [2012] states that "The coverage of Mendeley is extremely impressive, especially since the records are not created through systematic indexing as in the other databases, but by the users" and that in the case of JASIST "Mendeley covers 97.2% of the JASIST articles published between 2001 and 2011".

Research Setting

Our corpus comprises 224 papers from the JCDL and ECDL conferences covering the period from 2001 to 2011 and which have been identified by a well-established procedure as papers strongly related to the digital library evaluation domain [Alfiontzi et al. 2013]. Readership data were extracted from Mendeley and were examined to find in how many collections these papers belong to. Furthermore Google Scholar citations were retrieved for each paper (information valid as of January 15, 2014). We processed our data in Sci2,[1] a tool for network analysis, and

[1] URL: https://sci2.cns.iu.edu

Gephi,[2] a network visualization platform, in order to create maps of the distribution of readers around the globe, while IBM SPSS Statistics[3] was the main statistics processing tool.

For each conference we built a directed network between the different countries in order to explore the altmetrics-powered knowledge diffusion patterns in the domain of digital library evaluation. A network is defined as $G=(V, E)$, where V is the set of nodes and E the set of edges. The nodes denote either the readers', or the paper's country. The country of a paper is the country of the majority of the authors; if the countries of the authors of a paper are uniformly distributed, then the country of the paper is the country of the first author. An edge (v_{ai}, v_{bi}) denotes the inclusion of a paper b in the collection of a Mendeley reader a. Hence v_{ai} denotes the reader's country, while v_{bi} denotes the paper's country.

Results

Figures 1 and 2 provide a geospatial network that reflects the geographical distribution of Mendeley readers.[4] Each node has two properties: (i) the size of the node denotes the number of readers of the papers in each country (reader's country) (ii) the color density depicts the contributions of each country in the corpus (papers' countries; more papers from a country results to more intense coloring). An edge in the network denotes that in the collections of the readers of a country there exist papers produced by other countries. The thickness of the edge denotes the number of readers from one country that read papers produced by other countries, while the color denotes its direction as it is colored by the target node.

Figure 1 presents a proportional symbol map of the JCDL papers. The corresponding network consists of 47 nodes and 133 edges, with an average weighted degree -the average weight of the edges per node- of 6.213 and a network density degree -the ratio of existing edges to the number of potential edges of the graph- of 0.062. USA, UK and Germany are the countries with the most popular papers of our corpus among Mendeley readers, followed by Singapore and New Zealand. USA and UK are also the ones with the most contributions in our corpus, with US being -expectedly- the most dominant one. The contributions in terms of papers are followed by Canada and New Zealand.

In terms of 'consuming' countries, Greece and Poland are the ones that have more readers of US papers, while Greece has many readers with papers of UK origin. It is also noteworthy that UK readership of German papers is strong. Germany, Greece, USA and UK present self-loop cases, with Germany being the stronger case and UK the weaker one. The aforementioned countries are the most active ones in consuming papers from the producing ones.

Figure 2 presents the ECDL network which is structured by 47 nodes and 109 edges and has an average weighted degree of 5.046 and network density equal to 0.05. Papers from the US and UK have high readership rates, followed by Netherlands, New Zealand and Germany. From the contributing countries, US, UK and Germany are the ones with the highest rates. Other countries that contribute to the digital library evaluation research in ECDL are Singapore, Greece and Netherlands.

Similarly to the case of JCDL, Greek and Polish readers have many US and UK papers in their collections. This time the direction between Germany and UK is inverse, with German readers having several UK papers in their collections. In the case of ECDL it is worth mentioning that there are no self-looping nodes.

Table 1. Top 5 disciplines

ECDL		JCDL	
Computer Science	124	98	Computer Science
Social Sciences	27	29	Social Sciences
Humanities	12	16	Education
Engineering	11	10	Psychology
Education	10	8	Design

Table 1 presents the first five disciplines of the Mendeley readers. The high rates of Computer Science seem reasonable, since both conferences have a strong connection with this scientific area. These rates are followed by Social Sciences for both conferences and Humanities and Education for ECDL and JCDL respectively. This fact possibly occurs due to the lack of an Information Science entry in the Mendeley categorization schema and as a result many readers have selected Social Sciences as their representative discipline. Education and Humanities are also strongly connected topics to digital libraries as fields of application of these technologies.

[2] URL: http://gephi.org

[3] http://www-01.ibm.com/software/analytics/spss/products/statistics/

[4] Higher resolution images and corpus papers are available at http://gtsak.info/blog/gallery/lida-addendum/.

Figure 1: A global view of the JCDL readership network

Table 2 lists the ranking of the first five professional statuses of the Mendeley readers. PhD students and Practitioners (aggregating also the Librarian class) are in the first two positions. It is interesting to note that Mendeley does not attract too many Faculty members as well as Students, since their rates are low.

Figure 2: A global view of the ECDL readership network

Table 2. Top 5 statuses

ECDL		JCDL	
Practitioner	97	74	PhD Student
PhD Student	84	66	Practitioner
Researcher	53	64	MSc Student
MSc Student	48	27	Faculty
Faculty	26	25	Researcher

Figure 3 shows the relation of Google Scholar citations and Mendeley's readers from both conferences. Papers from both conferences are scattered based on these two metrics and the size of their points denotes the 'age' of publication, where small sized points depicting older papers. The pattern of the relation of the two metrics, even in this small scale, is similar to other studies [Gunn, 2013]. Statistical analysis confirms that there is a significant type positive correlation between the number of GS citations and the number of Mendeley readers. Spearman ρ was found to be 0.620 (p>.001, 2-tail) for both conferences and the corresponding coefficient was 0.629 for JCDL and 0.493 for ECDL (both p>.001, 2-tail).

Discussion

A tale of two conferences

Our research shows the spatial dissemination of the digital library evaluation knowledge. We used a small sample of papers, which is carefully selected, and as such it cannot claim representation of general patterns. The fact that we exploit a well defined corpus by two community events, which can be considered as prime means of communication, is also a critical parameter for its strong disciplinary character. These two differentiate our study over other similar studies like Thelwall and Maflahi's [in press], who compared the proportion of readership rates within the countries of origin. Despite having other methodological differences, i.e. in sample selection and adopted approach (statistical versus network analysis), the findings are somehow convergent, especially in the relevant category of Information and Library Science. Thelwall and Maflahi's findings demonstrate strong readership linkages between UK to US, Canada to US and UK to Germany. Their study suggests that in-country readership is quite strong in Mendeley, something that in our study applies only the case of the self looping phenomena of US, UK, Greece and Germany in JCDL.

From another view, our results reflect the impact of research in digital library evaluation. Through network analysis measures, we conclude that US, UK and the Netherlands have - in both conferences - strong research teams that their works attract the interest of the community. Regarding ECDL the above mentioned countries are closely followed by Germany, New Zealand and Singapore, which have also many readers, while as far as JCDL concerns these three countries are joined by Italy. The Eigenfactor Centrality, a measure to identify how strongly connected are some countries to other strongly connected ones, shows that in JCDL US, New Zealand and UK are the best linked ones, while in ECDL the list includes also Italy

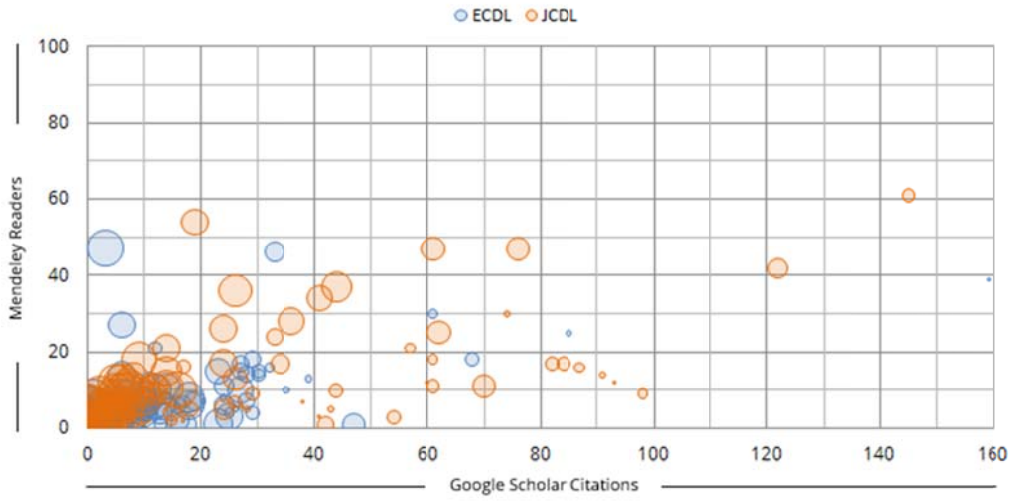

Figure 3: Scatterplot of Mendeley Readership statistics and GS citations

and Germany.

Our sample is governed by US papers in its JCDL fraction, followed by the UK and Canada. Despite being in another continent, the US papers are also ahead in ECDL, closely followed by papers from the UK and Germany. On the other hand there are countries, such as Greece and Poland that consume this research body with smaller contributions to it. Germany however is a country that has close rates between readers and papers and is consuming almost balanced papers as it is producing.

Given these similarities in the spreading patterns, we questioned if other similarities existed, this time inside the corpus itself. To investigate this, we produced two word-occurrence networks based on the abstracts of the papers from each conference. The two graphs of the networks were limited to the top-75 nodes to increase readability and are deployed according to the Fruchterman-Reingold layout (Figures 4 and 5). The graphs were cleared from commonly used words, such as 'paper', 'propos-', 'evalu-' and so on, that added noise. In both graphs, the size of the nodes denotes the reference rate, while the thickness of the edges reflects the weight of the co-occurrence of the two terms.

The two graphs show that the researchers use similar concepts in their papers. In both conferences, concepts that showcase retrieval aspects of digital libraries evaluation, such as 'user' and 'inform-', 'search' are high in the ranking, while other commonly used concepts are 'collect-', 'perform-' and 'support-'. JCDL researchers seem to use several research planning terms in their abstracts, such as 'design', 'task', 'method' and 'develop-'. In JCDL one can find strong connections between the concept of 'user' and 'search-', 'inform-' and 'interfac-', followed by linkages between the term 'inform-' and the terms 'search' and 'focus'. ECDL researchers on the other hand show a preference to more system-centered terms, such as 'document-', 'retriev-', 'differ-' and 'data'. They link together the term 'user' with 'inform-', 'support-' , 'document-' and 'search-', while there are also strongly links between 'inform-' and 'search-' and 'document-'.

Readership as a proxy of quality

Mendeley Readership statistics can be proven a useful tool in the research assessment field. As an indicator that resembles to bookmarking, its position in the iSpace visualization by Cronin [2014] is nearly at the cross section of its two dimensions, namely the Institutionalized — Feral and the Scholarly | Social; this means that these indicators can represent almost balanced all aspects of that space. This position can be further refined by calculating its surface properties using the dimensions of these statistics. Of course more evolved statistics are needed that will overcome the existing barriers, such as the limitation of 'top three' entries in each data category.

In pursue of an indicator that will take into account both sources of metrics and to illustrate further the role of readership data we define an impact indicator (i) for a conference paper, considering the readership (r) and citation (c) figures of the paper, a quality weighting factor denoting the acceptance rate of the corresponding conference (a) in the year published, and the 'age' of the paper, i.e. number of years (y) passed.

The quality rate of the citations (q_c) of a paper is defined by the division $q_c = \frac{y}{(1-a)\times c}$, while the quality rate of the readership (q_r) of the paper is defined by the division

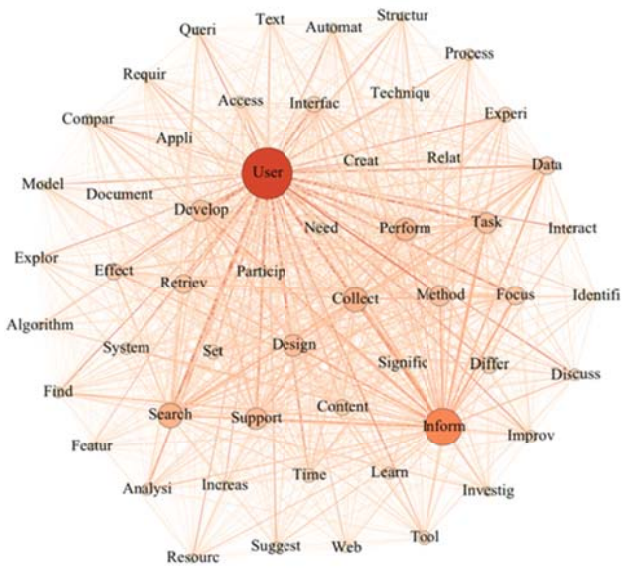

Figure 4: Word co-occurrence network for JCDL (top-75 nodes, edited)

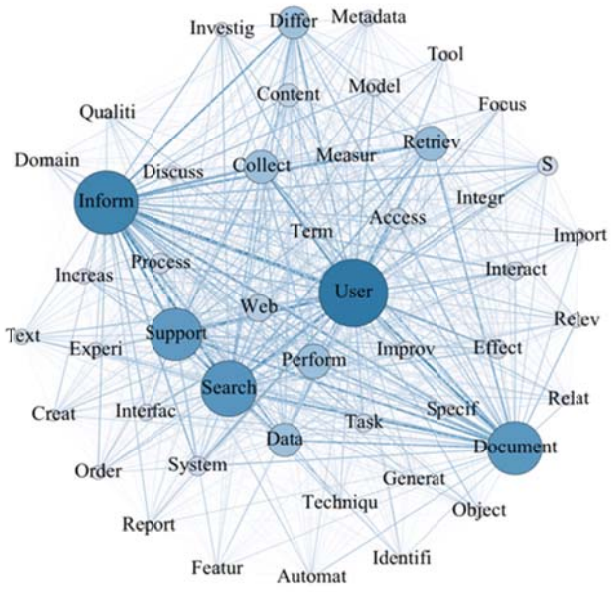

Figure 5: Word co-occurrence network for ECDL (top-75 nodes, edited)

$q_r = \frac{y}{(1-a) \times \mathrm{r}}$. We define the impact ($i$) of a paper as the harmonic mean of the two quality rates:

$$i = 2 \times \frac{q_r \times q_c}{(q_r + q_c)}$$

Table 3 presents the data for the two papers and the resulting indicator. The data are all quantifiable and machine traceable to be included in a potentially automated calculation process, which can be further aggregated for the entire conference. In a potential exercise one could also use, as an additional normalization factor, a numerical quality indicator for the conference. However the lack of a transparent and commonly agreed ranking system diminishes such opportunity.

Table 3. An example of an altmetrics powered impact indicator for conference papers.

	Conf.	Cites	Reads	Year	Acpt. Rate	Indic.
a	ECDL	61	30	2003	29%	0.34
b	JCDL	61	47	2007	36%	0.18

Conclusions

Altmetrics is a promising area of research that is subject not only to its own aspects of development, but also to the dependencies to other existing systems. Our study showed that when combined with traditional metrics, such as citations, they can complement the view we have on the impact of a scientific work. Indeed Costas et al. [2014] mention that "they could actually represent an interesting relevant complement to citations, particularly in order to inform other types of impact (e.g. societal or cultural impact) and especially in those fields where they have a higher presence, mostly the humanities and social sciences." The correlation between citations and readers was found to be important, either in aggregating, or in individual mode, showing that the Mendeley readership score can be a predictor of use of scholar works.

This study explored the use of altmetrics indicators -in our case of Mendeley Readership data- as a tool to understand the dynamics of knowledge diffusion in the domain of digital library evaluation. We managed to portray where and to whom the knowledge of the digital library evaluation field is spread and we reaffirmed the evidence found in other studies that altmetrics scores are somehow correlated to traditional metrics, such as citations. Despite being limited by its size and nature, the methodology we applied can be implemented in larger corpora of papers and it can extend from the lower level, that of a paper, to higher level in order to study the impact of conferences in the scholar community.

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Altmetrics for large, multidisciplinary research groups: a case study of the Leibniz Association

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Abstract

This explorative case study uses ImpactStory and Webometric Analyst to download altmetric indicators for publications of institutes of the multidisciplinary Leibniz Association. The analysis shows that Mendeley is most heavily used across disciplines, that further social media is preferred by different disciplines, and that altmetrics can complement traditional measures of research impact (e.g., citation counts) where data is sparse. Lessons learned of altmetrics studies which may assist others when faced with similar questions regarding usefulness of altmetrics for research evaluation are also presented.

Keywords: altmetrics, research evaluation, social media, scholarly communication.

Introduction

Since it has been estimated that 114 million English-language scholarly documents are available on the Web Khabsa & Giles, 2014) we know that to a great extent scholarly communication happens online.

Thus, libraries, research institutes, and universities have been increasingly confronted with discussions on how to properly review this situation and whether it makes sense to establish Web-based, alternative metrics for research evaluation. So-called “altmetrics” (Priem, Taraborelli, Groth, & Neylon, 2010) aim at considering all products developed during the research process (e.g., data sets) and for the communication of research (e.g., blogs) for the evaluation of research excellence. They have also been discussed as approach to measure impact of research on the society (Bornmann & Lutz, 2014). Complementing the

traditional approach of judging a journal article by its number of citations altmetrics want to draw a more holistic picture of research and a researcher's output. Usually altmetrics are strongly linked to social media platforms which allow for user engagement on the Web. Since many venues are at hand to either publish (e.g., blogs or Twitter) or measure influence of research products (e.g., when cited
in Wikipedia) there is a plethora of metrics which forms the altmetrics tool box (e.g., mentions or followers on Twitter, bookmarks on CiteULike, etc.) that can be used to describe the impact a researcher or a publication has or - in other words - how popular he/she/it is on the (social) Web. They also provide information additional to traditional bibliometric indicators. As such, altmetrics are always platform-dependent and vary in depth (i.e. value of a blog article vs. a tweet) and breadth (i.e. number of users registered with a platform or number of resources on the platform, e.g., bookmarks). Since altmetrics have included extremely new modes and tools of scholarly communication evidence for appropriateness still needs to be provided and then evaluated against the requirements of decision makers as well as disciplines although usefulness of altmetrics has been confirmed by survey participants (Bar-Ilan et al., 2012). For example, studies on research impact on social bookmarking systems (Haustein & Siebenlist, 2011), on Mendeley (Mohammadi & Thelwall, 2013), and Twitter (Haustein et al., 2013; Holmberg & Thelwall, 2013) showed that there are strong disciplinary differences between the extent to which publications can be found on social media platforms and the impact they have on the users. Hence, when using altmetrics for evaluation purposes those effects have to be considered. These disciplinary differences (e.g., in terms of publication and citation behavior) also have to be regarded in traditional bibliometric studies. Especially the comparison of disciplines or institutes of different fields is problematic and researchers and decision makers are strongly discouraged from performing such studies (if not applying discipline -normalization methods; Kaur, Radicchi, & Menczer, 2013; van Raan, 2006; van Raan, 2003).

Although we argued, that bibliometric comparisons across disciplines are questionable, we apply current altmetrics research methods and tools to a large group of multidisciplinary research institutes, i.e. the Leibniz Association. We want to stress that present study is not aimed at discipline- or institute-based comparisons of research impact as reflected by altmetrics but rather at evaluating methods and tools for such analyses. Since results of present study are of limited generalizability, due to the nature of an explorative case study, it is also our aim to share our experience with conducting studies of this sort, to point to problems we encountered and solutions we found. We also want to show how large amalgamations of multidisciplinary research groups can use altmetrics for research evaluation in particular and social media platforms for information dissemination and enhancement of visibility of research products (e.g., publications, data sets, blog articles) in general.

The Leibniz Association

The Leibniz Association encompasses 89 non-university research institutes that carry out applied as well as knowledge-driven research on societal, ecological, and economic issues. Some institutes also function as scientific infrastructure providers and developers of research-based services. Each institute falls into a particular section that describes the area of research and expertise: A) humanities and educational research, B) economics, social sciences, spatial research, C) life sciences, D) mathematics, natural sciences, engineering, and E) environmental sciences. Exchange within and between sections as well as with other bodies of academia, business, politics, and public shall guarantee excellent research. The Leibniz Association is also home of the Leibniz Research Alliance Science 2.0[1] which is a multidisciplinary amalgamation of Leibniz institutes and universities. Its aim is to combine forces in researching the (social) Web -driven changes of research workflows and products (e.g., open access and open data). Newly emerging technologies, scholarly work habits, and user studies are of particular interest to the research alliance. The present study can be situated in the context of that Science 2.0 research alliance.

The Leibniz Association, however, applies comprehensive guidelines for the periodic evaluation of its member institutes. Those

[1] http://www.leibniz-science20.de.

guidelines are publicly available on the website[2]. Regarding the evaluation of the institutes' research output and their excellence the evaluation guidelines ask following basic questions (cited from footnote 3):

- What does an assessment of work performance indicators yield (in terms of number of publications [depending on the publication culture of the subject area, in particular in peer-reviewed journals, at peer-reviewed conferences, in monographs]; the number of commercial property rights and patents, the number of consulting contracts and expert reviews; amount of third party funds raised for research, consulting, services, etc.; income from commercial activity)?
- Is the quality of consulting or other services, exhibition or collection management, as well as the transfer of knowledge and technology good, and are they adequately supported by the institution's own research? Does the institution utilise all necessary, state-of-the-art methods and techniques?
- Are the institution's consulting or other services, exhibition or collection management, as well as the transfer of knowledge and technology relevant for its users and others concerned, and are the latter satisfied with its performance? Does it succeed in reaching its respective target groups? Does it maximise its reach in terms of potential users and other addressees?
- Is the institution's public outreach appropriate? Does the institution engage in public discourse to which it can contribute?

Given that, nowadays, especially point 3 and 4 are directly concerned with social media activities and altmetrics institutes of the Leibniz Association need to know which indicators they can use and where they can find them in order to properly answer the questions in the evaluation guidelines.

Therefore, we use the institutes and sections of the Leibniz Association as source of an explorative study to gain a more detailed view on disciplinary (across sections) and institute-specific (within sections) differences in provided altmetrics. We especially want to look at the outlets where publications and alternative impact metrics can be found on what scales. Hence, our study is guided by following research questions:

1) Where and to what extent are the publications of the institutes of the Leibniz Association covered on social media platforms?

2) What impact do publications of the members of the Leibniz Association have on users (i.e., altmetrics)?

Related Work

Research similar to our study has been carried out by Bar-Ilan et al. (2012), Haustein et al. (2013), and Haustein, Peters, Bar-Ilan, et al. (2014) who studied the coverage of and altmetrics to a set of publications of the bibliometrics community. 82% and 28% of publications had at least one reader on Mendeley and CiteULike respectively. On Mendeley every article had 9.5 bookmarks on average. Priem, Piwowar, and Hemminger (2012) showed that Mendeley covers 80% of a set of articles published by the Public Library of Science (PloS) whereas only 31% and 10% of those papers could be found on CiteULike and Delicious respectively. Mohammadi and Thelwall (2013) searched in Mendeley for all English research articles in social sciences and humanities from 2008 indexed by the Web of Science. They found that 44% of articles from the social sciences and 13% from the humanities had at least one Mendeley reader. Psychology was the most prominent discipline in the social sciences (54%) and linguistics in the humanities (34%). When searched for all 2008 articles indexed by the Web of Science (Mohammadi, Thelwall, Haustein, & Larivière, in press) publications from clinical medicine had the highest coverage on Mendeley (62.1%) and physics the smallest (29.7%). Twitter is assumed to be of great value in scholarly communication, particularly regarding information dissemination (Mahrt, Weller, & Peters, 2014). For a set of 1.4 million articles published in PubMed Haustein, Peters, Sugimoto, Thelwall, & Larivière (2014) found a coverage of 9.4% on Twitter with an average of 2.5 tweets per paper. The same set of biomedical articles resulted in a 66.2% coverage on Mendeley with an average of 9.7 readers per paper (Haustein, Larvière, Thelwall, Amyot, & Peters, in press). Although coverage rates in Mendeley are found to be substantial there is also an age bias towards more recent publications. According to Haustein et al. (2013) 88% of papers published since 2000 have at

[2] http://www.leibnizgemeinschaft.de/fileadmin/user_upload/downloads/Evaluierung /Attachment_3_-_Criteria_for_evaluating_institutions.pd

least one Mendeley bookmark whereas only 44% of papers published before 1990 have readers on Mendeley. This is in line with results of Zahedi, Costas, and Wouters (2014) as well as Costas, Zahedi, and Wouters (2014).

Since it is not only interesting to know where and to what extent scientific publications can be found on social media platforms, altmetrics can also be compared against traditional measures of impact assessment, e.g., citation counts. Zahedi, Costas, and Wouters (2014) and Costas, Zahedi, and Wouters (2014) presented that the presence of altmetrics for publications has a positive effect on the presence and number of citations in general. Also, tweets are shown to predict future citations (Eysenbach, 2011). Mohammadi and Thelwall (2014) found that there are moderate correlations between Mendeley reader counts and citations for publications from the social sciences (r=.52) and from the humanities (r=.43). The highest correlations could be detected for Business and Economics (social sciences, r=.57) and linguistics (humanities, r=.45). These results are in line with those of Mohammadi et al. (in press) who also found weak to moderate correlations for physics (r=.31), engineering and technology (r=.33), chemistry (r=.37), and clinical medicine (r=.46). Moderate correlations (r=.45) were also detected by Haustein et al. (2013) for readers of bibliometrics publications and Scopus citations. For PubMed articles of the field of biomedicine altmetrics are strongly associated with citation counts (Thelwall, Haustein, Larvière, & Sugimoto, 2013). Here, correlations between Mendeley readers and Web of Science citations are moderate (r=.47; Haustein et al., in press) whereas they are very low for Web of Science citations and tweets (r=.11; Haustein, Larivière, et al., 2014). Positive correlations between Mendeley reader counts and citations have also been detected for genomics and genetics (Li & Thelwall, 2012). However, correlations between readers and citations that do not focus on a particular discipline are shown to be weak (Gunn, 2013).

Wikipedia has been expected to be a fruitful source for altmetrics since it is widely used for reference and allows for citing scholarly articles. Research in this area, however, is sparse. In terms of coverage Shuai, Jiang, Liu, and Bollen (2013) found only few Computer Science papers from the ACM Digital Library on Wikipedia. Nielsen (2007) could show that Wikipedia articles often link to multidisciplinary journals like Nature or Science and that the number of links correlates positively with the citation counts for theses journals obtained from Thomson's Journal Citation Reports.

Waltman and Costas (2014) studied the relationship between f1000 recommendations and Web of Science citations. They found that every article in f1000 receives 1.3 recommendations on average although 81.1% of articles have been recommended only once. More than 80% of articles get a recommendation two to four months after their publication. The most recommendations can be found for publications in biological and medical fields (e.g., developmental biology and anesthesiology). Pearson correlation between Web of Science citations and number of recommendations showed a weak but positive relationship between both indicators (r=0.26).

Shema, Bar-Ilan, and Thelwall (2014) asked whether articles mentioned in blog posts would receive more Web of Science citations. They found that most of the articles found in blogs come from the biological and medical disciplines with PloS ONE, PNAS, Science and Nature being the most popular journals cited in blogs. The authors also found that articles being cited in blogs accumulate more citations over time than articles not being mentioned in blogs.

Overall, Mendeley is found (Zahedi et al., 2014) to be the social media platform where the majority (up to 82%; Bar-Ilan et al., 2012) of scholarly publications is indexed. Twitter comes next, since coverage rates range between 9% (Haustein, Peters, Sugimoto, et al., 2014) and 13% (Costas et al., 2014). Coverage rates on blogs, Facebook, Wikipedia, Google+ and other platforms range between small one-digit numbers (Costas et al., 2014). All social media platforms have in common that coverage of publications varies strongly across disciplines (e.g., between 22.8% for biomedical and health sciences and 5.4% for mathematics and computer science; Costas et al., 2014). Low or moderate correlations between altmetrics and citation numbers reveal that altmetrics do not reflect exactly the same impact as shown by citations but something different which is not covered by traditional citation-based indicators. Hence, more research is needed to understand the characteristics of altmetrics and their usefulness for research evaluation.

Methods

Two to three institutions of each section of the Leibniz Association were chosen as sources for our

case study.[3] The institutions were comparable in the number of employees and publications (see Table 1) and we aimed at having about 500 publications for each section as starting

Table 1: Overview on publication output and employees for each institute.

disciplines	institutes	# publications (2011-2012)	# employees*
humanities/ educational research	A1	340	347
	A2	59	146
economics/ social sciences/	B1	161	180
	B2	118	151
spatial research	B3	141	193
life sciences	C1	186	337
	C2	628	232
mathematics/ natural sciences/ engineering	D1	205	185
	D2	164	140
	D3	130	180
environmental sciences	E1	509	381
	E2	193	149

* according to institutes' websites (May 2014).

set for our analysis. The download of bibliographic information from institutions' websites was conducted in June 2013 and was restricted to publications in conferences and journals and to book chapters published in 2011 and 2012 (for institute A2 we only retrieved journal publications). We only considered those publication types since they are most often linked to DOIs which were crucial for processing altmetrics data with ImpactStory[4].

ImpactStory automatically compiles alternative impact statistics for publications or datasets based on their unique identifiers (e.g., DOI, PubMedID, MendeleyID). ImpactStory data was successively downloaded in 2014 on April 30, May 5, and May 10 in order to obtain comparable results for altmetrics to publications and avoid time advantages in accumulating impact metrics. Webometric Analyst[5] (Thelwall, 2009) was used for the retrieval of missing DOIs. Only publications where DOIs could have either been found manually or by using Webometric Analyst were used for the analysis. It has also been checked whether Webometric Analyst's results were correct. In sum we found 1.762 correct DOIs (62.2%) for 2.834 papers of 12 institutions. For 1.739 out of the searched 1.762 (98.6%) publications at least one metric was found by ImpactStory. Hence, the results of our study are based on the 1.739 publications since publications with a zero score in one of the altmetric indicators have been discarded from analyses.

Webometric Analyst and ImpactStory

Webometric Analyst is software that can be used for webometric analyses of website collections, e.g., link structures or term analyses. It also assists in downloading data from social web -platforms like YouTube, Mendeley, or Twitter. Moreover, it uses bibliographic information (i.e. author name, title of publication, journal name, publication year, journal volume, and issue) to search for DOIs via removal CrossRef[6]. In advance extensive cleaning (i.e. of special characters) of input data is needed for DOI search.

ImpactStory is an open source web tool aiming at providing personal research impact profiles and returning a variety of indicators reflecting the attention a publication, website (e.g., a blog post), data set, presentation, or software receives on various social media and publication platforms. Altmetrics data compiled by ImpactStory in .json- or .csv-format can be downloaded for free according to the regulations of the metrics providers. For example, citation data provided by Elsevier's bibliographic database Scopus can be viewed on the ImpactStory-website but not downloaded. Also, ImpactStory will not release metrics where their value is zero. Metrics which are provided by ImpactStory include Wikipedia mentions, Mendeley readers and their career stage, country, and discipline, mentions in Twitter, blogs, Facebook, and Google+ (all provided by the company altmetrics.com[7] that sells article level metrics), HTML and PDF views (provided by

[3] We decided to not publish the institutes' names analyzed in the study since we mostly aimed at testing available altmetrics tools and concepts for multidisciplinary research groups and not at drawing general conclusions on the findings of the altmetric analyses.

[4] http://impactstory.org.

[5] http://lexiurl.wlv.ac.uk.

[6] http://www.crossref.org.

[7] http://www.altmetric.com.

PLOS Article Level Metrics only for PLOS publications[8]), and citations (provided by PubMed Central[9]which is focused on journals of biomedicine and life sciences). Given that some metrics are based on particular publishers or disciplines we are confronted with a serious limitation of ImpactStory which just cannot cater particular metrics to most of the publications entered. We also have to bear that in mind for the analyses presented in the results section.

ImpactStory differentiates between the audiences that are responsible for the impact metrics. There is scholarly impact when the platform where the indicator is derived from is considered scholarly (e.g., Scopus, Mendeley) or public impact when the platform is considered to be of wider interest to the public (e.g., Wikipedia, Twitter). The type of platform also determines how the impact is labelled: discussed (e.g., Twitter), saved (e.g., Mendeley), viewed (e.g., PLOS Pdf views), recommended (e.g., f1000), and cited (e.g., Scopus, PubMed Central citations). To help users determine what the raw number of views or citations actually means in comparison to other publications ImpactStory also puts compiled metrics into context: for example, when considering a scholarly platform ImpactStory gives information on in which percentile (Leydesdorff & Bornmann, 2011) relative to all publications indexed in the Web of Science that year the questioned publication can be found. Hence, users might learn that the particular publication has more citations than 93% of all other publications of that year. It also tracks changes in metrics over weeks, displays gains, and sends emails informing about those changes to profile owners.

Although ImpactStory is a convenient tool for gathering altmetrics data to various types of publications it has limitations which affect reproducibility of studies relying on it. First, there is the indispensable need for DOIs or other unique identifiers when working with it. A search with bibliographic information (e.g., author names or publication years) is not possible. Since publications can have more than one identifier and collecting all of them is laborious the completeness of altmetrics provided for one publication is questionable[10]. Likewise, entered identifiers do not always return all information that is needed to download raw numbers from the metrics providers so that entire metrics can be missing in ImpactStory although they are actually available for the publication. Moreover, metrics providers (e.g., Mendeley) can change access rules that affect data download with ImpactStory. Not to forget that data on platforms can be noisy (e.g., spelling errors in DOIs) or store multiple records for one publication so that erroneous impact metrics could be supplied in the first place. Similar to ImpactStory Webometric Analyst only compiles raw numbers for searched publications and suffers from the same problems of changing data access points or noise.

Results

Our first research question is concerned with the coverage of publications of the Leibniz institutes on the different platforms. How many of the publications with DOIs can be found on which platform? The highest coverage of articles is provided by Mendeley: 22.2% of publications of institute A2 and up to 96.7% of publications of institute C1 are saved here (see Table 2) . Overall, the most publications found on Mendeley come from the life sciences, then mathematics, natural sciences, engineering and economics, social sciences, and spatial research. These results correspond to the findings of Mohammadi et al. (in press) and Haustein et al. (in press). Publications from those disciplines are also well-covered on Twitter, with the life sciences and the institute C1 being the most prominent producers of content found on Twitter.

As mentioned earlier we can see institute - or discipline-specific advantages for citations and html- and pdf-views (especially for life sciences) since all of them only depend on either PloS- or PubMed Central-articles. ImpactStory also retrieves f1000 recommendations for publications. As already shown by Waltman and Costas (2014) f1000 is especially popular in biology and medicine which could be confirmed by our results although coverage is low. There are further neglectable rates of coverage on blogs, Facebook and Google+ for all institutes and disciplines.

[8] http://article-level-metrics.plos.org.
[9] http://www.ncbi.nlm.nih.gov/pmc
[10] https://impactstory.org/faq.

Table 2: Coverage of publications of each institute on various social media platforms in percent (%).

institutes	n (absolute)	blog	Facebook	Google+	tweets	Mendeley	f1000	html views	pdf views	citations
A1	110	0.91	0.91	0.91	9.09	69.09	0.00	1.82	1.82	17.27
A2	18	0.00	0.00	0.00	0.00	22.22	0.00	0.00	0.00	0.00
B1	150	0.00	0.00	0.00	12.67	87.33	0.00	0.67	0.67	5.33
B2	113	0.88	0.88	0.00	5.31	80.53	0.00	0.88	0.88	0.88
B3	124	0.00	0.81	0.81	12.90	70.16	0.00	0.00	0.00	0.81
C1	182	2.20	2.20	2.75	24.73	96.70	6.59	8.79	8.79	81.32
C2	272	1.10	0.37	0.37	12.50	81.99	0.74	4.78	4.78	38.60
D1	170	0.59	0.00	0.00	6.47	77.65	1.18	0.59	0.59	12.35
D2	129	0.78	0.78	0.78	10.08	73.64	0.00	0.78	0.78	3.88
D3	130	0.77	0.00	0.77	16.92	93.08	2.31	2.31	2.31	40.00
E1	206	0.49	0.00	0.00	6.31	76.70	0.00	0.00	0.00	4.37
E2	135	0.74	1.48	0.00	12.59	80.74	0.74	4.44	4.44	8.89

Having seen to what extent publications of the Leibniz institutes can be found on which social media platforms we now want to investigate how much effect the publications have on the users of these platforms, e.g., in terms of readership or tweet numbers. Figure 1 shows that the 454 publications from the life sciences attracted in sum the most Mendeley readers (5,483 readers) as well as the most tweets (329 tweets). Hence, in that discipline every article is read 12 times on average and 3 out of 4 articles are tweeted at least once. Interestingly, the publications of the environmental sciences receive fundamentally more readers than tweets which might indicate that environmental scientists more likely use Mendeley than Twitter. For the other disciplines the share of readers and tweets is proportionally distributed. Figure 2 displays the number of

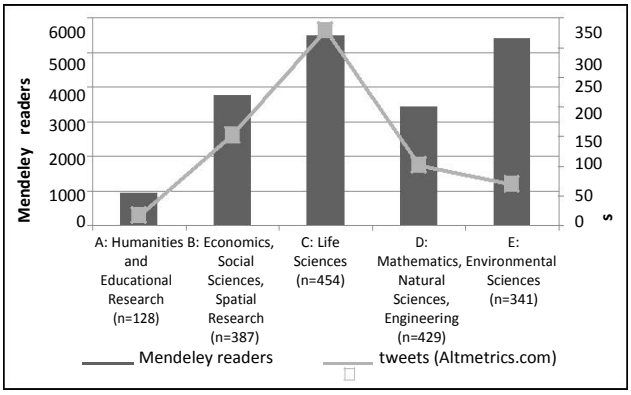

Figure 1: Sum of Mendeley readers and tweets for all publications of each discipline (absolute numbers for readers and tweets; n=number of publications in discipline).

blogs posts regarding the articles of the data set, their mentions on Facebook and Google+ as well as how often they have been recommended on f1000. Again, the life sciences outperform the other disciplines in terms of altmetric activity (although absolute numbers are very low in all disciplines and for all altmetrics). For example, only every 32nd article of the life sciences has received a recommendation. Publications from mathematics, natural sciences, and engineering, however, receive the most attention on Google+, whereas the humanities and educational research are almost not mentioned at all on blogs, Facebook, Google+, and f1000. Which disciplines are proportionally most prominent on which social media platform can be seen in Figure 3. Life science is dominant on each platform, except for Mendeley where shares of disciplines are almost equally distributed. Such overviews, as provided by Figure 3, visual well where scientists of different disciplines can find their readers. A direct comparison

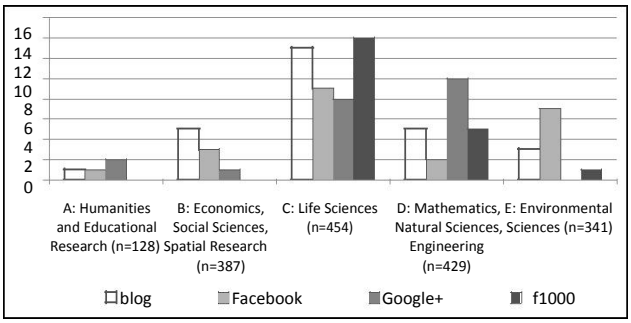

Figure 2: Sum of other altmetrics for all publications of each discipline (absolute numbers for altmetrics; n=number of publications in discipline).

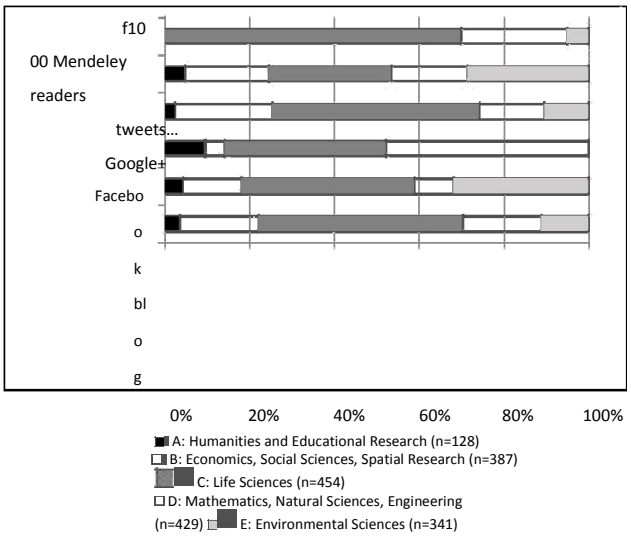

Figure 3: Share of discipline-specific activity per social media platform (relative numbers for discipline; n=number of publications in discipline).

of the altmetrics for two institutes of the same discipline is shown in Figure 4. Both institutes come from the life sciences, the subject with substantial reader numbers on Mendeley and citation counts on PubMed Central. Institute C1 has 182 articles with DOIs of which 176 have at least one reader and 148 have been cited at least once. The total number of readers is 3,324 and the total number of citations is 891. On average each article has been read and cited 18.9 and 6 times respectively. The second institute C2 has 272 articles with DOIs of which 223 and 105 have been read and cited at least once respectively. Reader numbers sum up to 2,159 (9.68 readers on average) and citations to 303 (1.36 citations on average) . Figure 4 displays that readership numbers and citations not necessarily correlate (as has also been found in former studies[11]). Articles that are often cited might attract only few readers whereas articles which only have low scientific impact might be popular on Mendeley (e.g., institute C1). We can also see that far more articles may get attention from readers as they would otherwise receive by scholars (e.g., institute C2). In this case altmetrics could really be considered "alternative metrics" since they provide information on the impact of articles where citations have failed.

Discussion and Future Work

[11] We consciously waived the calculation of correlations between altmetrics and other indicators since our sample only provided small n which would not result in substantial values.

Since traditional bibliometric indicators have been criticized because of neglecting most products developed in the research process (e.g., data sets or blog posts; DORA, 2014) as well as only measuring impact of publications on other authors, altmetrics aim at complementing the traditional toolbox of bibliometric analyses. It wants to shed light on how research is used and perceived on the web, especially on various social media platforms (Priem et al., 2010). Our case study on multidisciplinary research institutes of the Leibniz Association followed that vein and yielded at exploring where and to what extent altmetrics could be found and which conclusions might be drawn from findings. These aspects are of high relevance for the Leibniz institutes since regular evaluation processes ask for critical reflection of the institutes' work and output.

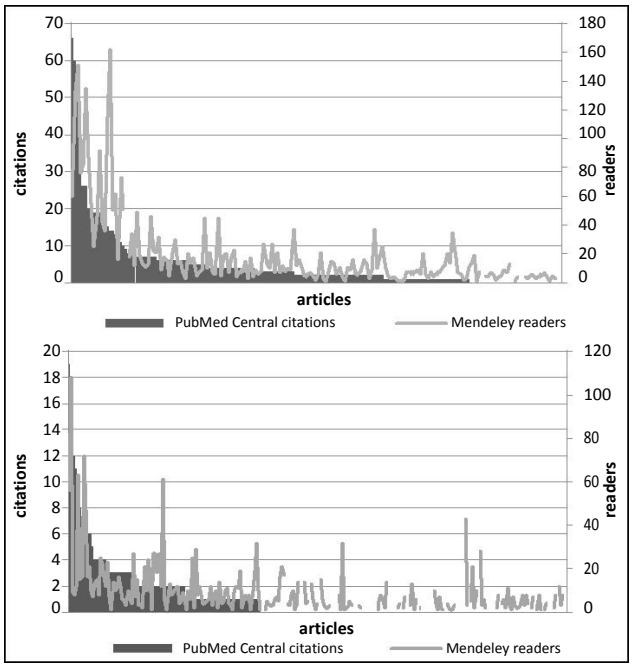

Figure 4: Comparison of Mendeley reader counts and PubMed Central citation numbers for institutes C1 (top) and C2 (bottom) (absolute numbers).

The study showed that across disciplines Mendeley is the social media platform that attracts an extraordinary high number of users. Those users are also responsible for the good coverage of publications in certain fields which makes Mendeley almost as complete as other bibliographic databases (e.g., Web of Science or Scopus; Haustein et al., 2013). In our data set life sciences is the most popular discipline since it is well covered and also produces a lot of activity around publications (e.g., number of tweets or users). We assume that it is because the discipline (includes

medicine and fields related to biology) is of general interest to a wider public. Also, the share of life science-related scholarly documents on the web is also the largest (Khabsa & Giles, 2014) which greatly enhances the chance of posting those publications on sociale media platforms. The type of publications may also play a role as Gunn (2013, p. 34) points out: „The greater representation of the sciences in Mendeley is thought to be primarily a reflection of its PDF-centric workflow and the journal article-centric communication in sciences".

Further, the analysis revealed that there are discipline-specific preferences on the use of social media platforms (e.g., publications from mathematics, natural sciences, and engineering are well used on Google+). This also shows that the social media platforms are populated with users having different interests. This finding has practical implications for the institutes of the Leibniz Association: if using the "wrong" platforms for research evaluation the actual impact of research on the users is not correctly reflected and may result in misleading interpretations. Hence, institutes need to know on which platforms they can find a critical mass of users and where altmetric studies make sense (i.e., where coverage and activity around publications is substantial). Also, for some institutes altmetrics provide a real alternative for bibliometric evaluations since more publications can be found on social media platforms than in databases traditionally used for research evaluation (e.g., Scopus).

Since our analysis heavily relied on ImpactStory and Webometric Analysis for data collection our results might be an underestimation of the actual coverage and activity around publications found on social media platforms (e.g., since DOIs could be erroneous, many publications do not have DOIs, etc.). However, the small data set is a severe limitation of present study and the conclusions drawn are restricted to an arbitrary chosen set of institutes and publications. Although we cannot generalize results the study showed how altmetrics tools could be used for research evaluation and detection of platforms with large amount of users interested in certain disciplines.

Future work should extend the case study to all institutes of the Leibniz Association in order to provide them with guidelines on how to use altmetrics tools and interpret findings. Moreover, we want to cater some preliminary altmetrics which they can use in the evaluation process. In order to better understand altmetrics and the role of social media in the research ecology more qualitative information on the users of social media platforms is needed. For example, we might want to look at the demographics of Mendeley readers (Mohammadi et al., in press) or people who tweet scholarly publications. Comparisons with more traditional indicators of research impact, like citation counts as provided by Web of Science or Scopus, will help assessing the value of altmetrics.

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Are downloads and readership data a substitute for citations? The case of a scholarly journal

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Abstract

With the advent of e-journals more than one decade ago and the increasing use of social media also by academics in recent years, citations are not the only data anymore for measuring scholarly communication. Indeed, so-called altmetrics are a further source for metering science. In our previous research we have already explored commonalities of and differences between citations, downloads and so-called readership data from Mendeley for two information systems journals. This contribution presents a replication of the previous study for a linguistics journal investigating the following research questions:

- **Is there a strong correlation between citations, downloads and readership frequencies? Could downloads and readership counts be a substitute for citations, or do they measure complementary aspects of scholarly communication?**
- **Do citations and downloads have different obsolescence characteristics? Are there other aspects in which citations, downloads and readership data differ?**

The comparison of the results for the linguistic journal with those of the information systems journals enables us to identify also possible disciplinary differences. We used a scientometric approach when analyzing citations, downloads and readership data, which were provided at article level. The major results show that there is a clear but not a very high rank correlation between citations and downloads (r=0.59) which was lower between downloads and readership counts (r=0.53) and between citations and readership counts (r=0.51). Citations and downloads have different obsolescence characteristics. While the download maximum usually occurs for recent articles, it takes several years after publication until the citation maximum is reached. The correlations were slightly higher for the information systems journals. Interestingly, older articles were more often downloaded for them than for Journal of Phonetics.

Keywords: citations, downloads, Mendeley, altmetrics, linguistics, Journal of Phonetics.

Introduction

In the past decades, citations were the main source to measure the impact of science. However, one main constraint of citations is their slow availability. Usually, it takes several years until the citation maximum is reached. In principle, social media and article downloads would be a promising alternative. In our contribution, we want to explore whether this holds true for one linguistics journal. In particular, we will investigate the following research questions:

- Are the most cited articles also the most downloaded ones? And have these also been added most frequently to the user libraries of the collaborative reference management system Mendeley?
- In which aspects do citations, downloads and readership data differ?

Since the authors of this contribution have already performed a similar investigation with two information systems journals (Information and Management, Journal of Strategic Information Systems) (see Schlögl et al., 2013, 2014; Gorraiz et al., 2014), this analysis should also reveal whether there are possible disciplinary differences with regards to citations, downloads and readership counts. As an example for linguistics, we analyzed the Journal of Phonetics. This is a peer-reviewed international journal with a strong bias to Anglo-Saxon countries (75% of all authors) and in particular to the U.S. (approximately half of all authors). The journal appears four times a year and covers phonetic aspects of language and linguistic communication processes. Topics deal with, among others, speech production, speech perception, speech synthesis, automatic speech and speaker recognition, and speech and language acquisition (Elsevier, 2014).

The main reason for selecting this journal was that it is published by Elsevier from which we were provided with detailed download and citation data in the framework of the Elsevier Bibliometric Research Program (EBRP). Furthermore, the Journal of Phonetics is among the top (citation) impact journals in linguistics.

Data sources and methodology

Our data are from three different sources: Scopus, ScienceDirect and Mendeley. Since ScienceDirect and Scopus are well known in general, we describe only Mendeley in more detail in the following.

Mendeley is a social reference management system which helps users with the organization of their personal research libraries. The articles, provided by users around the world, are crowd-sourced into a single collection called the Mendeley research catalog. This makes it possible to calculate the readership frequencies of an article which indicates how many Mendeley users have added it to their personal research libraries. At the time of writing, this catalog contains more than 110 million unique articles, crowd-sourced from over 2.5 million users (Jack, 2014).

Citations and downloads were provided at document level by Elsevier. For all documents published between 2002 and 2011 all monthly downloads were made available from ScienceDirect and all monthly citations from Scopus. Furthermore, we collected the total number of occurrences of publications, which appeared between 2002 and 2011 in Journal of Phonetics, in Mendeley user libraries (= readership frequencies). Mendeley data were sourced directly from their database. To find corresponding articles in the Mendeley catalog, we matched article titles reported by Elsevier (only full length articles from Scopus were considered) to article titles in the Mendeley database. Since minor inconsistencies can be observed between article titles across the two databases, we employed a Levenshtein ratio of 1/15.83 during the matching process. We found good matching results of around 99.9% accuracy for this ratio with a larger sample of titles. Nevertheless, we manually verified borderline cases to reduce the likelihood of false positive matches. In the following, the citation and download frequencies relate to end of 2011 and the readership numbers to the period of their collection in October 2012.

Results

In this section we will present the major outcomes of the download, citation and readership analyses. Afterwards, we will compare the results of the three.

Download analysis

Table 1 shows how publications from Journal of Phonetics and downloads for them distribute among document types in ScienceDirect. As can be seen, the great majority of all downloads (92%) accumulates for full length articles (FLA) which have a proportion of 82% of all documents between 2002 and 2011. One interesting result is that, unlike for the information systems journals, in particular discussions and editorials receive more downloads per document than full length articles.

In ScienceDirect download numbers comprise both pdf downloads and HTML document views. In case of full length articles 63% were pdf downloads and 37% HTML views. The proportion of pdf downloads was slightly lower for the two information systems journals (60% and 61%).

The results of the obsolescence analyses are presented in Table 2 in the Appendix. The rows indicate how many times articles from a (print) publication year were downloaded in the following years (asynchronous analysis). The columns express how the articles downloaded in a certain download year distribute to different (print) publication years (synchronous analysis). Since the download numbers are sensitive data, we only specify relational numbers for privacy reasons.

When analyzing Table 2 in more detail, it can be observed that articles from 2002 were rarely downloaded in 2002. Furthermore, all of them were available online in ScienceDirect only a few months after print publication. However, from 2003 onwards, full length articles were already partly downloaded before they appeared in print (formatted in grey and italics).

Table 1. Distribution of document types (n=395) and downloads per document type[1] (publication year: 2002-2011, download years: <=2011)

Document type	n	% docs	% down-loads (DL)	DLs per doc - relations[1]
Announcement	2	0.5%	0.1%	1.8
Book review	1	0.3%	0.1%	1.7
Contents list	2	0.5%	0.1%	1.9
Discussion	9	2.3%	2.7%	**8.7**
Editorial Board	30	7.6%	1.1%	1.1
Editorial	5	1.3%	1.5%	**8.7**
Erratum	3	0.8%	0.5%	4.4
Full length article (FLA)	324	**82.0%**	**92.3%**	**8.2**
Index	1	0.3%	0.1%	1.8
Miscellaneous	9	2.3%	0.4%	1.3
Other contents	1	0.3%	0.1%	2.1
Personal report	2	0.5%	0.2%	3.4
Publishers note	3	0.8%	0.1%	1.0
Short communication	2	0.5%	0.3%	4.8
Short survey	1	0.3%	0.3%	**9.9**
	395	100%	100%	

[1] For privacy reasons, we did not specify the absolute download numbers.

The synchronous analysis reveals that, besides 2004, most downloads were made for articles which appeared in the download year, and second most downloads for one year old articles. Interestingly, we computed a lower download half-life for the downloads in 2011 for the linguistics journal (2.2 years) than for the two information systems journals (Journal of Strategic Information Systems: 3.5 years, Information and Management: 5 years).

The diachronous analysis exhibits that the article downloads do not decrease with their growing age as strongly as expected. There is even a re-increase for articles published from 2002 to 2005 a few years later. This was similar for the two information systems journals.

Citation analysis

A comparison of Table 1 and Table 3 clearly shows that ScienceDirect and Scopus do not only differ in the number of documents included for Journal of Phonetics between 2002 and 2011 (395 vs. 345) but also with regards to the document types which are more comprehensive in ScienceDirect. Another difference is that nearly one quarter of all documents were not cited in Scopus. These were mainly more recent publications and documents other than "articles" and "reviews". The latter two account for nearly all citations. Furthermore, an average review article received much more citations than a mean research article.

Table 3. Distribution of Scopus document types and citations per document type (2002-2011) (n=345)

Doc type	n	Uncited	% uncited	Cites	% cites	Cites per doc type
Article	316	74	23%	2331	84%	**7.4**
Review	17	0	0%	432	16%	**25.3**
Editorial	5	3	60%	6	0%	1.2
Letter	3	0	0%	15	1%	5.0
Notes	1	1	100%	0	0%	0.0
Erratum	3	3	0%	0	0%	0.0
	345	81	23%	2784	100%	8.1

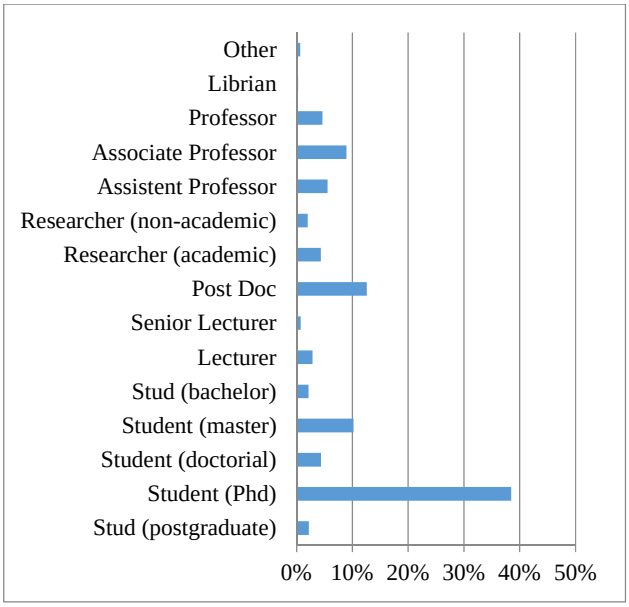
Citations have obsolescence characteristics (see Table 4 in the Appendix) that differ strongly from those of downloads. The citation maximum usually occurs for older articles (formatted in bold). The comparison of the half-lives for citations and downloads in 2011, the year with the largest observation period (10 years), reveals that the former is clearly higher (5.5 years) than the latter (2.2 years). Interestingly, it turned out that a few articles were cited before their print publication year (formatted in grey and italics in Table 4). In three cases, this could be attributed to self-citations by one author.

Mendeley readership analysis

The readership analysis in Mendeley exhibited that approximately three quarters of all full length articles from ScienceDirect were included in at least one user library in Mendeley. This is in contrast to Journal of Strategic Information Systems and Information and Management, where the inclusion rates of articles were 97% and 88% respectively. This confirms the observation by Kraker et al. (2012) that different disciplines have different coverage rates in Mendeley.

Figure 1 shows that articles in Journal of Phonitics are included in Mendeley user libraries of PhD students to a great extent. Altogether students make up a proportion of 57% among all users. This proportion was even higher for the two information systems journals (approximately two thirds). This demonstrates that social media are well accepted among students and also junior researchers (post-docs were the second strongest user group with 13%). The proportion of "reading" professors (full, associate and assistant) is considerably lower though it must also be considered that their population is much smaller than that of the students.

Figure 1: Structure of Mendeley users of Journal of Phonetics



Citations vs. downloads vs. Mendeley readers

As was mentioned before, citations and downloads differ strongly in their obsolescence characteristics. Articles usually receive only a few, if at all any, citations in the publication year. Afterwards, it takes several years until the citation maximum is reached. This is in contrast to downloads most of which are made for recent articles. However, also older articles are downloaded to "some degree". It may even happen that the downloads re-increase in later years which might be an indication that later downloads could be partly influenced by citations (Moed, 2005). Since Mendeley started in 2009 and since our readership data were from October 2012, we did not perform an obsolescence analysis for Mendeley. Also the huge increase in Mendeley users in recent years would have been a "challenge" for such an analysis.

As can be seen in Tables 5-7 which reveal the top-ranked publications with regard to citations, downloads and readership frequencies, the age of the articles has certainly some influence on their placement. First of all, it must be stated that more recent publications are discriminated due to the long analysis period. This is in particular true for citations because of their obsolescence characteristics. Accordingly, there is only one publication from 2005 in the top citation ranking, all others are older. In contrast, the download and readership rankings comprise four publiccations from 2006.

One commonality of cites, downloads and readership data could be that it is easier for review articles to attract more "attention". Though the proportion of review articles was only 0.5%, the top citation and download rankings comprise three review articles and the top readership ranking at least two.

Table 5. Top-11 cited documents (2002-2011)

Rank	Authors	Doc.type	Pub.year	Cites
1	***Rosen S.***	***Review***	***2003***	***118***
2	*Hawkins S.*	*Article*	*2003*	*72*
3	Yehia H., et al.	Article	2002	57
4	Xu Y. & Xu C.X.	Article	2005	55
5	Byrd D. & Saltzman E.	Review	2003	50
6	Atterer M. & Ladd D.	Article	2004	47
7	***Aoyama K., et al.***	***Article***	***2004***	***43***
8	Badin P., et al.	Article	2002	42
9	Ladd D. & Schepman A.	Article	2003	39
	Grossberg S.	*Article*	*2003*	*39*
	Clopper C. & Pisoni D.	Review	2004	39

Table 6. Top-10 downloaded documents (2002-2011)

Rank	Authors	Doc.type	Pub.year
1	***Rosen S.***	***Review***	***2003***
2	Flege J.E., et al.	Article	2006
3	***Aoyama K., et al.***	***Article***	***2004***
4	*Foulkes P. & Docherty G.*	*Article*	*2006*
5	Tsukada K., et al.	Review	2005
6	Clopper C.G. & Pisoni D.	Review	2004
7	Davidson L.	Article	2006
8	*Labov W.*	*Article*	*2006*
9	Halle P.A., Chang Y.-C. & Best C.T.	Article	2004
10	de Jong K.	Article	2004

A comparison of the three top rankings also reveals that the (article) overlap between them (formatted in italics if an article is included in another top ranking, and in italics and bold if an article is included in all rankings) is not very high. While half of the top ranked readership publications are covered either by the top citation or download ranking, this is only true for four publications from the top download ranking and for three publications from the top citation ranking. There are only two papers which appear in all three rankings: The review article by Rosen published in 2003 places first both with regard to citations and downloads, and fourth with regard to Mendeley readers. The article by Aoyama and colleagues from 2004 is ranked seventh in the citation ranking, sixth in the readership ranking and third in the download ranking.

Table 7. Top-10 read documents (2002-2011) in Mendeley

Rank	Authors	Doc.type	Pub.year	Readers
1	*Foulkes P & Docherty G.*	*Article*	*2006*	*59*
2	Johnson K.	Article	2006	57
3	*Grossberg S.*	*Article*	*2003*	*54*
4	***Rosen S.***	***Review***	***2003***	***54***
5	*Hawkins S.*	*Article*	*2003*	*52*
6	***Aoyama K., et al.***	***Article***	***2004***	***40***
7	Goldinger S. & Azuma T.	Article	2003	36
8	*Labov W.*	*Article*	*2006*	*35*
9	Hay J., Warren P. & Drager K.	Article	2006	34
10	de Cheveigne A.	Review	2003	32

The limited overlap between the top rankings is also confirmed through the rank correlation in which we only considered articles cited at least once (n=252). As was the case with the information systems journals, we computed the highest rank correlations (Spearman) between citations and downloads (0.59), followed by the correlation between downloads and readership counts (0.53) and the correlation between citations and readership frequencies (0.51). The corresponding values for the former two correlations were clearly higher for the information systems journals. For instance, for the Journal of Strategic Information Systems the rank correlation between citations and downloads was 0.77 and between downloads and readership counts 0.73.

Conclusions

First of all, our study has shown that the use of different data sources can be a certain challenge. This concerns the different use of document types in databases. However, since articles and review articles from Scopus corresponded to full length articles in ScienceDirect in nearly all cases, this was not a problematic issue. Since the matching with the Mendeley records was conducted on the basis of article titles which can differ from the original titles in social reference management systems, there is also some potential for errors here.

As is expressed in the title of our paper, our study aimed at investigating whether downloads and readership data could be a substitute for citations in the case of a linguistics journal. The main motivation behind was the shortcomings of citations, in particular their late availability. In this respect, downloads are a promising alternative since the download maxima usually occur for recent articles. (Since the sample of our readership data provided only a limited obsolescence perspective, we were not able to explore this aspect for them.) However, since the correlations between citations and downloads and between citations and readership counts were far from being perfect, we conclude that downloads and readership data complement citation data rather than substituting them. This was clearly revealed by the analysis of Mendeley users which showed that most articles of the linguistics journal were read by PhD students. In contrast, the user population of Scopus covers primarily publishing researchers. ScienceDirect might have the broadest user base, since articles are not only downloaded for research but also for teaching purposes. One example that the user structure has an influence on use can be found in the study by Nicholas and colleagues (2005), which found that undergraduates and postgraduates have other use patterns with regards to the age of the viewed items than professors, researchers and professionals/practitioners.

It follows that citations, downloads and readership metrics do not substitute each other. In fact they complement each other, since they represent different aspects of scholarly communication. As the comparison with the information systems journals suggests, there are also disciplinary differences with regard to downloads and readership patterns.

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Curriculum Vitae

Christian Schlögl is associate professor at the Institute of Information Science and Information Systems of the University of Graz. He studied Computer Science and Information Systems at the University of Linz and received a doctorate degree in the Social Sciences and Economics in 1996 and a post-doctorate degree (Habilitation) in 2001 from the University of Graz. In 1998 he established the diploma program on Information Studies at the University of Applied Sciences Burgenland. Since 2005 he is member of the scientific board of the interuniversity program on "Library and Information Studies" which is offered by the Universities of Graz, Innsbruck, Salzburg and Vienna. His main research interests include information and knowledge management, and scientometrics.

Juan Gorraiz studied physics at the University of Madrid and at the University of Vienna, where he obtained his Doctor's degree. He is Head of the Bibliometrics Department of the Library and Archive Services, University of Vienna. He is working on bibliometrics since 1992 and is furthermore teaching at the university program „Library and Information Studies". Furthermore he was organizer and program chair of the „10th International Conference on Science & Technical Indicators" 2008 in Vienna as well as organizer of the "14th International Society of Scientometrics and Informetrics Conference" 2013 in Vienna.

Christian Gumpenberger has a Doctor's degree in Veterinary Medicine from the University of Veterinary Medicine Vienna and a Master's degree in Library and Information Studies from the Danube University Krems. He has more than ten years of experience as an information specialist in academia as well as in industry. He is currently a member of the Bibliometrics Department of the Library and Archive Services, University of Vienna, coordinator of the Council of Austrian University Libraries, program chair of the "14th International Society of Scientometrics and Informetrics Conference" 2013 in Vienna and also in charge of the European Summer School for Scientometrics (esss) administration.

Kris Jack received a PhD in Applied Computing from the University of Dundee. Before he started at Mendeley, he was a research associate at the University of Manchester. At present he is Chief Data Scientist and responsible for research activities in Mendeley. Kris Jack gave many invited talks. Furthermore, he is involved in several international projects.

Peter Kraker is a research assistant at the Know-Center of the Technical University of Graz. He holds both a master degree and a doctorate degree in Business Administration from the University of Graz. His main research interests are visualizations based on scholarly communication on the web, open science and online privacy. He is a chairman of the Knowledge Management Forum in Graz and received several awards and grants so far. Among them are the nomination for the Best Student Paper Award of the International Symposium on Information Science and grants from Marie Curie Fellowship, Panton Fellowship and Marshal Plan Scholarship.

APPENDIX

Table 2. Yearwise relation[1] of downloads per print publication year (2002-2011), (doc type: full length article, download years: <=2011) (n=324)

Pub. year	n	Download year										
		2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**all**
2002	28	**0.2**	1.6	1.5	1.3	1.3	1.5	1.5	1.4	1.3	1.0	12.6
2003	29		2.2	**3.4**	2.4	2.2	2.1	3.1	2.8	2.5	1.9	22.4
2004	21		*0.3*	2.7	2.6	2.0	2.3	2.8	2.9	2.5	2.1	20.3
2005	20			*0.0*	**3.1**	2.5	1.9	2.0	2.2	1.7	1.4	14.9
2006	22				*0.6*	**4.4**	4.7	4.1	4.1	3.5	2.9	24.4
2007	29					*0.9*	**5.4**	5.1	4.2	3.1	2.7	21.3
2008	35						*0.2*	**6.6**	6.3	4.3	3.3	20.7
2009	32							*0.3*	**6.7**	5.3	3.0	15.3
2010	51							*0.0*	*0.7*	**7.8**	6.8	15.3
2011	57									*0.3*	**10.4**	10.7
all	324	0.2	4.1	7.6	10.1	13.3	18.2	25.5	31.2	32.2	35.6	178.0

[1] Since the download numbers are very sensitive, we did not provide the absolute figures but only the relations among them.

Table 4. Year-wise citations (2002-2011) per publication year (document types: article, review; citation years: <=2011) (n=333)

Pub. year	n	Citation year										
		2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**all**
2002	28	5	12	**44**	45	46	53	**73**	73	72	80	503
2003	37		55	23	**60**	**78**	**91**	64	**93**	**120**	**107**	691
2004	23		*4*	6	42	48	53	61	51	81	57	403
2005	18			*1*	7	17	27	28	35	48	32	195
2006	23					12	34	40	57	86	97	326
2007	29						5	41	59	71	58	234
2008	35						*1*	11	52	67	66	197
2009	32								7	44	74	125
2010	51								*1*	16	49	66
2011	57										23	23
all	333	5	71	74	154	201	264	318	428	605	643	2763

Altmetrics in the humanities: perceptions of Italian scholars

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Abstract

On-line access to publications and interaction through social media for researching is becoming increasingly used in the humanities as well as the sciences. The evaluation of humanities research should be based on the transparency of the quality of the reasearch which now has the possibility of creating an "Altmetric" alternative to the traditional peer review and bibliometric indicators. The Project "Altmetrics for the humanistic disciplines" aims to understand not only what functions in Altmetrics, but how and why it functions and also to gain knowledge of how the results of evaluation may be influenced by different elements.

Keywords: digital humanities, altmetrics, evaluation of publications

Introduction

Scholars have from the very first used the Internet to exchange ideas and research results quickly. We have now entered into a second phase, which could be called "collaborative", and is different from the earlier "connected or networked" which aimed solely at providing information and pre-prints. In this current second phase of Internet use by the scientific community, Internet and the Web are the basic infrastructures for collaboration amongst virtual communities. Not only may the scholar answers e-mails and share pre-prints as before, but he can interact with other experts in all parts of the world and undertake the sharing of his preferences (like), give open access to reports and research data, and collaborate with other experts on bibliographies and digital libraries. Even though still fragmentedly and differently in the various countries, scholars have the instruments to better the productivity and quality of their research through sharing digital resources and collaboration with other scholars. The impact of Internet and the Web on academic research has been studied by some authors who have underlined the reduction in duration of research, as well as other advantages such as the possibility of avoiding duplication, facilitating co-operation, stimulating innovation and making the research results available to all interested parties (Tenopir & King 2008). A recent study of circa 2,000 researchers (Rowlands, et al 2011), has shown that the majority of scholars in the humanities (79,2%) and social sciences (84,0%) have included social media in their research sources. These results indicate that on-line access and interaction through social media for researching is becoming increasingly used in the humanities as well as the sciences.

Evaluation of digital publications

The proliferation of digital publications on-line has however brought criticism that refers to publications that have a scientific appearance but do not follow a scientific method. Many of the new types of digital publications do not necessarily follow an editorial process: they are made available in Open Access, in the Universities' databases, in their departments' Websites, in Open Access periodicals, in University publication series available only on-line. The importance of the evaluation of humanities research is in the transparency of the quality of the reasearch for a broader public, just as for the scientific community, which now has the possibility of creating an "open" alternative to the traditional peer review and bibliometric indicators. It can be useful to the scholar himself to understand the impact of his results. A number of initiatives have highlighted the importance of recognizing different and equally effective means of assessing academic outcomes (i.e. ACUMEN, WISER, EICSTES). For instance, the EU research framework 'Horizon 2020' and the EU Digital Humanities Manifesto (2011), are clear examples, the latter stating: "The diversity of digital media and publication genres need to be accepted as genuine means of scientific communication", including " repositories, publication platforms, social media networks and blogging", where "Peer-reviewed texts in print journals can no longer be the only publications to be considered in application and proposal procedures". Terras (2012) adds that academics need to work on their digital presence to aid the dissemination of their research, to both their subject peers and the wider community. Recently, the National Information Standards Organization (NISO) announced a new two-phase project to study, propose, and develop community-based standards or recommended practices in the field of alternative metrics (NISO 2013).

Alternative metrics

A study which has not yet been realized is that of examining whether and how the infrastructure of the Web may be used as a social filter of quality of the digital publications in the humanities.

Webometrics is the study of the quantitative aspects of the creation and use of digital resources, of the platforms and technologies of the Web, based on bibliometrics. The term was coined by Almind and Ingwersen (1997) and the indicator "Web Impact Factor" (WIF) was introduced by Ingwersen (1998). The indicator WIF may be defined as the number of Web pages on a Web site that receive links from other Web-sites, divided by the number of Web pages published on the site that are accessible by search engines. There is also a second definition of Webometrics, the study of Web contents with essentially quantative methods for the research subjects, and using social science techniques that are not specific to any field of study (Thelwall, 2009), that underscores the development of applications of statistical methods in other disciplines.

The term Altmetrics is derived from Article level metrics or Alternative metrics, showing two different approaches to applying Altmetrics: either indicators of impact at the level of the article, or in a broader way, alternative bibliometric indicators. The term was proposed for the first time in 2010 in a Manifesto by Priem, Taraborelli, Groth and Neylon and has its roots in the Twitter hashtag # altmetrics. Altmetrics should be considered a subset of Webometrics, in as much as it concentrates on the impact of academic research measured on certain platforms and on-line academic social media rather than on the Web in general. (Priem J, Groth P, Taraborelli D, 2012). There are platforms that apply Altmetric metrics, for example: Altmetric.com, Plum Analytic, peerevaluation, Research scorecard and ImpactStory. The platforms that use Altmetrics metrics do not limit themselves to the basic statistics of download and access to the document, but attempt to obtain information about the readers and their use of the contents.

The supporters of Altmetrics do however point out that the indicators show the influence rather than the impact on scientific progress (Lin, Ferrer 2013). Even for Altmetrics one can find some disadvantages and obstacles: one can not avoid a manipulation in the order of relevance of the results, one may not depend only on automatic systems as it could influence the desired transparency of the evaluation (Priem, Groth, Taraborelli 2012).

Aims and objectives

The Project “Altmetrics in Italian humanistic disciplines” will propose alternative models and methods of traditional evaluation of digital publications in the humanities.

To obtain this scope, the Project proposes to:

- make evident the usage and the perceptions of the creators of digital resources for evaluation by Altmetrics;

- understand what may be the barriers and obstacles to evaluation by Altrmetrics

The question in hand is: can Altmetrics become a system for evaluation of digital publications in the humanities?

The case study deals with academics in the humanities in Italy, in discipline groups classified by the Governement as 10 and 11. Even academics in the humanities are creating increasing numbers of digital publications, accessible in digital libraries, institutional data-bases, or on the Web: besides books and periodicals, there are the blogs, teaching resources, research data, and other digital resources from research and teaching in university departments. Digital publications are hypertextual, dynamic, easily accessible, and may be opened and used again. The traditional Italian evaluation conducted by the Government Agency ANVUR considers only one type of publication – in print or pdf – whose evaluation is controlled by the publisher and offered to other academics in a one-dimensional way that excludes interaction. Consequently we may say that the traditional system of evaluation of quality is not adequate for the types of digital publications that use multi-medial systems and completely different editorial processes. The three traditional measures used for the humanities also have other disadvantages. Peer review is slow, inefficient and favors conventional thinking. Measures like the h-index require to much time to collect data, and the impact factor of the periodicals is applied wrongly as a way of evaluating the work of a single academic. Given the specific characteristics of digital publications on the Web, the procedure of evaluation of digital publications stimulates experimentation of Altmetrics which is open and collective, combining qualitative (peer review) and quantitative (bibliometric indicators) systems, making the seriousness of the digital resources on the Web clear.

Methodology

The Project, to last a year, is based on case study methodology of the community of humanistic scholars in Italy who participate in the Association for Humanistic Informatics and Digital Culture (Associazione Informatica Umanistica e Cultura Digitale (AIUCD).

In the first phase of the Project “Altmetrics for humanistic disciplines” an analysis of the literature and documentation was begun, using a Wiki as the instrument for sharing humanistic digital resources in Italy. The Project will attempt to create communities of interest for each disciplinary area and to identify the authors who use social media in their research and/or on-line digital resources. To find these resources we will use the different platforms listed under the various categories in Table 1. The authors will be those in the AIUCD list. The expected result of this first phase is that of discovering the types of digital resources used and the academics in each humanistic sector who create and use digital resources.

The on-line platforms covered by the Project "Altmetrics in humanistic disciplines" are grouped under the four categories as below.

Identification of the authors

Firstly it is necessary to identify univocally each author and/or contributor – for example, blog commentators. ORCID1 solves the problem of unambiguous identification of academics and contributors. ORCID is used for both traditional bibliometrics and Altmetrics.

Indicators of access to digital resources

The visibility of the Web, in order to make transparent the impact of digital publications, includes the possibility of their positive identification and measuring their download statistics. Various tools may used to this end. The primary instruments are proprietary and are based on access data. COUNTER is the measure given by the aggregators and counts the number of downloads for a publication. Google Analytics is another source for access metrics. Instruments in the social network are Research Gate and Academia Edu, used to measure impact calculated from access and downloading of publications.

Authors may use these statistics to gather basic information about the impact of their publications and use the analytic data to integrate information on their studies with impact factors of single publications. The administrators of institutional data-bases can use the statistics to promote their own contents (IR) as well as furnish information about the intellectual impact of the university to its administration.

Sharing of preferences

Social media such as Twitter and Facebook, Linkedin, Reddit, Faculty of 1000, Google+ are in this class of instrument. Twitter is the most used for sharing short messages, almost mini blogs, characterized by the #hashtag that groups tweets on a given argument. LinkedIn is a Web service used mainly to promote professional contacts. In January 2009 LinkedIn had about 30 million users, and in May of 2010, 68 million – more than double. The possibility of sharing bookmarks, with open indexing systems (tags) are the services based on a single platform on which it is possible to find collections of citations and links.

Bibliographical software like Zotero, Mendely, CiteUlike, Connotea are meant for academics and the organization of their publications and bibliographies, more than for librarians. The encyclopedias like Wikipedia, based on collaborative efforts, are part of this group, as they may be used to find relevant citations together with scientific and generic Blogs. Instruments like Delicious and Library thing also share opinions and key words, grouping citations on given arguments.

Creation of interest groups

Some Web platforms allow sharing of resources and create interest groups, facilitating the creation of thematic or geographical communities. Other instruments of this kind are the sites for organizing conferences like Lanyrd.com. The digital libraries may considered as part of this group of platforms, as they allow academics to share multidisciplinary resources and in some cases offer help in storing research findings and creating publications.

In a second phase there will be an inquiry based on a questionnaire followed by interviews with experts in each disciplinary sector. The questionnaire will be distributed through the AIUCD network and aimed at understanding academics' perceptions of Altmetrics.

In the third phase, during the second half of 2014, the Project will produce a final report which will be discussed on the basis of data analysis, with possible recommendations for increasing visibility and quality of digital academic publications. The final Report will be discussed by thematic focus groups with experts in order to understand what barriers and obstacles there may be to alternatives to traditional evaluation.

The results will be analyzed following the measures inspired by the Plum and PLOS studies. PLUM classifies the indicators in 5 distinct types: Use, Capture, Recommendations, Social Media, and citations. Examples of each are:

- Use - Download, seen, held by libraries, ILL, document delivery
- Capture – Preferreds, bookmarks, saves, readers, groups, bibliographical systems.
- Recommendations - blog, news, Wikipedia, comments, reviews
- Social Media - Tweets, Facebook, ranking Google
- Citations - Web of science, Scopus

The Public Library of Science (PLoS) began evaluations of article levels (ALM) in 2009, prior to the development of Altmetrics and collects the activities used for evaluations into five groups.

Using PLOS taxonomy in evaluating research articles, the platforms that will be applied for the Project are grouped into the following categories:

- Access – the means by which the user enters online resources;
- Register – the users means to organization and sharing of digital resources;
- Discuss – discussion of research described in a source by a short Twitter to a blog;
- Recommendation-recommending a source using various platforms;

- Cite – formal citation of a source in scholarly journals

. Table 1 Classification of online platforms

Access	**Register**	**Discuss**	**Recommend**	**Cite**
Counter	Citeulike	Twitter	F100	Scopus
Insitutional databases	Delicious	Facebook	Reviews	Web of Science
	Library thing			
Dryad, Figshare, Slideshare, Github,	Academic blogs	Academic blogs	Printed articles	Wikipedia
	Printed Articles			
	Wikipedia			

Conclusion

Programs for the evaluation of digital scholarly publications, academics, and all the involved interests, and the cultures of the varying disciplines, are in constant evolution, making the evaluation of research a cycle of continuous learning. Attention to this process guides the Project "Altmetrics for humanistic disciplines" and may allow us to understand not only what functions, but how and why it functions and also to gain knowledge of how the results of evaluation may be influenced for example, by variations in the availability of a source, its access by a broader public, or by available infrastructures. This suggests that any evaluation of digital resources in the humanities should be as comprehensive as possible, going beyond bibliometric measures and taking into consideration the specific disciplinary characteristics of each field by combining traditional methods with Altmetrics.

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Curriculum Vitae

Anna Maria Tammaro teaches at the University of Parma and is the local coordinator of the International Master Digital Library Learning, joint course with Oslo (Coordinator) and Tallinn University. She holds a Ph.D. in Computer Science from the University of Northumbria. She has been member of the IFLA Governing Board and now Chair of the IFLA Library Theory; she is Vice-President of the Italian Association Humanities Computing and Digital Culture

Workshop

Practical application of qualitative methods in libraries with special demonstration of oral history

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Background and objectives

The purpose of the workshop is to provide the participants with practical basics of qualitative research methods. The objectives are to: (a) summarize the principles of qualitative methods so that participants can develop proficiency on their own and (b) explain the concept of oral history, as an important qualitative methods application, showing its possibilities in librarianship with examples. The results of qualitative methods can be used, among others, to: evaluate the work and services of libraries, describe user behavior, gain insight into expectations of a community, and demonstrate the contribution of libraries as social capital. The principles and various approaches to qualitative research are summarized. Detailed descriptions of two methods with numerous examples are shown. The first method is oral history - a planned, prepared and carefully designed and conducted interview of individuals about an event in time past in which they actively participated in or had witnessed. The second method is the application of grounded theory - a systematic methodology in the social sciences involving the discovery of theory through the analysis of data. In practice, grounded theory is used for analysis of oral history interviews by developing codes about the content of utterances and then coding the utterances in each interview. The first method concentrates on getting data and the second on analyzing them. Numerous examples are provided from a study whose purpose was to investigate the activity and life of libraries, librarians and users in a number of cities that were under siege during the war in Croatia from 1991 to 1995 (Šapro-Ficović , M. (2012)). The study involved lengthy interviews with 50 librarians and 17 library users from ten cities that were under siege and where libraries were the only cultural institutions that fully functioned in their communities during those times and under war conditions. They enabled the records of oral history through the recollections of events, library services and library use under siege. One of the major outcomes of these qualitative methods are statements with examples of the value of libraries. Through the testimony of librarians and users, and through examples of continuous service delivery under difficult conditions, libraries have proven their value in and to the community.

Target audience

Researchers, LIS students, library professionals.

Learning objectives

After the workshop, participants should be able to: define the basic principles of qualitative methodology, aimed at libraries and users; begin to develop the application of internationally accepted methods of oral history to collect data from users and librarians about the work and the value of libraries; begin to develop a broad application of the established method of grounded theory for analyzing oral history data; evaluate the work and contribution of libraries in towns under siege during the war in Croatia; contribute information and studies about the value of libraries.

Duration

2,5 hours.

Keywords: qualitative methods, oral history, grounded theory, values of libraries, libraries in war

Curriculum Vitae

Position: Senior Librarian in Scientific and Public Libraries in Dubrovnik; Head of Department for Regional Public and School Libraries, 2001 to date.

Education: Bachelor of Arts (BA) in French language and literature, 1984. Accredited in library science (MA) by National and University Library, Zagreb, 1993. Ph.D.,Department of Information Science, Faculty of Philosophy, University of Zagreb, 2012. Doctoral dissertation : Activities of libraries under siege in war. Case studies: Croatia 1991/1995. Disseration research, which took over six years to complete, is based on extensive collection and analysis of oral history interviews.

Membership: Croatian Library Association, Governing Board, 1994-2006, Committee on Free Access to Information 1998-date. Library Association of Dubrovnik County, President, 1994-2005. Croatian Library Journal editorial board. International Federation of Library Associations and Institutions (IFLA), member of Committee on Freedom of Access to Information and Freedom of Expression (FAIFE), 2004-2009. American Library Association (ALA), member ALA International Relations Round Table (IRRT). Association for Information Science and Technology (ASIST), member, Internationa Relations Committee 2012 to date.

Conferences, publications: Member of organizing committees of regional and international conferences 1999 till present. Among them annual international conference Libraries in the Digital Age (LIDA) (Dubrovnik and Zadar, Croatia); Conceptions of Library and Information Science 3 (COLIS 3) (Dubrovnik, 1999); 6th Roundtable on Free Access to Information of Croatian Library Association and FAIFE anti corruption workshop (Zagreb, 2006). Participated in many other projects, conferences and seminars. Gave lectures and published articles related to special fields of interest: use and users of public libraries; free access to information ; professional values and ethics; access and preservation of valuable library holdings; digital libraries and library networks. Among others, presented papers at Qualitative and Quantitative Methods in Libraries International Conference (QQML2013), Rome, Italy, June 2013 and the Oral History Association Annual Meeting, Oklahoma City, Oklahoma, USA, October, 2013.

Project methodology in subject-based knowledge organization: Experiences from the UK

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Background and objectives

Project management may involve a wide variety of methodologies depending on numerous factors such as sponsors, scope, stakeholders etc. (see, for example, Newton, 2005; Department for Business Innovation and Skills, 2010). This particular workshop will draw on experience from three research projects in the area of subject-based knowledge organization, all with the same funder (JISC – Joint Information Systems Committee) but different scopes and deliverables, stakeholders, time frame and international project teams. It will discuss various components of project management such as planning, catering for the funder/stakeholder needs and requirements, communication, delivering on time etc. This will include writing project documentation such as proposals, progress and final reports as well as project-specific deliverables (for examples of project documentation see UKOLN, 2009a; UKOLN, 2009b; UKOLN 2013). The workshop will draw on theories of project management as applied to the three specific research projects. While the projects are in the same broad subject area of knowledge organization, it aims to demonstrate general research-project methodology.

The workshop will start by looking at the importance of project management: to clarify the purpose and objectives between funders/stakeholders and the project team and especially to align stakeholders' and researchers' views and expectations; to clarify tasks and responsibilities between project team members; to plan and monitor and direct accordingly. Characteristics of good project management will be discussed, with focus on the importance of quality communication with team members and funders/stakeholders. Budget planning and risk management will also be addressed.

A research project often starts with a successful project application. How to write a good project application, what project markers usually pay attention to will be discussed. The participants will then work in groups to exercise their own project proposal which will include major elements of a project application and project plan: scope and impact, deliverables and workplan, methodologies, risks and remedies, stakeholders input, dissemination.

Other project documents will also be covered: project plan, workpackages, interim report, final report, and completion report, based on the experience with the three projects.

Topics

- Project proposals
- Project plans
- Workpackages
- Progress, final and completion reports
- Deliverables
- Dissemination (web site, blog, twitter, (e-)conferences)
- Managing the project team

- Working with the funder/stakeholder

The target audience

The workshop could be of interest to those inexperienced in applying for research-project funding and in leading international research projects funded by external funders.

The learning objectives

At the end of the workshop the participants should be able to explain major components of project management and of project documentation. They should be able to apply basic principles of project management when writing a project proposal and when running it.

The method

The workshop will consist of presentation slides on the theory of project management and its application drawing on the three projects. Exercises will include group work on defining the scope for an own project, identifying the tasks, their dependencies and duration.

Duration

The workshop is planned to last two full hours with approximately an equal time devoted to the presentation slides and to hands-on work.

ACKNOWLEDGMENTS

Joint Information Systems Committee (JISC) provided funding for the three projects (2007-2011) from which the presented experience has been derived.

Keywords: project management, project applications, knowledge organization.

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Curriculum Vitae

Koraljka Golub is an associate professor at the Department of Library and Information Science, School of Cultural Sciences, Linnaeus University. After completing her PhD at Lund University, Sweden, in 2007, she worked as an information science researcher at UKOLN, University of Bath, United Kingdom, up until 2013. Since 2012 she has also been distance teaching on a part-time basis at the School of Information Studies, Charles Stuart University, Australia, at the E-learning Academy, Croatian Academic Research Network, and taught at the University of Applied Sciences in Cakovec, Croatia. Recently she was also employed as a consultant for FAO, United Nations.

Her work and commitment have been recognised by 11 different awards and grants, including a £280,000 research project grant from UK's Joint Information Systems Committee (JISC). Out of 10 research projects that she participated in, she acted as the principal investigator on 3 and an advisor on 2 of them. Most projects involved a range of international members as well as a variety of sectors.

She has produced research regularly over the past 15 years and published in highly renowned academic journals (e.g., Journal of the American Society for Information Science and Technology, Journal of Documentation) and conference proceedings (e.g., Joint Conference on Digital Libraries). She has also authored three books, the latest one scheduled to be published by ABC Clio in 2014. Her research has in particular focused on information retrieval and knowledge organization in digital libraries, in particular as related to integrating existing knowledge organization systems with social tagging and/or automated subject indexing, and evaluating the resulting end-user information retrieval performance.

She has acted as a member of various international programme committees, editorial and advisory boards and working groups. She was ASIS&T European Student Chapter's founder, chair, vice-chair and advisor. The success of the Chapter is reflected in it being awarded the best ASIS&T student chapter in 2008 and in 2012. In 2007 she was appointed as member of the International Relations Committee of ASIS&T. Furthermore, since 2004 she has been an Advisory Board member of the Bulletin of ASIS&T. She has acted as a member of Dublin Core task group DCMI/NKOS from its foundation in 2009. Over the past several years she has been on the programme committee of a number of international events, including European Conference on Research and Advanced Technology on Digital Libraries (ECDL, now TCDL), several Networked Knowledge Organization Systems (NKOS) workshops, Universal Decimal Classification Seminars and many others.

Using information visualization in libraries: why, when, and how

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Introduction

Information visualization communicates and presents data, information, and knowledge through a graphic display. The assumption therefore is that visual presentation supports human cognition and is able to make it easier for users to perceive, understand, comprehend, and discover knowledge in large data sets (Purchase et al., 2008; André et al., 2009; Beale, 2007). By providing useful overviews and offering interactive mechanisms for browsing and exploration, it helps users overcome large information spaces, understand the overall structure and contents of the collection or search results as well as build new knowledge, discover and understand relationships in the information space. These benefits are especially pronounced when searching large datasets (Carr, 1999; Fagan, 2006), but at the same time apply only to well-made visualizations that follow human perception principles: a poorly conceived representation could not only burden the user more, but would also disturb the user's information-seeking process (Song, 2000).

Information visualization presents us with various possible techniques to display our data. The challenge lies in a) choosing a technique that will be most appropriate for our data and will best serve the aims of our information system and user tasks and b) using the elements of visualization in a way that will create meaning of geometric and structural patterns and convey this meaning to users in a clear, useful, and informative manner (Chen, 2010). The workshop will look at the various properties of data, visualizations, and user tasks that influence on the choice and implementation of visualization techniques.

Background and objectives

Information visualization is not a new concept, but the ever increasing amounts of information and advancements in technology are beginning to establish its use also in everyday practices. The possibility to present overviews of large data sets on the one hand and to interactively explore and discover on the other, offer interesting potential also for the library community.

Topics

Information visualization, data types, visual principles, visualization techniques, information visualization and libraries

The target audience

The workshop will welcome anyone interested in the basic concepts of information visualization and its use in the library environment.

The learning objectives

The workshop will not deal with the more technical aspects of information visualization that are usually handled by computer scientists, but will rather focus on providing participants with sufficient insight that would allow them to conceptually think about and design their information services using information visualization. Discussing the principles of information visualization and its various techniques from the viewpoint of benefits and potential drawbacks, participants will therefore gain an overview of information visualization. They will also better understand why, when, and how information visualization could be applied to bibliographic data.

The method

Theoretical concepts and examples of existing visualizations will be combined with some practical work devoted to sketching and discussing possible applications of information visualization in libraries.

Duration

3 hours

Keywords: information visualization, user interface design

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Curriculum Vitae

Tanja Merčun is an assistant professor at the University of Ljubljana. Her doctoral thesis included an implementation and evaluation of information visualization to a prototype bibliographic information system. She has presented her work on several international conferences and has led a workshop on designing better user interfaces for library catalogues at ELAG conference together with Maja Žumer.

Maja Žumer is a professor at the University of Ljubljana. A significant part of her research work as well as her activities in international organisations have been focused on bibliographic data and library information systems.

Applying Grounded Theory methods to library and user assessment

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Introduction

While grounded theory methods are most often used in the way their name implies (i.e., to develop theory) they can also be used for more applied research and assessment problems related to libraries, their users, and uses of them. This workshop will begin with a brief discussion of the ways in which grounded theory methods might be applied to library assessment problems. It will continue by reviewing several of the core grounded theory methods, including the role of sensitizing concepts, simultaneous data collection and analysis, sources of data, identifying and recruiting an initial sample, coding, constant comparative method of analysis, memo writing, theoretical sampling, and integrating and presenting results. Several of these discussions will be accompanied by hands-on exercises, e.g., in observation, coding, and memo writing. The workshop will conclude by revisiting the issues associated with applying grounded theory methods to library and user/use assessment.

Background and objectives

In 1965, Glaser and Strauss published their text, *The Discovery of Grounded Theory*. Since then, grounded theory methods have developed much further and are often applied in library and information science research (a search of *Library & Information Science Abstracts* yields 211 papers with the phrase, grounded theory, in their titles or abstracts). Even so, few of these papers are studies that have fully applied the methods described in the standard texts on grounded theory (Charmaz, 2006; Corbin & Strauss, 2008). One possible explanation is that researchers are not completely familiar with the full range of methods to be incorporated in the development of grounded theory, and how those methods fit together as the study is carried out. This workshop will expose the participants to the range of methods used in the development of grounded theory. In particular, it will focus on how these methods can be applied to the goals of both theory development and library and user assessment.

The learning objectives

Those completing the workshop will be able to:

- Recognize situations in which grounded theory methods would be useful;
- Design a study using grounded theory methods;
- Select particular methods to apply in a particular study, and make valid decisions about which methods not to apply in a particular study; and
- Carry out a basic study using some or all of the methods discussed.

Topics and method

Some grounded theory methods are more challenging to apply than others; special attention will be paid to those that present particular challenges and are relatively unique to grounded theory methods (as compared with other qualitative approaches). The teaching method to be used will be primarily lecture and discussion, with several hands-on exercises used to solidify participants' learning. The topics of discussion will include:

- Alignment of applied research problems with a theoretical emphasis: Two types of research goals will be discussed: library or user/use assessment goals and theory development goals. Grounded theory methods were developed to fulfill the purpose of theory development, and so there is some question about whether they can be used to address more applied research questions. In small groups, participants will work with both these types of research problems.
- Sensitizing concepts: The role of previously-defined theoretical concepts (as identified through a literature review) in grounded theory studies is contested. Some researchers recommend that no literature review be conducted until near the end or after the study is completed; others argue that concepts may be identified but should be set aside

during the data collection and analysis phases. The impact of different approaches to handling sensitizing concepts will be discussed, with examples.

- Simultaneous data collection and analysis: The constant comparative method of data analysis (see below) requires that data be analyzed as it's being collected. The logistics of this approach will be briefly discussed.
- Data sources: Interviews and direct observation are the most frequently-used sources of data in grounded theory studies. During the workshop, interviews will be briefly discussed and participants will participate in an observation exercise. They will conduct observations of particular items/aspects of the workshop space (including the other participants). They will then share these observations, and provide suggestions to each other about improving their observation skills.
- The initial sample: For a grounded theory study, the researcher should seek data where it is most likely to be found. Developing an initial sampling plan will be discussed.
- Inducing codes and categories from the data: Grounded theory studies rely heavily on open coding, including in vivo coding. Some practice in these techniques will be provided through a coding exercise. Participants will code some interview data provided by the workshop leader. They will then share and discuss their codes in small groups, illustrating how each researcher's creativity comes into play during the analysis process.
- The constant comparative method of analysis: One of the hallmarks of the grounded theory methodology is the constant comparison of findings, across data (i.e., interview transcripts, observation notes, etc.), codes assigned to particular data points, and categories derived through analysis of the codes.
- Memo writing: Memos are used to elaborate and define categories and, in particular, support the creative role of the researcher. Based on the data coded during the previous exercise and the codes generated for it, participants will write a brief early-analysis memo. They will share their memos in small groups and provide feedback to each other about ways to further improve the memos or directions for additional memos.
- Theoretical sampling and theoretical saturation: Based on the findings from the initial sample, the researcher will expand the data set through theoretical sampling. This approach will be discussed, along with issues related to reaching theoretical saturation.
- Integrating and presenting the findings: Through the methods discussed in the workshop, researchers will draw conclusions and be ready to present them to others. Approaches to this final stage will be discussed, along with ways to evaluate the trustworthiness of the conclusions drawn. The workshop will conclude with a discussion of the ways in which existing theories can be expanded or specialized (Vakkari & Kuokkanen, 1997). In addition, we will revisit the issues associated with applying these methods to library and user/use assessment.

The target audience

Two types of participants will find this workshop useful. The first is doctoral students or junior faculty members who are interested in applying grounded theory methods; this group may also include more senior scholars who have not yet applied grounded theory methods in their work. The second is information professionals who are interested in applying grounded theory methods to questions of library use and users in their professional settings. Many of the LiDA attendees may fall into both of these groups, and the workshop will be doubly useful for them.

The workshop will be presented at a relatively introductory level, requiring little prior knowledge of grounded theory methods. It will be expected that attendees have some familiarity with interpretive research approaches and qualitative methods, generally.

Keywords: grounded theory, research methodology

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Curriculum Vitae

Dr. Barbara Wildemuth is Professor and Associate Dean in the School of Information and Library Science at the University of North Carolina at Chapel Hill (USA). She is the author of the monograph, *Applications of Social Research Methods to Questions in Information and Library Science* (2009). She regularly teaches a doctoral seminar in theory development, which includes in-depth discussion of grounded theory methods.

PhD Forum

How do public libraries measure their socio-economic value and impact upon citizenship in the UK?

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Introduction

One of the roles of the public library is to provide access to resources which support the self-education and development of the citizenry (Alstead & Curry, 2003). This study sets out to investigate how public libraries in the UK measure their socio-economic value and impact in carrying out this role.

Theoretical framework and Literature Review

This will be addressed through an investigation into the generation and exchange of human, intellectual, transactional and social capital in the UK public library service. There is a general acceptance that public libraries contribute to 'community' and have the potential to have a very positive impact on civil society. This can be attributed to public libraries contribution to the creation of social capital (Varheim, 2007).The study will explore the extent to which the generation and use of social capital helps library users develop as citizens. Literature reviews have been conducted around the themes of performance measurement in libraries, value and impact case studies, information society and public libraries generating social capital. In addition, the study will now look into the generation and use of intellectual capital and human capital in public library services with a view to determining whether or not there is a positive and valuable impact on an individual's citizenship due to the effective seeking and processing of information and support obtained through the library. The study must also consider the growth in information and whether the concept and theory of the Information Society has a bearing on information and library usage.

Method

The research will be generated from a continual review of the literature as well as empirical research elements. This will enable a longitudinal 3 year study and include a cohort approach over three geographical locations in the UK, representing different demographics and types of public library services within the UK.. Focus groups will be used with cohorts of library users and library staff from each location.

Keywords: public libraries, impact of public libraries, social capital

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Curriculum Vitae

Leo Appleton is a part time PhD student in the Centre for Social Informatics at Edinburgh Napier University as well as Assistant Director of Library Services at Liverpool John Moores Univerity. He is responsible for the operational management and strategic planning of the university's library service with a particular focus on customer services, business planning and administration. He has worked in a number of Further Education colleges and Higher Education Institutions in various management roles, and has published and presented widely on a number of library management themes including, student partnerships, quality assurance, library spaces, electronic resources, information literacy, staff development and library technology initiatives.

Reading in print and digital environment

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Summary

Due to the increased availability of devices that allow reading from the screen, the doctoral thesis investigates if there are differences in the quality of reading a scholarly and a literary text, specifically in reading comprehension and satisfaction in print and digital environment. The study will include undergraduate students of the University of Zadar. Additionally, possible differences in reading habits among respondents who read and those who do not read from the screen are going to be explored. Furthermore, dissertation explores the possible correlations of personality traits and intelligence with reading habits and the quality of reading in print and digital environment.

Introduction

In the last decade, computers, cell phones and the Internet access have become widely available. Such increased availability of technology may lead to changes in reading quality and reading habits. Possible difference in quality between reading from the screen and from the paper can have far-reaching effects on the quality of learning and thinking. Quality of reading includes not only reading comprehension but also the pleasure of reading. The enthusiasm and the pleasure of reading provide ongoing motivation not only for reading but also for lifelong learning, thus creating positive change in society (Clark, 2005; 2011; Kirsch, 2000).

Literature Review and Conceptual Framework

Theorist McLuhan points out that the medium is the message (McLuhan and Lapham, 1994). The medium adds and changes the meaning of the content by changing our perception. Such a view can be applied to explain the impact of print and digital environment on the level of comprehending the message being read.

Cognitivist approach emphasizes the structural differences between print and digital text that impose cognitive challenges to readers (Eshet-Alkalai and Geri, 2007). Unlike linear reading of printed text from the beginning to the end, digital text requires skills of non-linear reading and thinking that is branching in different directions, by skipping sentences and paragraphs, switching to other articles and returning to the previous ones. People on the Internet are "scanning", speed browsing the text to single out individual words and sentences (Morkes, J. Nielsen, J., 1997; Liu, Z., 2005). Maughan (according to Eshet-Alkalai and Geri, 2007) emphasizes that the experience of using a specific information format increases the value of the information itself. This increase can be explained in a way that information becomes valuable to the user only when the user acquires, interprets and uses the information successfully. Information format or environment can facilitate or constrain the effectiveness of reading. Experience and the pleasure of reading in the digital environment are important determinants of successful reading. Young people have developed the skills and habits of working in a digital environment, and therefore the information being acquired in the digital environment has higher value for them.

In most surveys conducted before 1992 it was found that people read more slowly, with less accuracy and less understanding when reading from the screen compared with reading from the paper (Ferris, 2013). More recent research findings are less clear. Some studies found no differences or only minor differences in speed reading and reading comprehension between screen and paper (Noyes & Garland, 2008). However, in a recent study it was found that subjects who read from the paper achieved better comprehension (Mangen et al 2013). Although people still mostly prefer paper, primarily for intensive reading, attitudes are changing due to improved quality of reading devices. Meanwhile, screens and e-readers do not provide the same experience of contact with the paper (Ferris, 2013). Also, recent research shows that reading habits that people apply when reading from screen are less effective (Liu, 2005; Morineau, Blanche, Tobin, & Guéguen, 2005, according to Ackerman, R. Lauterman, T., 2012).

Purpose

Thesis is based on the following starting points:

- Differences in quality between reading in print and digital environment, primarily in reading comprehension and satisfaction can have far-reaching effects on the quality of learning, critical thinking and participating in society.

- Previous studies have not fully clarified the differences between reading comprehension from paper versus screen.
- Previous studies have not taken into consideration the interrelation of intelligence and personality traits of students with reading habits, satisfaction and comprehension in both print and digital environment.

Objectives, Research questions and Hypothesis

Objectives of this thesis are to determine possible differences in reading comprehension and satisfaction with regard to the reading environment: on screen (digital environment) and on paper (print environment); and with regard to some traits of respondents: gender, intelligence, personality. The second objective is to determine the possible interdependence of factors that affect the process of reading in print and digital environment among a sample of students from the University of Zadar.

Along the lines of the objectives, research questions are to determine whether there are:

1.) differences in the reading satisfaction and reading comprehension with regard to the reading environment: on paper and on the LCD computer screen?
2.) differences in reading habits, reading satisfaction and reading comprehension in two reading environments with regard to some personal characteristics of the respondents (gender, personality traits and intelligence)?
3.) interactive effect of personal characteristics and reading environment on these dependent variables: reading habits, satisfaction and comprehension?
4.) differences in reading habits among respondents who read from the screen and those who do not read the screen?

Hypotheses about the expected results:

1.) Reading comprehension will be the same in the two environments because students have substantial experience in reading both from screen and paper. Reading satisfaction is going to be higher in print environment.
2.) In the digital environment, correlations of some personality traits (openness to new experiences and intelligence) with higher satisfaction and reading comprehension are expected to be positive.
3.) Intelligence, gender and / or certain personality traits are mediator variables between the reading habits and the reading environment, on the one hand, and reading comprehension and reading satisfaction on the other.
4.) Respondents who more often read from the screen have developed the habit of superficial reading, and will have lower scores on tests of reading comprehension both from screen and paper. However, respondents who at least occasionally read e-books have a habit of thorough reading, and will have a better reading comprehension.

Methodology

Participants

Undergraduate students at the University of Zadar are going to participate in the research. Up to 300 participants is the sample size needed to achieve good statistical power. University students were chosen for this study because they have experience in reading from the screen, and in addition, future cultural and economic development of a society largely depends on the student population.

Methods

The impact of digital and print environment on the level of comprehension and satisfaction is going to be examined by using experimental design combined with a correlational study.

Procedures

Two separate, but identical research procedures are planned, one with scholarly text and the other with literary text. Each procedure should be carried out in two stages. During the first stage participants from both groups are going to take the intelligence and personality tests and fill out a reading habits survey. During the second stage, one group reads a text from the computer screen with the instruction: "Please read the article carefully, because your reading comprehension is going to be examined afterwards." After reading, participants are going to fill out a short questionnaire about reading satisfaction, followed by a comprehension test. Then, participants are going to read another text from paper, with the identical procedure as in reading from the screen. Second group of participants is going to read from paper the same text that first group reads from screen, and vice versa. Computer screens used in this research are going to be LCD, since most of the Croatian population has the possibility to read on LCD screens. Planned analysis of results includes multivariate statistical analysis in order to test research hypothesis.

Instruments

Reading satisfaction is going to be examined with Likert scale questions relating to personal assessment of the reading experience satisfaction. Also, perception on how easy it was to read from paper or screen is going to be examined.

Comprehension tests are going to be specially designed for each text material and verified in a preliminary research. Questions are partly based on Bloom's taxonomy of cognitive processes and outcomes. Bloom's taxonomy is useful for asking questions that test the different levels and types of thought processes, recall and comprehension. In order to achieve test validity, questions for the final version of the test will be those that can be objectively scored and having a good variability of the results.

Reading habits survey will include questions about reading frequency, hours a day spent in reading, reading preferences, and attitudes about reading in print and digital environment. Also, participants will estimate whether they are reading more or less today due to the increased availability of digital text.

"Big Five Questionnaire" is going to be used for testing personality traits, and a culturally unbiased intelligence test is going to be used to test general intellectual factor (Caprara, 2005; Vonkomer., 1995)

Significance of the Study

The results will contribute to a better understanding of the process of reading in print and digital environment. New insights are expected regarding the interrelation of personality traits and intelligence with reading habits, satisfaction and comprehension in both print and digital environment in a student population. Findings will upgrade existing theoretical point of view related to reading habits, which are a key element of lifelong learning and the development of a knowledge society.

Keywords: reading comprehension, reading satisfaction, personality traits, digital, print

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Curriculum Vitae

Mate Juric has been a research assistant at the Department of Information Sciences at the University of Zadar since July 2011. His former occupation was as Psychologist in a Primary School. As of September 2012, he is enrolled in the PhD study programme of 'Knowledge Society and Information Transfer'. His teaching and research interests include cognitive science, research methods, statistical analysis, and user studies in library and information sciences.

Information needs and information behavior of Catholic priests in pastoral work

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Summary

The aim of this dissertation is to discuss recent theoretical insights into information behavior of Catholic and other Christian priests in the world, offer research methodology, conduct research and critically analyze results of the research which will identify information needs and behavior patterns of Catholic priests in Croatia in their pastoral work (liturgy, catechesis, counseling, parish management). Study will be conducted using quantitative (questionnaires) and qualitative methodology (semi structured interviews).

Introduction

Information seeking behavior of Christian priests for their pastoral roles has been researched since early 1990-ies. At the end of 20th century more scientific studies on that topic were published, especially in Canada and the USA (for example Wicks, D. A., 1997; Wicks, D. A., 1999). Significant number of papers on information behavior of priests has appeared just few years ago (for example Lambert, J. D., 2010; Michels, D. H., 2012). In available scientific literature several groups of clergy, whose information seeking behavior has been investigated, can be identified. These groups belong to different Christian religions such as priests of Roman Catholic church (Wicks, D. A., 1999; Curran, C.; Burns, K., 2011), Baptist pastors (Wicks, D. A., 1997; Lambert, J. D., 2010; Michels, D. H., 2012), Protestant clergy (Roland, D., 2012), clergy of Evangelic church (Roland, D.; Wicks, D. A., 2009). Moreover, some recent studies deal with information behavior of non Christian, Muslim clerics (Bakar, A. B. A.; Saleh, A. G., 2011). As a rule, in all this studies participated a small number of the respondents from one country. Therefore, it is necessary to conduct similar studies on a larger sample and in different societies (countries) in order to check if the results of research can be generalized.

Literature Review

D. A. Wicks (1999), one of the most fruitful authors in this area, explored information behavior of clergy from six different religious groups in Canada. His findings showed that clergy had closed pattern of information seeking in preaching role, caregiving role and parish management role, and was open for information outside their social group only in caregiving role. It was revealed that denomination affects openness of ministers for outside information in preaching role and that Baptist, Pentecostal and Presbyterian ministers were more open for outside information than those from Anglican, Catholic and United church. Survey questionnaire was conducted on a sample of 378 respondents. Wicks also measured liberal or conservative attitudes of ministers with the help of scales with religious beliefs (Christian dogma), and found that closed sources were related to the theological world of ministers, while open sources were not related to that world. Information sources (books and religious journals) that respondents indicated they used in a preaching role, caregiving role and management role were coded as liberal or conservative (by the two independent investigators). According to the results ministers with liberal religious attitudes often used liberally sources of information, and conservative ministers had more closed patterns of information behavior.

In a newer pilot study D. H. Michels (2012) investigated how leaders of Baptist Christian churches in Canada seek information for personal faith and corporative decision making. Author conducted interviews with five participants. J. D. Lambert (2010) studied information seeking habits of Baptist ministers in USA. In his interviews carried out with the help of a critical incident technique ten respondents have participated. Results of his study showed that the most often types of tasks during which ministers needed information belonged to preaching role and teaching (for example wedding arrangements) and management (for example coordination of church activities). Ministers most often stopped seeking when they had enough information to complete a task, and when seeking was time consuming. To the similar insights came D. Matsveru (2013) who researched information behavior of pastors from different Christian denomination in Namibia, and found that respondents needed information mostly for evangelization, sermon, teaching, direct prayers, leading Bible groups and leading service wherein for sermon and teaching they mostly consulted personal libraries, internet and church documents. Study was conducted with the help of quantitative methodology (138 filled questionnaires) and qualitative methodology (16 interviews).

D. Roland (2012) in his study revealed that Protestant clergy during information seeking and choosing of information in preaching role was influenced by Bible literacy among members of religious community, structure of believers who listened sermon, knowledge on information which members of community wanted to receive and knowledge on political attitudes which members of community had. His results confirmed Wicks' conclusion that clergy work under closed information system. The study was conducted in USA with the help of interview (sample consisted of 5 respondents).

A. B. A. Bakar and A. G. Saleh (2011) have examined information seeking behavior of Muslim clerics in Nigeria. As well as in most of the studies mentioned, their findings have also showed that preferred information sources of the respondents were religious books and personal libraries, while information use depended on a role of preaching, counseling, management and church leadership. Survey questionnaire was conducted on a sample of 233 respondents. On a slightly larger sample (281 respondents) the same authors later reveal that Muslim clerics most often use sources from personal library for preaching purpose, while in a role of counseling they consult secular information sources and informal channels, such as friends and relatives.

C. C. Curran and K. Burns (2011) are one of the rare authors who were exclusively interested in information behavior of Catholic priests. Results of their study indicated that during everyday pastoral duties (preaching, catechesis, caregiving, parish management, liturgy, counseling, personal growth) Catholic clergy most often used personal print sources of information and personal contacts, while less consulted were libraries and the internet. Study was carried out in the USA (Columbia) using qualitative methodology and sample consisted of parish priests, a university chaplain and an ordinary priest.

Theories and models of research

Since the research is oriented on pastoral roles of priests, its aim is to apply a *General model of the information seeking of professionals* in the research. According to that model professionals have many complex and different work roles. Tasks from each role create information needs, and encourage information seeking. This model was tested on engineers, health care professionals, lawyers and recently on Muslim clerics. In the model five professional roles are mentioned: service provider, administrator or manager, researcher, educator and student. Under these roles exist specific tasks (for example assessment, counseling, supervising, report writing, public appearances), and information seeking is related to the particular role and its associated tasks. Characteristics of information needs are shaped by variables like individual demographics, context, frequency, predictability, importance and complexity. Professionals seek information from colleagues, librarians, handbooks, journal articles and their own personal knowledge and experience. Information sources can be formal or informal, internal or external (within or outside organization), oral or written. Information seeking is influenced by awareness of information (direct or indirect knowledge of various information sources), whereby variables can be accessibility of sources (easy access), familiarity and prior success, trustworthiness, timeliness, cost, quality etc. Results of the information seeking process are outcomes like providing a service or product, completing paperwork, and achieving professional development goals. In case when information need is not satisfied, further information seeking is required and that is conceptualized as a *feedback loop*.

Methodology of proposed research will be also based on theories of information seeking which developed Elfreda Chatman (Chatman, E. A., 1999). According to her theories social norms of particular group determine perception of information and information use outside this group (*Theory of life in the round*). Individuals will not use information outside their social group, although they can be useful (*Small world theory*). Affiliation of individual to the particular social group (in this case Catholic clergy) may cause *information poverty*.

Theory of social network implies interpersonal transactions that assist the individual in meeting problems. This theory consists of several concepts: structural attributes (size of social contacts), homogeneity (types of relationships in network), density (nature and degree of interaction among members of the network), content (social and material resources that are exchanged in the networks) and dispersion (spatial distribution of network members). Social networks enable to explore who communicates with whom, about what, via which media, and who is the most strategically positioned to receive and forward information. Network ties are determined by the types of interaction and the ways of media use. Ties in a group can be weak, if a small number of resources of similar type is exchanged or strong when many different resource types are exchanged (Haythornthwaite, C., 2001).

It is assumed that theory of social network is applicable in a proposed research since the Catholic priests in their pastoral work mostly use information from Catholic church, which represents a specific social network and possesses its own hierarchical structure.

All methodological models will be adjusted to the particularities of Catholic priests' community in Croatia.

Research questions and Hypothesis

Research questions are:

1. From which fields of knowledge do Catholic priests need information in order to carry out their pastoral work?

2. How do the Catholic priests find information that they need for pastoral work?
3. Do different pastoral roles affect information seeking behavior of Catholic priests and types of information sources they use?
4. Are there differences in information needs and behavior (information seeking and use) of Catholic priests in relation to various demographic characteristics (for example age, education level, length of service conducting, size of place where the parish is situated etc.)?

Hypothesis:

1. For their pastoral work Catholic priests need information from different fields of knowledge (for example economy, pedagogy, psychology etc.)
2. Catholic priests find information that they need for pastoral work through the active seeking of information
3. Information seeking behavior of Catholic priests is open and oriented on informal and web sources in pastoral roles of counseling, caregiving and parish management, while it is closed and based on formal and print sources in the roles of liturgy and catechesis
4. Among Catholic priests there are differences in information needs and behavior in relation to various demographic characteristics

Methodology

Respondents and sample

Sample consists of priests from Roman Catholic church in Croatia who manage parishes in five archdiocese (Djakovo-Osijek archdiocese, Rijeka archdiocese, Split-Makarska archdiocese, Zadar archdiocese and Zagreb archdiocese) and ten diocese (Bjelovar-Krizevci diocese, Dubrovnik diocese, Gospic-Senj diocese, Hvar diocese, Krk diocese, Pozega diocese, Pula and Porec diocese, Sisak diocese, Sibenik diocese, Varazdin diocese). The whole population counts 1025 parishes.

Methods

In the research a combination of quantitative and qualitative methods (questionnaires and semi structured interviews will be used. The data on information needs, types of information sources used and information seeking behavior of Catholic priests will be collected with the help of the survey questionnaire. Respondents will be asked to participate in the qualitative research. According to the collected data from the questionnaire and wishes of respondents to participate in further research, a smaller sample of the respondents will be formed for the semi structured interviews. In the semi structured interviews parish priests will be asked about a specific case (*critical incident*) of information seeking and using for decision making within their pastoral roles in order to find out the purpose of information use, impact of pastoral roles on information seeking behavior and closed or open patterns of information behavior. In the context of social network theory the research will try to determine the purpose and way of priests' communication with colleagues and (arch)diocese as superior institutions as well as types of information that priests obtained from the (arch)diocese.

Expected scientific contribution

It is expected that the findings will contribute to a development of scientific insights on information needs of Catholic priests and their patterns of information seeking and using in different pastoral roles, testing and conceptualization of theories and models that will be used in this research. The research methodology can serve as a starting point for a further similar research.

Keywords: information needs, information behavior, pastoral roles, parish priests, Roman Catholic church

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Curriculum Vitae

Darko Lacović is a teaching and research assistant at Department of Information Sciences, Faculty of Humanities and Social Sciences in Osijek and a doctoral student at the University of Zadar (Croatia). His main research interests include human information behavior and library services to socially excluded persons. He has published in peer-reviewed journals such as Croatian Librarians Herald, Libri and New Library World.

Poster Session

User-centered design as it pertains to online reference systems

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Introduction

This poster presents models of, and approaches to, user-centered design of online-reference systems (encyclopedias, dictionaries, and their aggregations). This is based not only on approaches used by Credo's product development team, but also on specific interviews of key staff at other online reference companies such as Tom Bayer at iFactory (who has built award-winning reference platforms for Sage, Oxford University Press, Harvard University Press, and others), and Erin McKean at ReVerb (who has built the largest online English dictionary). Approaches that model user behavior such as personas, audience analysis, and a specific model related to reference (the modes of reference) will be featured.

The focus of this poster is on the earliest stages of product design, the point at which you are deciding who your users are and what needs of theirs you are going trying to solve. Getting a complete picture of potential users, understanding their goals and objectives, and appreciating the context in which they will experience your new product or application is essential. This includes an understanding of the economics of their access to the product, the other players in their world who may play an important role in the purchase and set-up of the product, and even a sense of the emotional connection you are hoping to create with your users.

Audience Analysis

The first section of the poster covers the techniques used in audience analysis: market segmentation, personas, and the multiple talents/voices you should have at the design table when doing early stage design.

Geoffrey's Moore's *Crossing the Chasm* is famous for popularizing the logic behind Everett Rogers' Technology Adoption Curve. If your product or application requires a broad adoption in order that the business model supporting it can be successful then a detailed understanding of a user's "100% solution" is necessary. Otherwise one will be left with only a fraction of the potential market for the innovation. Moore's book gives a good description of how to go about envisioning the holistic, 100% solution necessary to carry a product into the mainstream.

This resonates well with a popular technique in understanding users, the use of personas. Personas are detailed descriptions of an imagined user of your system or application. In a group setting you get the design team to think through a half-dozen archetypical users and give a detailed description of a fictitious member of that user group. You give them names and characteristics that give real life to the discussion about the needs of differing users among your target user-base.

A great example of personas are those used in the development of some new capabilities by ReVerb, formerly Wordnik. ReVerb has built the largest English Language online dictionary and they are building both their own apps for this dictionary as well as making it available to other developers wanting to add dictionary functionality to their apps. Examples of their personas (as you can see on the poster) include:

- Confirmers
- Explorers
- Collectors
- Student Collectors

- Super Collectors
- English Language Learners
- Two different API users: Dave and Sanjay

It's interesting that Reverb has included two personas related to their API. Most product designers wouldn't spend much time thinking through the whole user context of an API user. But Erin McKean is very specific about user needs when she talks about Sanjay:

> Sanjay works for a start-up and he is coding when most things are closed. In the middle of the night he's got this great idea; he wants to finish it. He's in this creative flow state and he wants to include a dictionary in what he's building and he doesn't want to send an email to a business development person and ask for permissions and wait to get approval and wait to get his key.

Erin goes on to say that she knows several Sanjays personally because she is the one who answers their frustrated e-mails first thing in the morning when she gets to work—each one is asking a question which Sanjay would have preferred to have found his own answer to only a few hours earlier when he was in his creative flow state.

Getting a personal image in mind of likely users is a hallmark of the use of personas, but it's not a new idea. One of the most endearing features of the seminal article on reference and user services in libraries is Samuel Green's article based on a speech he gave at the first conference of the American Library Association back in 1878. Even though he does not use the word "reference" anywhere in his 7 page article, he gives wonderfully clear descriptions of 27 different users coming to the Worcester Free Public Library and shows what user-focused service of these users mean for the library and the library staff.

Since the design conversation seeking a holistic, potentially transformative design is multi-faceted, it begs a diverse set of outlooks or voices at the table. Tom Kelly, the CEO of Ideo, has co-authored the book, *The 10 Faces of Innovation* in which he describes some of the faces he recommends be at your design table. Each of these differing voices may have a pivotal role in suggesting what may turn out to be the central feature or aspect of the application which then leads to its success.

It turns out that in some cases understanding different groups of users may unlock a completely different business model that would have gone untapped if not recognized in a timely fashion. *Birds of North America* is such an example. There is a significant difference in the needs of ornithologists and amateur bird-watchers. Both can be served by much of the same information, but there are also differences in what information each group can provide to an encyclopedia of birds. Amateur birders can provide data on sightings and many would be pleased to be able to do so. But the authority of a bird encyclopedia would not be served by having just anyone being able to declare a new species of finch. It also turns out that each of these user-types has different economics driving them and their interest in the online application. So Alan Poole, editor of the *Birds of North America* designed the online version of this 18 volume iconic reference work with two very distinct user communities: ornithologists and bird-enthusiasts. Bird enthusiasts pay an annual subscription which sustainably covers the financial needs of this ongoing resource. Ornithologists, through collaboration with professional ornithological organizations are then able to have the functionality that supports the scholarly communication needs of that community.

The Modes of Reference

The second section of the poster deal with the Modes of Reference, developed at Credo Reference. Typically the user-centered design life cycle goes from audiences or user identification to use cases, web page and interaction design. At Credo we have found it useful to put significant design attention to what we call the modes of reference. This level of design has proven useful to us not only as a way to generate discussion when enumerating candidate use cases, but also to help get a sense of a product road map on how our product can evolve over time—incrementally improving our coverage of the various modes.

The result of audience analysis often correctly captures the fact that the search behavior of lawyers is different than that of doctors, teachers different than students, and high school students different than PhD candidates. The modes of reference capture the fact that the same student or doctor can have very different search behaviors depending on their immediate goal and state-of-mind. We call each of these a mode and they are distinguished by:

- Desired completion state
- Tolerance, delight, or distain for false positives (serendipity)

- Tolerance or distain for false negatives
- Importance of source authority

You can see from the poster that we currently have identified 8 modes in 4 different categories:

- Fact finding
- Exploration
- Diversion
- Detailed Bibliographic Research

Testing User Design

Because the objectives of user-centered design demand an iterative and continuous improvement process it's important to point out that all interim products of the design process lend themselves to some form of usability testing. With permission from the publisher, ALA Editions of eContent Quarterly we are providing a handout of an annotated bibliography including classics of reference and reference librarianship as well as both classics and recent textbooks, articles, and websites re User Centered Design. This bibliography was put together with contributions from Terry Winograd of Stanford University, Erin McKean of ReVerb, and Jodi Wing and Josh Orum of LoudDog.com.

It's worth pointing out from this bibliography that if you have time for just one book, it should be Steve Krug's *Don't Make Me Think.* And if you have time for just one chapter from one book, make it Chapter Nine in *Don't Make Me Think*. If you implement well what Krug presents in Chapter Nine your user-centered design will be way ahead of the pack.

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Keywords: reference, user-centered design, user models, product development, user experience

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Curriculum Vitae

John G. Dove has worked for Credo Reference for the past 11 years, first as CEO, then President, and now as Senior Publisher. He has spoken at a variety of library conferences such as the Charleston Conference, the Fiesole Collection Development Retreat, and the Acquisition Institute at Timberline Lodge. John is currently co-editing a book on the future of reference and reference services with Dave Tyckoson of CalState/Fresno to be published later this year by Purdue University Press.

John has extensive experience in technology businesses including a Boston area consulting firm, Symmetrix, which was instrumental in building learning organizations and electronic performance support systems to back them up. In the mid-

90s he was president and COO of SilverPlatter, a supplier of electronic and online bibliographic information to research libraries worldwide.

In 2000, John was COO of GlobaLearn, a company that deployed investigative reporters and photographers to travel the world on behalf of (and wired into) social studies classrooms all across the U.S. GlobaLearn was subsequently purchased by Houghton-Mifflin. Immediately prior to joining Credo Reference in 2003, John worked with the Executive Education for E-Government project at Harvard's Kennedy School of Government.

Film collection development: methodological approaches

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Introduction

This poster will present two methodological approaches to the appraisal of library film collections.

First methodological approach is the appraisal of the library film collection diversity. Poster will draw attention to the possibility and need of using UNESCO methodology in appraising library film collections. Important reason for use of this methodology is that most important part of the libraries mission, acknowledged in their statutes, is to offer diverse cultural works to the users. But if we look for example at the library film collections in Croatia we will notice imbalance in favor of the recent Hollywood films. If libraries want to satisfy various (potential) users' needs and interests they need to take care of the collection diversity for each type of the media that they collect. For that reason UNESCO methodology can be valuable to appraise diversity of their collections.

Second methodological approach that will be presented is the appraisal of the library film collections by comparing library film collection with film canons or lists of the important films. In this work we will present canon definition and types, their relevance for appraising library film collections and we will give example of study in which this methodological approach was used. Methodology of "canonical comparison" enable appraisal of library film collection with regard to value or importance of films that are in the collection. However, because of the subjective aspect of value perception, attention will be drawn to the possibility and need of using various, sometimes mutually opposed canons, to appraise library film collection.

"UNESCO methodology" – first methodological approach

In last decade we have witnessed development of UNESCO inspired methodology for appraising cultural diversity. It was described by Ranaivoson who defines cultural diversity as a three dimensional concept:

- Firstly, any form of diversity is a mix of variety, balance and disparity.
- Secondly, a distinction should be made between supplied and consumed diversity.
- Thirdly, cultural diversity relies on complex interactions between the diversity of producers, products and consumers.

One of the research examples in which this methodological approach was used is Moreau and Peltier paper "*Cultural diversity in the movie industry: A cross-national study*" (2004). From this and similar research papers we can get valuable insights and get inspired to think of how to accommodate UNESCO methodological approaches for appraising library film collections diversity. To make this more clear now we shall give a few examples of methodological appropriations that could be extracted from aforementioned approaches.

Accessibility of the supply

Measurement of the variety supplied can be implemented if we find out in which towns or regions library film collections are available and what types of films are available in different places.

Variety consumed

On the consumption side, the variety consumed can be evaluated on the basis of film collections circulation data. For example, we can investigate what type of films are borrowed or is there any correlation between film geographical origins with the frequency of their borrowing.

Balance

Balance of library film collections can be also appraised using the Herfindhal-Hirschmann index, to reflect the degree of concentration of the various types of films that are in the library collections.

Canonical comparison – second methodological approach

O'Loughlin analyzed film collections in seven university libraries to determine the role of film canons in collection development (2008). Catalogs of these libraries were searched in quest for films found in four different types of canons:

- *Industrial Canon* (AFI's 100 Years...100 Movies)
- *Populist Canon* (50 top ranked films from Empire magazine)
- *Critical Canon* (Sight and Sound Critics' Poll 2002)
- *Elitist Canon* (personal canon of film critic Paul Schrader)

This methodological approach can be used in appraisals regarding the availability of various film types in library collections. We can determine that certain library has mostly films from "Populist Canon" or that some other library has mostly films from "Critical Canon".

Important question is how canons are defined. There are many definitions, but this one is of special importance: "*Canon is collection of works which are regarded as most important in certain field.*"

Works in the canon can be selected using various criteria, for example, above mentioned "Populist Canon" can contain films that are mostly entertaining and popular, although they can be significant cultural artifacts, representative of mass culture. On the other hand, if library user wants to borrow some other type of film he may look for the films included in "Critical" or "Elitist" canons. It is important to recognize that we can use diverse type of canons to build and appraise library film collections. The value of this methodological approach is exactly the possibility of multidimensional appraisal of library film collection by using different canons as evaluative point of reference.

Keywords: film collection development, methodology, UNESCO, canon, diversity

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Curriculum Vitae

Mirko Duić graduated journalism at Faculty of Political Science (University of Zagreb) in 2003. He also graduated film and video editing at Academy of Dramatic Art in 2004 (University of Zagreb). He is a third year student of the PhD programme "Knowledge society and information transfer" at University of Zadar. From May 2009 he works as Teaching and Research Assistant at the Department of Information and Library Science, University of Zadar where he participates in teaching of the following courses: Basics of information activities; Metadata and identifiers; Information technology II; Designing content for digital libraries; Electronic documents and formats.

How qualitative methods can show value of libraries: results from an unusual study

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Introduction

During the Homeland War in Croatia (1991-1995) numerous cities were attacked and their cultural institutions, including libraries were damaged or even destroyed. Some of these cities were under lengthy siege and constant shelling, but life in them went on. The part of that life were libraries; despite difficult conditions, they worked and were open to the public.

The purpose of this research is to apply a number of qualitative methods in order to explore the life and work of libraries, librarians and users in cities that were under siege during the Homeland war in Croatia. Among others, the objectives are to collect and organize recollections and reflections from librarians about their work in the cities under siege, describe the users and the use of libraries in conditions of war, and contribute evidence about the social role and value of libraries. Theoretical and practical framework incorporates a variety of qualitative methods and approaches: oral history for collection and study of historical information about events as recalled by participants; grounded theory for analysis of collected interviews; and the notion of social capital for a general valuation of libraries. Ten cities under siege throughout the country, involving 14 libraries, were included in this study. Some of these cities were under total siege for a long period of time, others were under partial siege but regularly attacked, shelled and bombarded; one city (Vukovar) was totally levelled, library included. In all these cities libraries functioned during the time of the siege; however, in some of them, libraries were closed for a short period of time. Altogether 50 librarians and 17 library users were interviewed – they provided records of oral history about their recollection of the events and library services and use under siege. All participants, librarians and library users, were presented with information about the topic of the interview and purpose and objectives of the study and signed a statement of informed consent. Interviews were semi structured, digitally recorded, and then transcribed for analysis. Altogether, there were some 54 hours of interviews, with some 435,000 words when transcribed. Following grounded theory, analysis consisted of developing codes about the content of utterances and then coding the utterances in each interview. Finally, codes were cumulated showing the results with comments and illustrative examples quoting directly from interviews. Ten main categories were derived, each with a number of subcategories. The main categories for results are: General context: war situation in the city; Work of libraries just before the attack; Work of libraries during attacks; Librarians: their work during attacks; Users during attacks; Use of the library; Suffering the consequences of attacks; Value of libraries; retrospectively: current thoughts and feelings about that time; and General thoughts. The presentation shows some of the main findings – all generalized from oral histories, with particular emphasis on findings that reflect on value of libraries.

Keywords: Homeland War in Croatia, libraries, qualitative study

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Curriculum Vitae

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Quantitative and qualitative methods applied to comparative student reading habits and book buying research in Croatia, Italy and China

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Introduction

The objective of this poster is to present the methodology and results of an investigation in progress. The aim of this research is to analyze the main aspects of the reading habits and book purchasing behaviour of university students. In the past, numerous studies on reading behaviour have been carried out which involved individual countries and Europe as a whole. These studies allowed us to define the general framework of this phenomenon and to distinguish readers based on age, place of residence, gender, occupation and other socio-demographic variables.

However, the university student population has rarely been specifically targeted as a subject of research, particularly as regarding the behaviour of voluntary reading (i.e. the autonomous and independent reading of books not related to exams).

The authors will present a theoretical framework and the outcomes of a comparative study conducted at the University of Pisa, Italy, the University of Zadar, Croatia and the University of Nanking, China.

The authors of this poster have put forth the claim that a combination of both qualitative and quantitative methods is a means which should provide interesting answers to the questions of research; these relate to the research of reading habits and the purchase of books.

Our paper will consist of two main parts.

The first part will present our theoretical framework which has the slow but constant use of qualitative research in the social sciences as its basis, namely in information science and marketing in several countries.

The second part will present the results of a pilot study based upon the quantitative and qualitative methods which were used in a comparative study of the habits of book buying and reading of university students in Pisa, Italy (a total of 55.000 students, a sample of 561 students, Zadar, Croatia (a total 5.500 students, a sample of 193 students) and Nanking, China (a total 30.000 students, a sample of 350 students).

Theoretical framework

Our general theoretical framework ranges from LeGoff's (1985) research regarding the effects of different forms of reading on the emergence of intellectuals in the Middle Ages to the issues discussed by Carr in his work: 'Shallows, what is the Internet doing to our brains?' (2010). In the midst of such a broad and fascinating theoretical framework and within the context of the primary interest of our research, there is an issue which Gordon and Lu (2008) have explained in the following way: „There has been "a downward trend in voluntary reading among youth at both the middle and high school levels over the past two decades" (Alverman *et al.*, 2007, 34, as cited in Gordon and Lu, 2008) that clearly signals that something other than reading for leisure is occupying their time. That "something" may be a literacy now emerging based on digital technologies."

We have also found the evidence for arguments that have been frequently expressed and scientifically proven that reading impacts the development of an individual personality and one's intellectual abilities. We also accepted the claim that

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what is missing in early childhood cannot be replaced in adulthood. In order to justify this claim we will quote the following statement by Clark and Rumbolt (2006):

„Research with children has shown that reading for pleasure is positively linked with the following literacy-related benefits:

• reading attainment and writing ability (OECD, 2000) for reading that is done both in school and out of school (Krashen, 1993; Anderson *et al*., 1988; but also see Taylor *et al*., 1990);

• text comprehension and grammar (Cipielewski and Stanovich, 1992; Cox and Guthrie, 2001), even after a variety of health, wealth and school factors were statistically controlled for (Elley, 1994);

• breadth of vocabulary (Angelos and McGriff, 2002), even after other relevant abilities such as IQ or text-decoding skills are controlled for (Cunningham and Stanovich, 1998);

• positive reading attitudes (Guthrie and Alvermann, 1999), which are linked to achievement in reading (McKenna and Kear, 1990);

• greater self-confidence as a reader

Correlational studies have also consistently shown that those who read more are better readers."

Regarding our methodology, we will also show that it has become common knowledge (for the last twenty years or so) that there has been an ongoing debate in social science circles on the justification of the application of qualitative research methods. We belong to the camp that believes that a combination of qualitative and quantitative methods can yield more reliable, credible and detailed results.

In regards to this topic we will cite Leburić (1997, as cited in Leburić and Kamber, 2000), according to whom it seems likely "that research strategies of a multi-methodological and multi-perspectival character will generally develop with greater intensity, and in the most general terms of access, when applied to social phenomena. It may prove possible, and perhaps of great help, to combine surveys with focus groups or some other types of interviews that have a different structure or case study methods as well as typically qualitative methods. The integration and application of a number of methods, including focus groups, will increase the advantages of these methodological combinations in a theoretical sense as well. In cases such as these the results may prove more credible considering that their diversity is one of the fundamental comparative advantages of such multi-methodological research strategies. Besides, the more methodologically complex the research, the more challenging it is. "

Methodology

Quantitative

We will show the results of a comparative study using online questionnaires that was conducted in October and November of 2012. Students in Pisa completed a questionnaire in Italian, and students in Zadar filled out the same questionnaire but in Croatian.

In 2014 we expanded our research by conducting a poll with students in Pisa, Zadar and Nanking using printed questionnaires, in order to compare the differences between an online sample and the sample of students that completed a printed questionnaire.

Qualitative

We conducted two focus groups in Zadar and two in Pisa. In each city one of the focus groups included students who consider themselves to be avid readers and the other group included students who do not like to read. The first focus group in Zadar consisted of 8 participants and the second consisted of 4. The Focus groups in Pisa consisted of 10 participants each. Due to the poor response to the second focus group in Zadar we invited not only those students who do not like to read but also those who like to read, but prefer to spend their leisure time differently. However, even the few students (N=4) who responded actually read a lot. The reason for this being that in Zadar students who truly do not like to read did not respond and this indicates that they hide their non-reading as they consider it to be socially unacceptable. On the other hand, in Pisa there are at least 10 students who had the courage to admit that they do not like to read and don't even consider this to be something they should be ashamed of. Due to the number of participants, the results of the focus groups do not allow a generalization, but they provide interesting insights into the opinions and attitudes of students toward the habits of buying books and reading.

Research questions

We attempted to find answers to thirty questions which we considered relevant to the theme of our research and for this poster we have decided to present the results which have come to light based on the following research questions:

- What are the reasons for reading, why do students read in their leisure time?
- Who influenced their reading habits and do they read more or less than they did in secondary school?

- What informs their decision to select the title (theme) of the book that they will read?
- How much time is spent reading online?
- When reading online, on what device do they read?

Results

Our poster will show the results based on questionnaires conducted online, as well in print, and on our conversations with focus groups on the questions mentioned above.

Conclusion

Here we will provide a summation, in a few points, of the main results of our research and will provide a detailed description of the plan for our future investigation. We will also provide an overview of the results which will prove of interest for our future research with the aim that teachers, librarians, booksellers and publishers acquaint themselves with the book-reading habits of students by taking into consideration the main questions of our research.

Keywords: quantitative methods, qualitative methods, reading habits, book buying, university students

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Curriculum Vitae

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Application of qualitative methods in researching academic library users: some practical experience

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Abstract

Considering constant and rapid development of information technologies as well as changes in academic education, information literacy (IL) programs have become a necessity in academic institutions, including Croatian Law Faculties. Librarians at the law faculties have to instruct users in searching, using and evaluating information sources through various programs, while considering the specific aspects in the field of law. However, for a successful implementation and creation of an IL programs, librarians need to understand the information behaviour of their users and the context of the institution in order to best create and adapt these programs to their information needs.

Modern trends in the study of information behaviour of users recommend the implementation of numerous qualitative research methods that enable finding a solution to a better understanding of the information behaviour and preferences of users, as well as a deeper understanding of the context phenomenon. Considering the above mentioned the following question arises: What qualitative methods are to be used in the study? When and how to apply them to obtain good results?

On the example of the used methods case studies, content analysis and in-depth interviews in the research of the user competences in the field of law, we will show challenges that a researcher encounters in the stages of the research process, implementation, assessment, analysis and interpretation of results.

On the basis of the specific research experience, we will try to determine to what extent the used methods are agreeable and whether the "sensitivity" of instruments is appropriate to obtain data for research of information behaviour of users and do they enable us the understanding of the deeper context of the afore mentioned phenomena.

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Keywords: application of qualitative methods, research of the user competences, academic library

Curriculum Vitae

Dejana Golenko is a head of librarian at the Faculty of Law University of Rijeka. She is student on Postgraduate program Knowledge Society and the transfer of Information, University of Zadar. She has published a several articles about the role of academic library in education and information literacy programmes and has participated in numerous conferences and workshops.

On modelling mobile context

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Introduction

Efforts at context detection have improved dramatically. Goker et al (2004) described a context detection system that required installation of physical devices that admitted proximity detection for mobile devices. Since then, the inclusion of GPS and other location services on mobile devices increased both their accuracy and availability. Yet many efforts at context detection have worked on simple assumptions such as detecting device type and inferring the searchers context based on this. In mobile contexts, precision is emphasised over recall, while results are selected based on timeliness and relevance to location. Even when deeper contextual information is added to these assumptions - for example, detecting motion - analysis of mobile search shows that users are using these devices for complex search in unexpected contexts (Church et al, 2014). Queries may be exploratory in nature, seeking to discover information that is related to place, but not the present and or unfamiliar topics; in these cases, recall should be emphasised over precision.Church et al (2014) have also shown that mobile devices are being used in static contexts such as home. In surveys, the authors have observed queries of a geographical nature being submitted in a static context such as the home. For example, seeking directions and opening hours of a store that the seeker plans to visit later on; in this case, both the timeliness and geographical context of the seeker are irrelevant to the results sought. A better means of detecting a users information context was sought.

Tate and Russell-Rose (2012) propose that an information need can be defined by the searcher's motive and search type. Motive was defined as the sophistication of the information need, while search type described the genre of information sought. They described four motives - casual, lookup, learning and investigation, while search types were described as informational, geographic, personal information management and transactional.

Our Proposal

This paper examines how these criteria can be used to define the context of an information need. We propose that both motive and search types can be discerned by observing users actions. Search types can be detected by carrying out a parts-of-speech analysis on their queries. This analysis can identify entities and classify questions being asked of them. Motives can also be classified by observing user actions. Hoare and Sorensen (2010) and others have produced models of search activity that classify user actions through the rate and type of actions executed. Combined, these observations can be used to classify a users informational intent and provide them with results that cater to that need. These observations can be used to better serve users by adopting their search interfaces to present information in a way that is suitable for their context. We will now examine how these observations are made.

Search types are detected by parsing the users' queries. Three types of information are sought during this analysis, including, presence of keywords that denote tasks, objects and knowns associated with particular contexts and meta data from the device's sensors. In a geo-informational context (information about a place), task keywords include, for example, 'directions', 'close-by', 'near here', while objects include 'building', 'statue' or 'monument'. Metadata includes, for example, GPS tags. Currently, geographical, transactional and geo-informational types can be detected.

Motivation can be discerned by analysing the type of search a user in undertaking. Users' search actions can be described by a search process, for example, the search process described by Hoare and Sorensen (2010). Lookup searches are described by a short sequence where focused query definition, result examination and limited extraction takes place. This

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indicates targeted querying where precise results are sought. Querying that includes examination and recording of results, as well as query modification using information discovered in previous search cycles indicates learning or exploration and is best served by a combination of initial high recall and, after identifying salient details in the information space, more precise queries. Where lookup occurs, answers and answer oriented results should be presented, while summary information should be presented initially to assist with learning.

The detected context can be used in a number of ways to assist the user. For example, type and motive can be used as factors in a recommender system to help users discover information discovered by others with similar needs. The context could also be used to adapt the results presented by emphasising precision or recall and particular types of information depending on the discovered context.

Keywords: mobile search, search user interface design, mobile context, adaptive search

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Curriculum Vitae

Cathal Hoare is a PhD student in Computer Science at University College Cork (UCC). He graduated with a BSc in Computer Science from UCC in 1998, after which he worked as a software engineer at Motorola and Comnitel Technologies. On returning to UCC he began to work on applying the benefits of the sensors available on an smartphone to improve search user interfaces by creating query-by-image query interfaces. He has been published widely in the areas of user interface evaluation and search interface design. He has also worked with local companies to conduct early stage research on new products through a variety of Enterprise Ireland grants.

Humphrey Sorensen is a Senior Lecturer in Computer Science at University College Cork, where he has worked since 1983. He was educated at University College Cork (B.E., M.Sc.) and at the State University of New York at Stony Brook (M.S.). He has also worked at the University of Southern Maine and at Colby College. He teaches in the area of database and information systems. His research has largely been in the area of information retrieval, filtering and visualization, where he has collaborated with industrial partners on several funded projects. Latterly, he has researched and published in the areas of multi-agent approaches to complex information tasks, and in the broader fields of artificial life (AL) and multi-agent systems (MAS). He has supervised several M.Sc., PhD and Postdoctoral researchers within these areas.

Using time-driven activity-based costing in assessing acquisition process: a case study in estonian university libraries

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Introduction

Libraries today are included in the general demand for cost transparency and effective cost management. In the current socio-economic situation, it is challenging to cope with the same or reduced resources in managing the same processes and activities, so that the quality of the result would not be affected. The need of library managers to justify their costs to their parent organizations has become particularly important, perhaps even more important than ever in the history. With the data they have traditionally collected, libraries can assess details about the costs of collection building; what they need now are reliable data about the costs of their services and products. However, libraries lack a specific overview of the activities between which their costs are divided. Cost accounting is the simple process of breaking down resources to the activity being carried on and then collating the monetary cost to show the cost of the activity. The time-driven activity-based costing TDABC helps to get a better picture of the acquisition related activities that libraries are actually engaged in and their costs.

Stouthuysen *et al* state that „Though digital libraries began more and more to be developed, the print format books – both scientific books and textbooks - are still very important for university libraries and continue to pour into acquisition activities. Not only the levels of responsibility and time spent on activities related to digital resources but also to nondigital resources have increased compared to 5 years ago. One reason for this is that print and digital formats each have exclusive values, and until those values can be replicated in other media, both formats must be collected, maintained, and supported by libraries. Print formats have independent value and contain centuries of information not yet available in digital formats" (Stouthuysen *et al* 2010, p. 84).

The purpose of the present paper is to analyse the cost of activities related to acquisition process in Estonian university libraries based on the example of the time-driven activity-based costing (TDABC) method. More specifically, the study concerned both the acquisition process of foreign as well as domestic documents in physical carriers – books, audiovisual documents and printed music documents. Only documents acquired as purchases were added.

While analysing the results, it appeared that the difference in time consumed for purchasing a document can be remarkable and it concerns, first and foremost, acquiring foreign documents.

Research methodology and data collection

Time-driven activity-based costing (TDABC) method was designed in the USA in the beginning of 2000s by Robert Kaplan and Steve Anderson. The TDABC model can be estimated and installed quickly as only two parameters are required: 1) the number of time units (e.g., minutes) consumed by the activities related to the cost objects (the activities the organization performs for products, services, and customers), and 2) the cost per time unit. In other words, it is necessary to determine the capacity cost rate and the use of capacity of the implemented activities carried out by each subunit. Both parameters are easily identifiable. Practical capacity is often estimated as a percentage, for instance, 80% or 85% of theoretical capacity. That is, if an employee can normally work 40 hours per week, practical capacity could be assumed to be 32 hours per week. This estimate allows for 20% of personnel time for breaks, arrival and departure, and communication and reading unrelated to actual work performance. It is also very important to stress, though, that the question is not about the percentage of time an employee spends doing an activity, but how long it takes to complete one unit of that activity (the time required to process one order: for example, how much time it takes to deal with one interlibrary loan request – order reception, request handling, and transmission of orders). Knowing the real (practical) capacity of the resources used and the time spent on activities, it is possible to determine the cost of each activity by multiplying the time spent on activities by the practical capacity of the resources (Kaplan & Anderson, 2007; Pernot et al, 2007).

The study was conducted in a Tallinn University of Technology Library (TUT Library) and in the Estonian Academy of Music and Theatre Library (EAMT Library). Both selected libraries are university libraries governed by public law.

These libraries were chosen because they are funded on a similar basis, they perform the same functions and their main aim is to support high quality education and to increase the state's potential for ongoing scientific discovery and development.

In accordance with the analysis of the previously conducted research, the study was divided into the following stages: identification of key activities, identification of all resources, involved in the process, identification of the capacity cost rate and determination of time spent on activities.

In the first phase, all the staff members involved in this work process, as well as their general duties and those specifically related to acquisitions were mapped. On the basis of the descriptions of the staff and interviews conducted with them, and the analysis of the documents, all the activities that have to be done with a book during the ordering and receiving process were determined and recorded. As a result of this stage, filled questionnaires of participant observation was prepared. In the filled questionnaires, prepared on the basis of job descriptions and interviews with employees, the staff members were asked to undertake self-observation, that is, to record the time spent on a specific activity in the observation report. The questionnaire also enabled to add notes. Stopwatch was recommended to measure the time as exactly as possible.

The next step was the study of library statistics for identification of the resources. The statistical reports of activities of 2013 were used to determine the numerical data on the staff, expenditure, working days and working minutes in month derived from days, size of the collection, and additions.

As the result, the capacity cost rate in EAMT Library and in TUT Library was calculated.

Finally, the cost of every activity and the cost of the whole work process in total were calculated. The time spent on the activity was multiplied by the capacity cost rate to reach the cost of the activity.

Results

While ascertaining the key activities of acquisition process, it appeared that the activities differ both between the libraries as well as the documents concerned. A relatively time-consuming activities in both libraries are receiving the order, transferring the order to the supplier, registering the reception of the document.

On the average, purchasing of documents published abroad is approximately 91 percent more time-consuming and therefore more expensive than purchasing domestic documents at TUT Library. The large difference in time consumption is conditioned by the fact that the TUT Library makes its decision on purchasing domestic documents on the basis of the weekly exhibition of legal deposit copies. Although employees from the Information Services Department, and from the Library Services Department make their recommendations, the acquisition librarians have the final say, what to acquire. The acquisition process of documents in foreign languages for TUT Library completely differs. Because the process is divided between the two departments, it is too complicated and time consuming. Solution would be that the orders from academic staff and students come directly or via „Send a suggestion" or via „Ordering new books" forms to the acquisitions librarian. Resulting from the large difference in time consumption, the difference in the financial cost also turns out to be big – when the average cost of cataloguing a document in the foreign language is €9.12, then the average cost of cataloguing a domestic document is only €0.8.

There occurs no such amount of difference in time consumption and costs while speaking of the EAMT Library. The acquiring of documents in foreign languages takes only approximately 33 percent more time and money than the acquiring of domestic documents here. The average cost of acquiring a document in the foreign language is €2,14 and the average cost of acquiring a domestic document is €1,45.

The purchasing of foreign documents in TUT Library takes approximately 78 percent more time and money than in EAMT Library. However, in the case of the purchasing of domestic documents the situation is reversed – in EAMT Library it takes approximately 40 per cent more time and money than in TUT Library.

Conclusions

Because the words "efficiency" and "productivity" are not culturally accepted in the context of library, TDABC is an appropriate method for the evaluation of the library work:

- in the case of the TDABC, the question is not about the percentage of time an employee spends doing an activity, but how long it takes to complete one unit of that activity;
- the TDABC model can be tested and implemented by departmental managers for each separate library department or for each work process;

- the TDABC already considers many aspects that affect employees' efficiency and performance, e.g., rest periods, personal time for breaks, arrival and departure, and communication and reading unrelated to actual work performance.

The TDABC is well suited for a library setting, involving many activities with complex time drivers. The TDABC seems to be one of the best tools for understanding cost behavior and for refining a cost system for university libraries. This is also a great method for mapping the organizations' activities and processes. Although the documenting the activity flows and data collection to gather the time duration can be time-consuming for researcher, and uncomfortable for the staff of being observed, it enables to seek out how it would be possible to shorten the time consumed for certain activities and, by this, turn it more cost-effective without damaging the work quality. While integrating the TDABC method with the analysis of library performance indicators, the more valuable data is possible to produce for managerial decisions.

Library personnel willingly participated in the time measurements. Identifying the staff members involved in the acquisition process and seeking out the activities they were engaged in was swift and the course of the study understandable to all its participants.

Finally, it should be emphasized that no method of measurement can not give all answers and the final truth. There are intangible factors in the library work that no cost accounting system can ever reach. Although through the decades there have been several endeavours place the library work under factory-wise standardized product so, that library staff can be worth their salaries, it has not been fully successful. In and of itself no cost system can cut costs. All it can do is to show the administrator where costs may, and should, be cut. However effective a tool cost accounting may be, it is only a tool. And no tool does work unless it is used, and every tool does its best work in the hands of a skilled employee.

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Keywords: Cost accounting; Time-driven activity-based costing; Case studies; University libraries, Estonia

Curriculum Vitae

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The extent of academic library services support to e-learning

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Introduction

Teaching at the academic level is rapidly changing because of the strong influence of the ICT on all aspects of life, especially in the way in which we communicate and learn. E-learning is one of the most promising and rapidly growing aspects of the information society nowadays. Education at all levels, but particularly at the academic level, is considered incomplete without e-learning and e-learning is unthinkable without information literacy.

In this new environment the role of academic libraries is to redesign library services and introduce several innovative services to promote information literacy and e-learning. Academic libraries today have multiple roles and over the years have implemented numerous related operations and services. This has inevitably led to the expansion of support to e-learning. However, their fundamental purpose, i.e. provision of access to trustworthy and authoritative knowledge, has remained the same.

All the resources in the digital library should be browsed and searched as a large repository of multimedia contents which uses structured metadata for the syntactic and semantic description of all the resources.

Sample:

The sample for this analysis includes library web sites of the Constituent Units at the University of Zagreb.

University of Zagreb comprises 29 Faculties and 3 Academies of Art. Some faculties have mutual libraries. Therefore Zagreb University has 29 independent libraries.

Objectives and methods

The objectives of this study are to identify:

- which digital content and e-services exists on the web pages of academic libraries at the faculties of the University of Zagreb,
- which social media tools are integrated into web pages as part of modern library services,
- according to the content on the web pages determine the extent to which the library supports access to library e-services.

Methodology

The research was conducted between 5-10 May. The purpose of this research was to evaluate if the libraries follow modern trends in developing e-services and which e-services are applied on web pages for the dissemination of the content appropriate for studying and teaching.

The content of each of the academic libraries web sites at the University of Zagreb was browsed to check the content and availability of the following 10 categories: OPACs (Online Public Access Catalogues), Facebook/Twitter, interface for mobile devices (access to online catalogue or access to the whole website), access to academic and professional databases that the library subscribes to (access to digital journals and/or digital books), free and carefully selected resources which are of particular interest to the students and researchers at the faculty, encyclopedias and dictionaries, institutional digital repository, Frequently asked questions (FAQ), blogs, tags. Data were taken from each library web site, which is an integral part of the institution web site to which the library belongs.

The starting point for browsing the library web sites was the web site of the University of Zagreb where all institutions of the University are presented. From this place it is possible to link directly to web pages of each faculty, which also contain web pages of the libraries. Every library web page was browsed in detail to check the availability of the ten

categories mentioned above. First, initial browsing of the library web page was conducted, and then the web page of the institution was browsed to retrieve information about some Web 2.0 tools not found on the library web pages. When the selected category was found, it was marked with "YES" in the table, but if the selected category was not found on the web site, it was marked with "NO".

The following should be taken into account when considering the data:

- "Ask Librarian Service", which is more common in Croatian libraries, was used instead of the e-service Frequently asked questions (FAQ),
- some library web sites have been constructed under the project System of Scientific Information,
- free resources were considered (e.g. data-bases, company web pages, e-journals…).

The criteria for evaluation:

- easy/difficult access to the e-content at the library web page,
- diversity of the content for study and research,
- accepted tools for promoting library e-services and for e-communication with users.

Findings

Access to the library page from the institutional web page interface was more or less easy. Some faculty web pages provide direct link from the home web page to the library web page.

This research is expected to show which services are preferred at the academic libraries' web sites of the University of Zagreb according to new trends in developing library services. This research will also assess if library staff know the value of e-learning and their approach in creating digital library content.

This poster presentation will offer an overview of the content which could be considered a part of digital libraries at the academic level.

Keywords: e-learning, Web 2.0, academic libraries, digital libraries, library e-services

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Curriculum Vitae

Andreja Tominac was born in 1973 in Sisak, Croatia. She finished elementary and high school in her home town. In 1991 she started studying Russian language and literature and Information science at the Faculty of Humanities and Social Sciences, University of Zagreb. Since 1997 she has been employed at the Faculty of Teacher Education, University of Zagreb, Department in Petrinja. She obtained her diploma in 1999. In 2008 she enrolled in postgraduate studies at the Faculty of Humanities and Social Sciences, University of Zagreb. During her professional work she has participated at several conferences, mostly held in Croatia. She is author or co-author of professional and scientific papers published in conference proceedings and professional and scientific journals. She is the head librarian at the Faculty of Teacher Education, University of Zagreb, which comprises three faculty libraries, i.e. the central library in Zagreb and two dislocated departmental libraries at the Faculty of Teacher Education, Department in Petrinja and Faculty of Teacher Education, Department in Čakovec. She is the president of the Professional Board of the Croatian Library Association, and a member of the Commission for academic libraries founded by the Croatian Library Association. Her professional interests are information literacy, user education, library services, etc.

Tamara Krajna was born in 1961 in Vinkovci, Croatia. She finished elementary and high school in her home town. She began studying geology at the Faculty of Science in Zagreb in 1980 and earned her Diploma in 1986. In 1996 she enrolled in postgraduate studies of Information science, the field of library science earning her Master's degree in September 2003 and her PhD degree in October 2012. She has participated in a number of conferences, both in Croatia and abroad. Also, she is author or co-author of a number of papers. She is a member of the standing committee of IFLA's Science and Technology Libraries Section. She is the head librarian at the Faculty of Mechanical Engineering and Naval Architecture, University of Zagreb. Her professional interests are scientific communication, scientific publishing, bibliometrics, etc.

Altmetrics – new metrics and its application in Croatia

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Abstract

Social media is creating new ways of communication in the academic environment. More and more scholars read, share and discuss topics using "non traditional" modes of communication (blogs, social networks, twitter).

We find this useful and very engaging because an author can publish interesting research results in article and discuss his findings in e.g. a blog, so other can see his post, look up the article and cite it. This can increase the impact of the article by being cited by other authors and thus increase the IF of the journal.

To monitor and rate the progress of science, the Croatian academic community has been using bibliometrics. Some of the criteria for evaluating academic achievement (with minor variations in different fields of science) are: a) publishing in journals which are indexed in Current Contents, Science Citation Index, SCI – Expanded; b) publishing in journals included in other relevant databases ; c) publishing in journals with an IF > 1, etc.

Croatian scientific productivity has shown the value of bibliometrics, but can there be more factors that contribute to the value of a scientific work, and the integrity of the authors in the academic context?

"Bibliometric indicators have long been used in academic publishing to assess the quality of a publication, article or author and the vast majority of traditional bibliometric indicators have been based around article-article citation, where the cited source is seen as being strongly relevant to the citing source. The 'Impact Factor' (IF) is the most prevalent metric associated with the journal citation-based system, and while it has its place as a single-source indicator of quality, more and more eyebrows are being raised about it's real value, the expanding distance between IF and individual article citations, and the widespread misuse of the IF."[1]

By analyzing the basic services provided in academic libraries, which are directly incorporated in the academic environment, and the criteria set forth in the *Regulations for academic advancement in Croatia (applied from 1 January, 2006)*, this poster will try to answer:

In which way could altmetrics contribute in tracking citations of Croatian authors via social networks?

This question will be answered with an appropriate sample size of two examples from the Croatian academic community. The authors of this poster work in libraries at the University of Zagreb, one at the School of Medicine, and the other at the Faculty of Humanities and Social Sciences, therefore the examples chosen are from the field of psychology (from author Ajduković, D.) and medicine (from author Habek, M.), both articles are form 2010.

The examples will show results that we obtained by applying bibliometric and altmetric methodology, and they are listed under their DOI numbers, because we wanted to place the emphasis on the paper and not the author as well as to protect the authors, and allow for the further use of these examples in future research.

[1] Galligan, F. (2013). Reforming bibliometrics with altmetrics and Mendeley data. [Swets: blog] Retrieved May 9, 2014 from http://www.swets.com/blog/reforming-bibliometrics-with-altmetrics-and-mendeley-data#.U2373KIkQTA

Examples:
Example A (Medicine):
doi: 10.1016/j.clineuro.2010.04.011.

Example B (Psychology):
doi: 10.1001/archgenpsychiatry.2010.37.

Table 1. Indexing examples A (Medicine) and B (Psychology)

Index in:	**Example A Medicine**	**Example B Psychology**
Web of Science	+	+
Current Content	+	+
Impact factor (IF)	1.636/1.585 (5 year)	10.782 /15.618 (5 year)
Subject Category (Q)	Clinical Neurology (Q3) Surgery (Q2)	Psychiatry (Q1)
Scopus	+	+
Citations (Article)	12	44
Total documents in Scopus	114	45
h-index	11	11
PubMed	+	+
Altmetrics (score in contex)	5	7
Altmetrics- Blog	0	1
Altmetrics- Mendeley	10	11
Altmetrics-Connotea	0	1
Altmetrics-Tweet	3	0
Altmetrics- Facebook	6	0
Altmetrics-CiteULike	1	0

Altmetrics are new metrics proposed as an alternative to the widely used journal impact factor and personal citation indices (h-index). Altmetrics can be applied to any kind of publishing by looking at the (context, e.g.) number of article views, downloads, saves, cites or mentions in social media as a reference. That is why altmetrics is better suited to the challenges of the modern era and the current environment of scientific communication.

Table 2. Comparison between bibliometrics and altmetrics

	Bibliometrcs	**Altmetrics**
Required time for results	Impact Factors (IF) are based on cites to articles published in the previous two years.	Results of the impact are available immediately, and are increasing through time.
Scope /coverage field	Less coverage includes scientific databases only.	Wider coverage includes e.g. blogs, forums, tweets = wider audience
Funds	Databases are commercial and in large parts hold a monopoly along with high subscription prices.	Some of these tools are commercial, but the philosophy is based on open source = wider audience
Citation	Based on: citations of the journal (IF) or citation of the author (h-index, which is not recognized in Croatia)	Based on: citations of the journal (IF), but it can be calculated separately also for the impact of the journal, and the institution etc..
Impact of the work-article	Impact is seen only when the work is published, this may take several months	Shorter feedback loop: before the official review in a journal, the work can be commented on or

	(the time it takes to make a review). Longer feedback loop.	corrected e.g. on scientific forums. The work can go through more informal reviews prior to official reviews.

As the current metrics, based only on citations, cannot keep up diversity in scientific communication, alternative indicators offer a different perspective on the impact of scientific work.

Tools such as Mendeley and CiteULike, Connotea, ImpactStory, and Altmetric have all arisen from the need to shift these quality measurements into the modern, digital era. Fundamental features of web tools, these days, are easy to use, built around specific user needs, and available, up-to-date and in real time. Also some databases (e.g. Scopus) and publishers (e.g. BioMed Central, Public Library of Science, Frontiers, Nature Publishing Group) have begun to incorporate the Altmetric tool on their websites and provide such information to their readers. This is also an indicator of the impact and increase in "non traditional" ways of measurement and metric.

Our work on this poster has given way to new questions, which we will try to answer in a future study (detailed study and elaboration of the Croatian examples, statistically relevant sample). At the moment we have only scratched the surface and this is certainly an interesting topic for research and opens up rich possibilities in the future.

Our goal with this poster is to contribute to the raising of the awareness of the academic community about the value of new methods as a preface for more research in the future. Libraries and institutions should be looking for new and more relevant ways of measuring the authors' impact, and the impact of their work in the scientific community.

Keywords: bibliometrics, altmetrics, academic libraries, Croatia

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Curriculum Vitae

Lovela Machala Poplašen was born in Zagreb, Croatia. She graduated from the Faculty of Humanities and Social Sciences in Zagreb. From 2010 she is head librarian at the Andrija Štampar Library, School of Public Health, School of Medicine, University of Zagreb. She is teaching assistant at the School of Public Health PhD Programme: Biomedicine and Health Sciences in the courses Structure, methodology and function of a scientific work 2. Her research interests are

new technologies, information literacy, academic education, information science. She is a member of the Croatian Library Association, and from 2012 member of the Medical Library Commission of the Croatian Library Association.

Lana Zrnić was born on 15 June 1983 in Zagreb, Croatia. She studied Philosophy and Library and Information Science (majoring in Library science) at the Faculty of Humanities and Social Sciences in Zagreb, and graduated in 2008. While she was a student she worked as a student assistant in the Faculty library (Philosophy Collection). Since May 2008 she has been employed as a subject librarian in the Philosophy Collection of the Faculty of Humanities and Social Sciences Library in Zagreb. Her subjects of interest are information and reference services in libraries, subject cataloging and indexing, and especially new technologies and their application in libraries. She has been a member of the Croatian Library Association since 2013.

Library collections availability in online environment though processing user requests: case study in the Croatian State Archives Library

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Abstract

This paper will show the percentage of use of library materials through processing user requests in the reading room of the Croatian State Archive, CSA. Based on the processing users' requirements, according to the tracked requested library materials, the priorities in selecting library materials for the further process of digitizing the purpose of preventive care and also the rapid availability of the same in using online will be emphasized. The CSA Library successfully participate, according to the principles of representation of library materials in custom purposes, through the work of archive staff themselves, as well through the work of users of archives. Aim is to improve its primary activity through stronger promotion of content, services and activities of the CSA Library, but also within the Archives. In this poster we will emphasize the purpose of the efforts CSA Library to special archive libraries materials recognize as conclusive source of information, and thus show the inevitable need for the same to researchers - users in their research and archivists in the archival materials arranging.

Aspiring towards the final goal of a large number of users, the aim of this poster is to show a tendency for updating and modernizing the provision of rapid and necessary information in the parameters of today's "Internet" generation.

This poster wants to give a brief insight into the process of digitizing library materials, in order to facilitate access to the most requested items according to the records of user requirements of users in the reading room, and present the five-year period (2008-2013), the need for defining priorities in facilitating access to library materials online form diverse range of users.

Keywords: library collections, user requests, Croatian State Archives Library

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Curriculum Vitae

Alisa Martek was born August 16, 1970 in Zagreb, where I'd finished elementary school as well as the classics-program secondary school. In 1995, I gained a degree in Information sciences – Librarianship and Spanish Language with Literature at the Faculty of Philosophy of the University of Zagreb and at the same Faculty I also gained a masters degree

in 2003. The name of my master's thesis was „The Electronic Journals and their role in small scientific communities“. During the academic year of 2005/6 I enrolled and passed all the exams at the one-year-old doctoral study from the Information sciences. I've published several professional and scientific papers and in 2008, I've received a vocation of the Senior Librarian and in 2013, a vocation of the Librarian advisor. From 1995 till 2008 I've worked in the Library of the Croatian Geological Institute as a head of the Library, and in the summer of 2008 I came to the Croatian State Archives as the Head of the CSA Library and I still obtain that duty.

Snježana Šute was born in Zagreb, in 1979. After high school – languages program secondary school Lucijan Vranjanin in Zagreb, I started working in the Croatian State Archives Library as well as I enrolled at the Faculty of the Political Sciences – Journalism. After gaining the degree in journalism, I stayed in the CSA and passed the state exam for the occupation of an Archivist gaining the working title of the Archivist – professional associate in the CSA Library in the Communication and Information Department of the CSA.

Assessing content of e-reference services at the National and University Library in Zagreb - from usage to quality measures – establishing baselines for service

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Introduction

The growing use of Internet for information storage, retrieval and communication is perhaps the most significant development shaping library and information services. The information-seeking preferences and communication patterns of library users are rapidly changing. Easy - to - use digital libraries enable users to access information on their own.

Definition and Scope of Information and Reference Services

Rothstein's (1961) definition of reference work "being the personal assistance given by the librarian to individual readers in pursuit of information" is applicable even today. Bopp and Bunge (2000) categorized reference services as a) Information services b) Guidance and c) One-to-one or Group instruction. The American practitioners, differ the reference services as: a) informational, b) instructional and c) advisory/guidance services. Cassell and Hiremath (2009) generalise reference questions being of three types: ready reference questions, research questions and bibliographic verification. Grogan (1991) sees the reference work, after 90ties as beeing significantly affected by technological development, leading to explosion of various services far beyond the traditional reference services.

Terminology is still fluid in this area. Namely, E-reference (electronic reference), Digital Reference (DR), Virtual Reference (VR) and Reference at a Distance (RAD) are used interchangeably in the professional literature.

The growth of online reference services is undoubtfully the most significant development over the past decade. Such services has developed from asynchronous electronic digital reference using email or web forms to synchronous live or virtual reference using chat technology, videoconferencing, instant messaging or social media. E-reference services are very often provided in collaboration and in partnership.

Using e-reference is convenient because it saves the time for users, and the Internet is generally cheaper than a telephone. Reference at distance provides the user with a degree of anonymity or at least minimises any embarrassment that they might feel in a face to face reference interview. It is also a free service.
For librarians it lacks feedback, they are addressed for information help by the unknown user, with unfamiliar information needs.

Provision of E- reference at the National and University Library in Zagreb

The NUL provides the tired information services separating directional and simple queries from complex questions for walk-in users. Comparison of statistical data for e-reference and subject searches for walk-in users indicates a minor reduction of subject searches done by librarians for walk-in users since 2011, and a steady grow of e-reference services.

Many libraries have experimented with different reference delivery models when introducing e-reference services. In 2004 the NUL started to develop an effective library portal to act as the front end of the service, provided a wireless network, set up the Croatian digital archive, launched several digitization projects of newspapers, journals and dissertations, and opened the Facebook profile in 2010, along with Twitter, Pinterest and Library blog in 2012.

E-reference service *Ask Librarian* (QuestionPoint) was introduced at NUL in March 2005. Since 2013 e-reference services are provided using home - made application. From its beginning, the number of reference question was growing - almost doubled every year. E-reference service permits creation of clearer delineation of responsibility based on 3-tier mode: level 1 - minimum human intervention- FAQ; level 2 paraprofessional staff; level 3; librarians, subject specialist and experts. The service at NUL was supported by the network of subject specialist within and some outside the institution.

The Research

As an administrator of QP services I have applied a structured observation of questions received at NUL in 9 months of 2012. Observation, as a method, is particularly suitable for observing the use of electronic services because precise quantitative or qualitative instruments for evaluating them are still in the process of formation. In 2012, users have sent 1,471 questions by QuestionPoint application.

In order to identify practices of user behaviours and types of questions, I analysed question transcripts applying the different reference delivery models;The Warner Model – of categorising questions at four levels and Meserve et. al., (2009) and Whitson (1995) who propose five types of information service (basic, technical, broking, consultation and instruction). Those classifications are all used to analyse service demand and assess staffing needs, although the reality of providing timely help in multi-use both physical and digital environments separating the duties is unworkkable.The questions in QP AskLibrarian were coded using 5 levels of content analysis in order to acquire user input. The method is effective and simple for evaluating the effectiveness of services, for counting questions by difficulty and determining who can best answer aiming at increasing the efficiency of the reference librarians.

Some verbatim were selected as quotes to support the type and style of questions (formal structure, defining the information need, the lenght of questions…).They will be presented on poster.

Findings

In order to encourage librarians – as service providers to think about service in the larger context I have adopted *Evans and Heft's* (*Introduction to Technical Services, 4*) view of service as *bibliographic, physical and intellectual access to library materials*. Access and assistance for gaining access are the essence of library and information services because they represent the fundamental requirements that must be fulfilled before any benefits can be derived from library's efforts, such as support of education, intellectual enlightenment, or knowledge. Questions about the availability of resources and assistance in finding the relevant resources were the most common topics. They are predominant in a generic question level matrix.

Majority questions, 65 % were questions of the 3rd level that need consultation, 30% were connected to bibliographic instruction, 5% were non-resource oriented questions, only 0,5% skill-based questions and 0,95% demanded strategy based instruction.

The ratio of questions received and the questions answered was rather low (45%). This poor score indicates a need of staff training, improving the organization and developing service quality guidelines. Whitlach (2000), RUSA reference guidelines (2000) and ISO TR/ 28118 (2009) state that National libraries should assess both speed and accuracy of responses when evaluating their reference services. The score was in favour only for accuracy of answers.

Discussion

The NUL has to set up its own evaluation framework, bacause it is not an exception and it needs repeated customers to survive. We witness that users tend to be loyal only as long as they are satisfied with the sense of quality of service provision.

The quality guidelines should address the quality measures as proposed by Novotny, (2011) and performance indicators, as indicated in international standards and guidelines in order to be comaparable and reach the benchmarks.

This research was focused on gathering information about how well the service has met the goals of accessible, timely and reliable information.

Conclusion

Librarians and library services must understand their users to provide systems that better meet their information needs. User want librarians to provide needed and specific information quickly and in a variety of formats, expecting courteous service. The information provided must be convenient, authoritative and reliable. Those are the goals which information services at NUL have to fulfill in the future.

In e-reference assessment the most critical are the standards and benchmarks by which to judge the performance. The real problem, as Novotny states, is the inability of professionals to reach a consensus on quality standards.

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Keywords: e-reference services, e-reference questions assessment, Warner model for tiered reference

Curriculum Vitae

Marina Mihalić, PhD in Information Science at the Faculty of Humanities and Social Sciences in Zagreb (*Evaluation of Digital Information Services and Resources in Libraries*), Master of Information Sciences – Communication Sciences. She works at the National and University Library in Zagreb as a Head of Central Information and Reference Section. Since 2000 to 2007 she was appointed Director of the National Division, deputy director, at NUL, Gabriel-European Library contact person from 1998-2008, Web editor of NUL web pages, administrator of QP. From 2004-2006 she led an EU TEMPUS project *A Model of the University Library of Zagreb Library System*. Active in National Library Association since 1987: President of the Professional Board 2004-2006, and 2006-2008; President of the Commisssion for Library Statistics and Performance Indicators in Libraries. Author of 35 articles and several book chapters. She gives workshops and professional training. She was active in many conferences as a speaker and a participant.

Library services/resources and handheld mobile devices

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Abstract

Handheld mobile devices have become part of our everyday lives and they are used for various activities: communication, business, entertainment but also for finding information.

Strong contribution to this trend was given by the emergence of smartphone which encompass many features and operates almost like a small computer.

Due to such advanced capabilities, new kind of users has appeared who expect information at any time and on any place. They use mobile devices for meeting different informational needs including the needs for educational and academical contents, therefore libraries has started to take them into account by customizing library resources and services for mobile devices friendly display.

In order to get an insight in users' opinion on library resources/services on handheld mobile devices, online survey was undertaken. The survey was focused on small screen mobile devices with screen size up to 7 inches (17.1 cm) which are the most used in public spaces.

Objectives were to establish which types of small screen mobile devices are used and to find out is there a tendency for using academic and educational contents on such devices. Also, what library resources/services and to what extent respondents consider as the important ones for mobile friendly customization.

Data collection was obtained by online questionnaire with 10 questions. Questions were mainly multiple-choice and close-ended but respondents were also able to make comments which gave us an additional and valuable insight into their mindset. The questionnarie was created by LimeSurvey tool, and for mobile optimized version SurveyMonkey.com service was used too. We received 295 questionnaires, out of which 285 were taken into account. The survey was anonymous.

The survey found that the largest number of respondents (58%) own smartphone/tablet/phablet, and the most represented model is Samsung Galaxy.

Considering the small screen mobile devices features top three daily used were: phone calls (88%), texting (72%) and checking of e-mail (63%).

From the obtained results it can be concluded that small screen mobile devices are, to some extent, used for educational, academic and informational purposes (reading of e-books and e-journals, education, data checking, searching internet and searching of handy information), but non academic purposes still dominate (texting, reading e-mails, phone calls, taking pictures).

Overall 64% of the respondents has expressed need for mobile friendly customization of library resources/services.

Based on the survey findings it can be concluded that users are following current trend of using small screen mobile devices and they are interested in mobile friendly library services and resources.

More and more libraries in the world decide to accept the challenge of meeting the mobile users' needs. Although Croatian libraries still do not offer their own mobile friendly services and resources, (however some commercial mobile friendly databases are avilable), they will surely soon find themselves faced with the same challenge.

Keywords: handheld mobile devices, small screen mobile devices, smartphone, mobile friendly library services/resources

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Curriculum Vitae

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As a member of the Croatian Library Assocciation she works as the chief editor of *Croatian Library Association Electronic Series*.

Online databases and students: why don't they use them?

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Abstract

The library at the Faculty of Humanities and Social Sciences (FHSS) offers access to several online databases for over 1,400 undergraduate, graduate and postgraduate students and almost 200 members of teaching staff. FHSS library enables access to online databases through the Center for online databases (funded by the Croatian Ministry for Science, Education and Sport) and through institutional subscription. In order to facilitate and promote the use of online databases, the library offers training for users in online database use, both in groups and individually.

On one hand, the subscription to online databases are becoming more and more expensive and the library budget is being cut. On the other hand, the students are not using the databases as much as librarians (and teachers) would expect. In order to understand how students perceive and use the online databases and why they are not using these quality resources more, in 2013 a number of studies were undertaken. In this paper authors will present only the results obtained in a quantitative study (survey). The students at the Department of Information Science at FHSS conducted a small study as a part of their research assignment for the Human Information Behavior course. The goal of this research was to answer the following research questions: How do students perceive and use online databases? and What makes the use of online databases difficult for students?. The research set off from two basic hypotheses. The first one was that students consider articles found in online databases to be equaly good and relevant as those they find through free web sources, such as Google. The second hypothesis was that students don't use databases because they are inaccessible to them, both physically and intellectually. Physical inaccessability includes being unable to access online databases from home, considering that access and searching the databases is at the moment being regulated with IP adresses and are therefore only available at the FHSS building. Intellectual inaccessability refers to the vocabulary use, structure and style of articles in online databases.

A total of 210 undergraduate and graduate studen ts have participated in this survey, representing roughly 15% of the total number of students enroled at FHSS. It was arranged with course instructors to distribute the print self-administered questionaires at the begining of their lectures. The major results of the study show that only a few students understand the true value of online databases in research. When answering the question regarding barriers they face when searching online databases, most students claim that they have difficulties with reading and understanding scientific articles mainly due to the professional terminology (N=118, 56,1%) and the use of foreign language (English) (N=67, 31,9%). In addition to that, many students claim they do not search databases because they are used to first seek out articles through Google (N=101, 48,5%). However students also said that access to databases from home (N=119, 57,1%), easier and simpler searches on databases (N=113, 54,2%) and better IT infrastructure in the library (more computers) (N=96, 46,0%) would encourage them to use online databases more. Although (N=55, 26,6%) of students don't think there is a difference between sources found in online databases and the sources on the Internet, respondents consider using peer reviewed articles in their academic work useful because they will get better grades (N=58, 28,0%) and teachers will appreciate them more (N=43, 20,9%).

Since databases are highly important source of quality and peer reviewed articles/books, librarians at FHSS should continue promoting and facilitating online database use among students by offering them training and facilitating both intellectual and physical access to them. Hopefully, they will also be able to secure continued funding for the subscriptions.

Keywords: online databases, students, social science and humanities, perceptions and uses, barriers, survey, Croatia

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Curriculum Vitae

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How often student graded papers are used in creating new student papers?

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Introduction

Poster presentation is a result of monitoring and analysis of using student graded works (final papers of I and II cycle, master theses and dissertations) in the library in creating new student papers. The aim of the research was to determine how often new student papers at School of Economics and Business in Sarajevo (SEBS) list in the literature used graded student papers. Here is presented the number of student papers defended by the end of 2013 in relation to the number of used graded works in accordance with copyright protection. Through its training program "COBISS, databases and information literacy" library draws attention to ethics in academic writing. Content of the training program has been enriched by continuous changes based on conducting regular surveys to monitor and identify the real needs of university library users and improve their skills in information sources citing.

Research Method

Survey is based on analysis of using graded papers in the new student papers at the School of Economics and Business in Sarajevo based on completed statements of citing and quoting sources, with the aim of determining how many students defended their own papers by the end of 2013. A sample of 300 statements represents the number of used graded papers from January to April in 2013. Students have used one or more papers and for each one used paper they had to fill the statement. Statement of citation is signed when library users use graded papers / II cycle final paers , master's and doctoral theses. Verification of defended papers is found by checking the bibliographic data in the local online library catalog COBISS / OPAC. The sample is consisted of 188 student names who signed 300 statements.

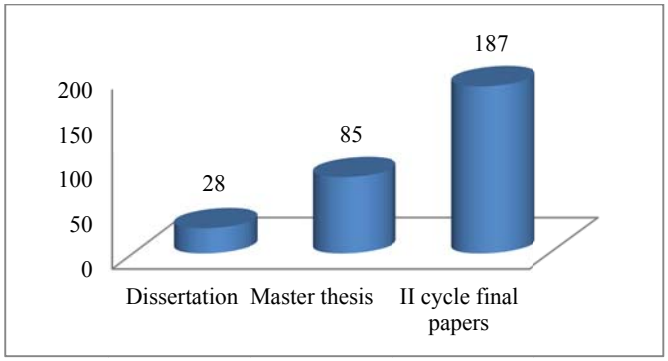

Figure 1: Number of used graded papers

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Results

Of the total 188 students who used graded papers from the archival collection in the library of the School of the Economics and Business in Sarajevo during the mentioned period, 44 students defended their own final papers by the end of 2013. Only18 of them list in the literature used graded student papers, citing a total of 26 graded works. Among those cited graded student papers, 19 papers were from the archival collection of student papers of the School of Economics and Business in Sarajevo, and seven papers were from other faculties. It was noticed that there was a small number cited in relation to the number of used graded works.

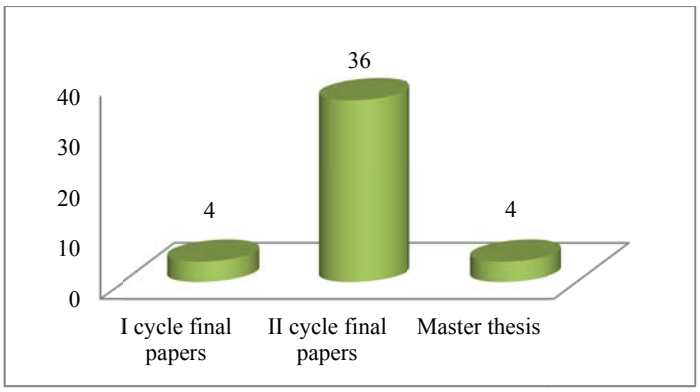

Figure 2: Defended student papers by the end of 2013 at SEBS

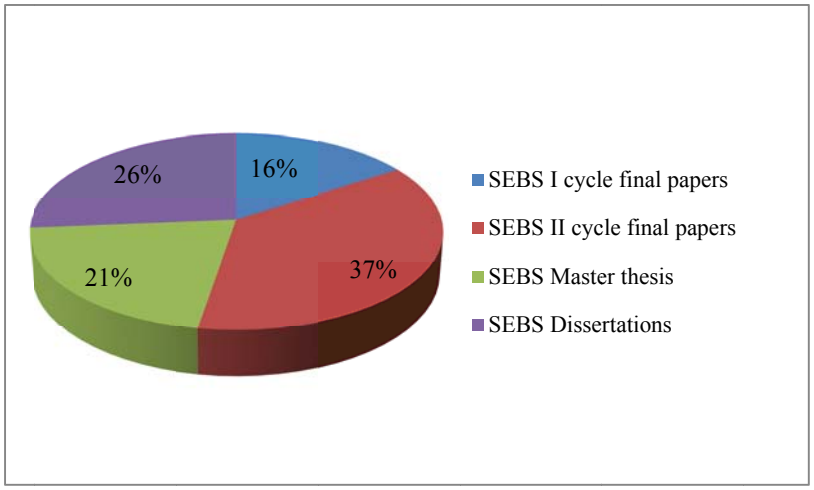

Figure 3: Stucture of cited graded papers

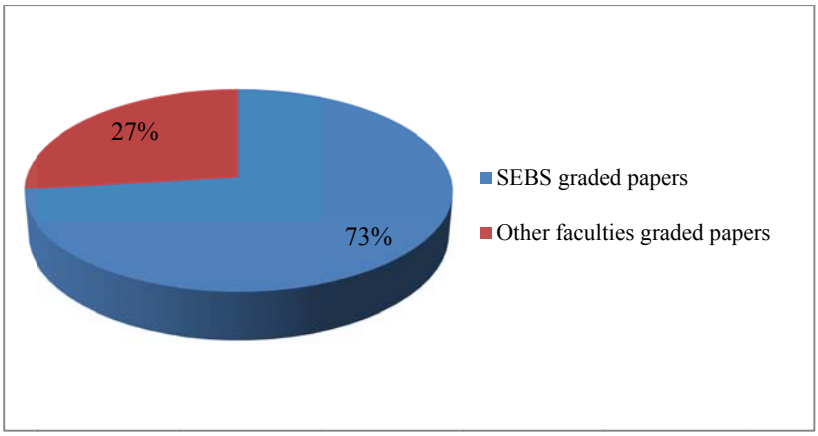

Figure 4: Cited SEBS graded papers in relation to the graded papers from other faculties

Conclusion

Based on the presented analysis it was noticed that the library needs to strengthen its role in teaching and promoting the correct use and citing of information sources, especially graded student papers in accordance with copyright protection. With the aim of improving the quality of library services, it is necessary to work on the promotion of interlibrary loan, as well as the creation of e-repositories of graded works, in order to enable users to easily access to the sources of scientific content.

Keywords: student papers, citing, referencing, library users, academic writing

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Curriculum Vitae

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Altmetrics in institutional repositories: new perspectives for assessing research impact

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Introduction

The aim of this project is to find out if and how Institutional Repositories (IR) are using alternative metrics or Altmetrics (besides usage statistics and citation counts) as a value-added service to showcase their content impact and give some hints on how this tool can be used to supplement the traditional research performance assessment exercise in an institution. Altmetrics can provide a measure of impact for all non-journal scholarly works available in Open Access (OA), like usage statistics, but it can go further by contextualizing the readership of an author's research output. The increasing importance of Altmetrics indicators led to its inclusion in the 2014 edition of the Ranking Web of Repositories. This project promises to be useful for repositories managers in that it gives some examples of good practices of implementation of Altmetrics along with other metrics in IRs which can help to increase the content, foster the adoption of OA by authors, contribute to the visibility of the institution and meet the funding agencies requirements, thus making a strong case for the relevance of IRs in the context of the research assessment process.

Methodology

For the purpose of this project, the following data were collected from the 2014 edition of the Ranking Web of Repositories, regarding the top 100 IRs, between April 11th and 15th: evidence of statistics reporting; item/global level statistics; type of statistics generated (usage, citations, altmetrics); statistics provider; IR software; IR size and country of origin. The IRs homepage and content were scrutinized for these data and an Excel spreadsheet was used to gather the information obtained and for statistical analysis of the results. In this study the different "types" of repositories found in the top 100 were considered: institutional, disciplinary, digital library (for example of theses and dissertations) and a mix of IR, publishing platform and/or digital library. The fact that Altmetrics sources like Academia, Facebook, LinkedIn, Mendeley, ResearchGate, Slideshare, Twitter, Wikipedia (all editions), Wikipedia (English edition) and YouTube were included in the "Visibility" indicator of the 14th edition of the Ranking Web of Repositories, suggested that some top IRs could have included Altmetrics to supplement their existing "statistics package". Even though the sample used is

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only 6% of the total repositories in this Rank, the main purpose of this study was to find out some examples of Altmetrics implementation in IRs that could inspire repository managers to work in the same direction.

Results

The most important findings of this project are that the majority of IRs (70%) exhibit usage statistics at global and/or item level (download counts, page views and geographic provenance). But only few provide citation counts (9%) and Altmetrics (9%). But this numbers could be inflated if all IRs displayed metrics openly. The most used repository software platforms in this study - DSpace, EPrints and Digital Commons – currently deliver usage statistics that can be hidden (only viewed by administrators) or made available to the public. These platforms also supports citation counts (in the case of DSpace and EPrints, a plug-in is available if the institution has a subscription access to the SciVerse Scopus API) and Altmetrics reporting. In the IRs analyzed, citation data were displayed in two ways: through a badge (Scopus) and/or metadata ("dc.identifier" was used for placing DOI, Scopus ID, PubMed ID, Web of Science ID, Journal Impact Factor (JIF) and Scimago Journal Ranking (SJR); "dc.relation" was also used for DOI). Regarding Altmetrics reporting, the IRs use Altmetrics.com API that displays metrics related to social bookmarking and social media through a badge. In the table 1 are listed the IRs that provides Altmetrics data.

Table 1: List of IRs of the top 100 Ranking Web of Repositories reporting Altmetrics

Institutional Repository	Country	Software platform	Usage statistics	Citation counts	Altmetrics
Queensland University of Technology Institutional Repository	Australia	EPrints	×	×	×
Digital CSIC	Spain	DSpace	×	×	×
University of Queensland UQ eSpace	Australia	Fedora	×	×	×
LSE Research Online London School of Economics and Political Science	U.K.	EPrints			×
Purdue University DigitalCommons	U.S.A	Digital Commons			×
University of Wollongong Research Online	Australia	Digital Commons	×		×
Warwick Research Archive Portal	U.K.	EPrints	×	×	×
University of Glasgow Published and peer-reviewed papers	U.K.	EPrints	×		×
Indiana University Scholarworks	U.S.A	DSpace	×		×

Conclusions

Altmetrics are here to stay, and librarians, mainly those involved in learning and research support activities, must be familiarized with the tools available to implement and disseminate it. This study indicates that only a few IRs report Altmetrics data. Other studies demonstrate that many scholars aren`t using Altmetrics tools or are aware of its power. Librarians play a crucial role in supporting the adoption of this metrics by researchers in a responsible way. The IR may be the starting point to raise awareness of researchers and institutional administrators towards Altmetrics, using it as a value-added service. The metrics generated could be used to contextualize the usage statistics that doesn't tell the "story" behind the readership of scholarly works. It could also be useful to recruit more content to IRs and supply authors and institutions with data for various stakeholders (ex.: funding agencies). Although in its infancy Altmetrics reveals to be very useful in providing data about the impact of non-journal publications. And, in some cases, it could be a good predictor of later citations such as usage statistics, as some studies states. Also its immediacy in showing impact helps to fill the gap until the first citations appear. But unlike citations, Altmetrics are capable of giving context and meaning to impact. And, unlike JIF, Altmetrics provides impact at article level. For this and other reasons mentioned before, Altmetrics could be a valuable source of information concerning research impact when used with traditional metrics. Yet work has to be done to overcome some limitations of Altmetrics such as: gaming (this also happens with the JIF), discipline-based bias when collecting data from the same platform, differences in the meaning of data extracted from different social media, volatile aspect of social media (changes in usage patterns or platform obsolescence) and absence of a standardized way for reporting Altmetrics data. Altmetrics, like traditional metrics, are not infallible. But its

increasing use by publishers on their websites and all the research that is being done in this field along with the tools that have been developed that deliver Altmetrics data, are a preview of the growing importance of these metrics in the research arena. So it is essential for IRs managers to be prepared to enter into the "Age of Altmetrics".

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Keywords: institutional repositories; research assessment; usage statistics; citations counts; Altmetrics

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Curriculum Vitae

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Using citation checking of Ph. D. dissertation references as a tool for evaluating library collections of the National and University Library in Zagreb

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Introduction

To identify how the library´s collection is being used is important to evaluate the library and to facilitate decision-making. Collection assessment can be provided by library collection usage study (mainly circulation data) or by user survey as a method of quantitative data collection. Another method is to check library holdings against standard bibliographies. In order to evaluate the collection of the National and University Library in Zagreb, this research, has chosen the citation analysis technique. Citation checking is a time-consuming and in-depth approach for determining the usefulness of libraries' collection to support research. By citation we implicitly mean a bibliographical entry in a footnote, reference list, or bibliography of a document that contains enough information (e.g., author, title, publisher, or journal title) to verify the original item. Citation checking of scholarly (research) documents and comparison of those citations against the availability of materials in a Library collection offers an unobtrusive method of evaluation of the collection`s ability to support research.

The citation analysis technique can be traced back to the works of Jewett in 1848 using references found in major scholarly works against the holdings of several American libraries. In the early 1960s, Coale evaluated the Latin American colonial history collection at Chicago´s Newberry library using bibliographies for a group of scholarly monographs. Citations drawn from student´s dissertations or term papers was another source of checklist used in many studies. The earliest being that of Emerson´s analysis of 23 engineering doctoral dissertations at the Columbia University between 1950 and 1954 (Heidenwolf, 1994) to determine the percentage of references held or not held by the other campus libraries in the university. A study by L. S. Zipp (1996) indicated that the data derived from research on graduate students provide more than a valuable insight into students' research behaviour. Zipp found that citation analysis in theses and dissertations is a reliable surrogate method for evaluation of library collection used by the faculty member publication citations against the research part of library collection. Another study investigated library collections of doctoral dissertations used by doctoral students in the humanities, sciences and social sciences (Buzzard and New, 1983). Checking citations in master theses was one of the methods by Ch. E. Bolgiano and M. K. King (1978) used to evaluate journal collections. E. T. Smith (2003) used a sample of graduate theses and dissertation bibliographies from 1991 and 2001 to provide "snapshots" of graduate research demands against the library collection.

This study attempted to evaluate a particular aspect of the library´s collection (meeting the users´ needs), intending to gather and consolidate preliminary data that could be used later as a basis for establishing a proper and systematic evaluation process for other aspects of the library´s collection.

Purpose

The goal of this study was to evaluate the usefulness of the current Library collection as a whole. This study is describing and analysing the application of citation analysis in the collection evaluation of National and University Library in Zagreb collections (NUL). Dissertations used for the purpose of this analysis had to satisfy two criteria:

1. Dissertations are by the scientists who are the users of NUL (registered member of NUL),
2. Dissertations were defended at the University of Zagreb in 2013.

This study describes the method of assessing usefulness of the NUL collections to an extremely important user group - graduate student. By looking at the citation patterns in Ph. D. theses and cited works written by the University of

Zagreb students against the library holdings, this study sought to answer one critical, question: Does the Library hold the resources our graduate students use?

Methods

The study analysed citation patterns, characteristics of information resources used by graduate students and their availability in the Library. In 2013 at the University of Zagreb, 270 dissertations were published. Our sample consisted of 73 Ph. D. Dissertations published in 2013 at University of Zagreb (all scientific fields) by scientists being the members of NUL. In order to identify all dissertations written at the University of Zagreb in 2013 we searched the NUL online catalogue. The results were grouped into two general categories: Social Sciences and Humanities and Natural and Applied Sciences (Biomedicine and Engineering). The next step was a comparison of Library's holdings data against the works cited in those theses. The cited literature was categorized by a type of material, language and available format in the Library (print and electronic). For the purposes of this study, printed document holding was defined as specific edition for monographs or specific issue in case of serials. Ownership of electronic resource was defined as permitted access to the full-text of the specific article cited.[1]

Findings

The findings reveal that National and University Library in Zagreb owned 46% of resources cited in dissertations of post graduate students at the University of Zagreb (members of NUL) and 16% of the cited bibliographic references are resources available on the Internet. The dissertations cited more periodicals than any other resource, 57%. Monographs were cited with the second greatest frequency, 34%. Citations by other type of resource show: journals 1.3%, proceedings 5%, other resources 2.5% (dissertation and etc). Analysis by scientific disciplines reveals that 48% dissertations are from Social Sciences and Humanities and 52% dissertations are from Natural and Applied sciences (biomedicine and engineering). In majority of citations both scientific disciplines have one predominant format. In Social Science and Humanities predominant format in bibliographic references is print and in Natural and Applied Sciences (Biomedicine and Engineering) e-resources.

Conclusions

In conclusion, citation analysis gives library researcher a deeper insight into user´s research patterns and library research needs, which should be important in recommending materials for selection and deselection. The complete results of the citation checking/analysis will provide information about the materials cited in dissertations being important in the collection development decision-making. The findings will provide the Library a better insight of its' own competitive position.

Keywords: citation analysis, dissertations, users, National and University Library in Zagreb, collection evaluation

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Curriculum Vitae

Kristina Romić. Acquisition Department, National and University Library in Zagreb (NUL), Croatia. Graduated from the Faculty of Science, University of Zagreb in geography and history, and from the Faculty of Humanities and Social Sciences, University of Zagreb in information sciences (librarianship). Holds an MA in economy. From 2008 to 2013 worked as cataloguer at the National Bibliography Department (Retrospective Bibliography Section) of the National and University Library in Zagreb. Since 2013 works at the NUL Acquisition Department as acquisition coordinator.

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Scholarly and social visibility of top hundred most cited articles affiliated by Croatian authors in Scopus

Dina Vrkić

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Abstract

Altmetric for Scopus launched in 2012 is a powerful third party web application that runs within the sidebar of Scopus article and abstract pages. It is a quick and easy way to see all of the social or mainstream media mentions gathered for a particular paper as well as reader counts on popular reference managers.[1] Current researches[2] are focused on proposing various methods for evolution of data in altmetrics while working on big datasets and comparing altmetrics values with article citation counts[3]. Previous studies indicate that there is a significant positive correlation between different altmetrics indicators and citations. The main purpose of this study is to analysis and determines usage and quality of Altmetric for Scopus, especially Mendeley and CiteULike altmetrics application data.

This study was conducted on the top hundred most cited articles affiliated by Croatian authors in Scopus bibliographic database in the period from January 1, 2012 to August 30, 2013. The results indicated that only 69 papers had aggregated Altmetric for Scopus application data. Although the sample size was unexpectedly small, the statistical analysis confirms statistically significant correlation between the altmetric score (composed of all available altmetrics indicators) and citations counts. Surprisingly, lack of altmetrics data was found in 31 articles. The method used to determine existence and problem of 31 omitted papers on social networks, was to manually check the altmetrics data through reader counts on reference managers Mendeley and CiteULike. The results showed that 18 papers had a significant number of readers, and 13 papers had none. The study showed that the application did not harvest data from those bookmarking/references managers. Altmetric for Scopus is a new application; the limitation of this application is that currently cannot harvest data in real time which is necessary in monitoring social media activity. The problem of data quality and provenance will take some time to adapt to these massive and hourly new incomes of fresh data sets into application. The findings suggest that the usage of Altmetric for Scopus has high potential for informing researchers, but still needs to be considered with caution.

Keywords: Altmetric for Scopus, Croatia, reference managers, scholarly visibility, social media

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[3] Thelwall, M., [et. al.] (2013). Do altmetrics work? Twitter and ten other social web services. PLoS ONE 8(5): e64841. Retrieved October 13, 2013 from http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0064841.

Curriculum Vitae

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PROGRAMME

SUNDAY, JUNE 15

Rectorate Building, Room 2.3

15:00 – 17:00 **Workshop A** *(for PhD students)*

Koraljka Golub (Linnaeus University, Sweden).
Project methodology in subject-based knowledge organization: experiences from the UK

17:30 – 19:30 **Workshop B** *(for PhD students, in Croatian language)*

Marica Šapro Ficović (Dubrovnik Libraries, Croatia).
Practical application of qualitative methods in libraries with special demonstration of oral history

20:00 **Welcome Cocktail for LIDA participants** – Hotel Zagreb Terrace

MONDAY, JUNE 16

Aula Magna, Main University Building

8:30 **Registration**

09:30 **Opening of LIDA 2014**

Introduction by: Tefko Saracevic
(Rutgers University, USA) and Tatjana Aparac-Jelušić (University of Zadar, Croatia).

09:45 – 10:30 **Introduction to Theme I.**

D. Bawden (City University London, UK).
The noblest pleasure'?: on gaining understanding from qualitative research

10:30 – 11:00 **Get Together Coffee**

11:00 – 12:30 **Accepted Papers –** Aula Magna, Main University Building

Nasrine Olson, Alexander Karlsson and Gustaf Nelhans (Högskolan i Borås BHS Borås Sweden).
Information fusion as an e-service in scholarly information use (INCITE) – Information needs of scholars in the age of big data

Nicole Boubée (Université Toulouse 2, France).
Cross self-confrontation method and challenges in researching active information seeking of youth

Silvana Sehić and Sanjica Faletar Tanacković (University of Osijek, Croatia).
Exploration of information needs and academic library use of the blind and visually impaired students in Croatia

13:00 – 16:00 **Workshop C (*brown bag lunch included*)** – Rectorate Building, Room 2.3

T. Merčun and M. Žumer (Univeristy of Ljubljana, Slovenia).
Using information visualization in libraries: why, when, and how

16:00 – 17:30 **Accepted Papers** – Aula Magna, Main University Building

Linda Z. Cooper (Queens College, CUNY, USA).
Proposal for a qualitative study of LIS students' self-assessment of growth and direction using Dervin's sense-making methodology applied to intrapersonal examination of their ongoing eportfolio development

Martina Dragija Ivanović (University of Zadar, Croatia).
Impact of public libraries in small rural communities: challenges to conducting a research

Isabelle Fabre and Cécile Gardies (Ecole Nationale de Formation Agronomique, France).
Photography: a methodological tool to question uses in the "learnings centers" in France

17:30 – 18:00 **Coffee Break**

18:00 – 19:00 **Invited Speaker (Theme I)** – Aula Magna, Main University Building

Elke Greifeneder (Royal School of Library and Information Science, Denmark).
Big data does not equal big picture

19:30 **Cultural Programme – Guided tours to the Sea Organ and Roman Forum**

TUESDAY, JUNE 17 – Aula Magna, Main University Building

09:30 –11:00 **Accepted Papers (Theme I)**

Thomas Weinhold, Bernard Bekavac and Sonja Hamann (HTW Chur, Swiss Institute for Information Research and Namics AG, Switzerland).
BibEval – A framework for usability evaluations of online library services

Josipa Selthofer and Tomislav Jakopec (University of Osijek, Croatia).
How can customized IT system support qualitative methods in web site validation: application for visual content analysis

Cathal Hoare and Humphrey Sorensen (University College Cork, Ireland).
A reporting framework for search session evaluation

11:00 – 11:30 **Coffee Break**

11:30-12:30 **Introduction to Theme II**

Blaise Cronin (Indiana University, USA).
Beethoven vs. Bieber: on the meaningfulness of (alt)metrics

13:00 – 14:30 **Break – Visit to State Archives, Archeological Museum, Gold and Silver of Zadar Exhibition or Museum of Antique Glass**

15:00 – 16:30 **Parallel Sessions**

Accepted papers (Theme I) – Aula Magna, Main University Building

Liz Lyon (University of Pittsburgh, USA), Manjula Patel (UCOLN, Bath, UK) and Kenji Takeda (Microsoft Research Connections, UK).
Assessing requirements for research data management support in academic libraries: introducing a new multi-faceted capability tool

Lisa Lamont (San Diego State University, USA).
Digital Library assessment through multiple measures

Vivien Petras, Juliane Stiller and Maria Gäde (Humboldt University in Berlin, Germany).
How we are searching cultural heritage? A qualitative analysis of search patterns and success in The European Library

Accepted Papers (Theme II) – Rectorate Building, Room 2.3

Jonathan Levitt and Mike Thelwall (University of Wolverhampton, UK).
From webometrics to altmetrics: one and a half decades of digital research at Wolverhampton

Isabella Peters (ZBW, EU), Alexandra Jobmann (Leibniz Institute for SME, Germany), Anita Eppelin (Leibniz Information Centre for LS, Germany), Christian P. Hoffmann (University of St. Gallen, Switzerland), Sylvia Künne (Institute for the World Economy, Germany) and Gabriele Wollnik-Korn (Leibniz Information Centre for LS, Germany).
Altmetrics for large, multidisciplinary research groups: A case study of the Leibniz Association

Leonidas Papachristopoulos and Angelos Mitrelis (Ionian University, Greece), Giannis Tsakonas (University of Patras, Greece) and Christos Papatheodorou (Ionian University, Greece).
Where and how knowledge on digital library evaluation spreads: a case study on conference literature

16:30 – 17:00 **Cofee Break**

17:00 – 18:00 **Invited Speaker (Theme II) -** Aula Magna, Main University Building

Paul Wouters (Centre for Science and Technology Studies, Netherlands).
The metrics acumen: supporting individual researchers in assessment

18:00 – 18:30 **Demonstrations and Accepted Papers** – Aula Magna, Main University Building

András Simon (Monguz KFT, Hungary).
Aspects of the constructing the metadata structure and the business logic of the integrated library systems, concerning to the measurability of the usage of the library and the traditional and electronic documents.

Accepted papers (Theme II)

Anna Maria Tammaro (University of Parma, Italy).
Altmetrics in the humanities: perceptions of Italian scholars

Primoz Južnič, Polona Vilar and Tomaž Bartol (University of Ljubljana, Slovenia).
What do researchers think about altmetrics and are they familiar with its abilities?

Free Evening

WEDNESDAY, JUNE 18 – Aula Magna, Main University Building

9:30 – 11:00 **Theme II – Accepted Papers**

Christian Schloegl (University of Graz, Austria), Juan Gorraiz and Christian Gumpenberger (University of Vienna, Austria), Kris Jack (Mendeley, UK) and Peter Kraker (Know-Center, Austria).
Are downloads and readership data a substitute for citations? The case of a scholarly journal

Blanca Rodríguez Bravo (University of Leon, Spain).
The use of electronic journals at academic libraries in North-Western Spain

Jeppe Nicolaisen (Royal School of LIS, Denmark).
What is a journal article and does it really matter?

11:00 – 11:30 **Coffee Break**

11:30 – 12:30 **Invited Speaker (Theme II)**

Cassidy Sugimoto (Indiana University, USA).
The metric menagerie: Tweets, Likes, and other social media metrics in the library

13:00 –14:30 **Break/Visit to State Archives, Archeological Museum, Gold and Silver of Zadar Exhibition or Museum of Antique Glass**

15:00 – 16:30 **Accepted Papers (Theme II)** – Aula Magna, Main University Building

Karima Haddou ou Moussa (GESIS – Leibniz, Germany), Ute Sondergeld (DIPF, Germany), Philipp Mayr and Peter Mutschke (DIPF, Germany) and Marc Rittberger (DIPF, Germany).
Assessing Educational Research: An Information Service for Monitoring a Heterogeneous Research Field
Jadranka Stojanovski and Franjo Pehar (University of Zadar, Croatia).
Multiple bibliometric indicators approach to Croatian open access (OA) journals

16:30 – 17:00 **Coffee Break**

17:00 –18:00 **Invited Speaker (Theme II)** – Aula Magna, Main University Building
Marija Brajdić Vuković (University of Zagreb, Croatia).
Challenges of globalized evaluation practices in the context of semi-peripheral and localized knowledge production

18:00 –19:00 **Accepted papers (Theme I)**
Evelyn Dröge, Julia Iwanowa and Steffen Hennicke (Humboldt University in Berlin, Germany).
A specialisation of the Europeana data model for the representation of manuscripts: The DM2E model
Katarina Švab, Tanja Merčun and Maja Žumer (University of Ljubljana, Slovenia).
E-searching bibliographic data with users: examples of 5 qualitative studies

19:00 – 21:00 **Poster Session** (with Cheese and Wine)

THURSDAY, JUNE 19

9:30 –11:00 **Parallel Sessions**
Accepted Papers (Theme I) – Aula Magna, Main University Building
Isto Huvila (Uppsala University, Sweden and Åbo Akademi University, Finland).
Where is the library, or is it an archive? Assessing the impact and implications of archaeological information collections
Kate-Riin Kont (Tallinn University of Technology Library, Estonia).
Using qualitative methods in assessing work efficiency of library services
Matthew Kelly (Curtin University, Australia).
Core collections for civil society's libraries: assessing value across domains

Accepted Papers (Theme I) – Rectorate Building, Room 2.3
Polona Vilar (University of Ljubljana, Slovenia) and Ivanka Stričević (University of Zadar, Croatia).
Quality school library – how do we find out?
Ross J. Todd and Punit Dadlani (Rutgers University, USA).
Collaborative information use by high school students in a digital learning environment
Sanjica Faletar Tanacković, Darko Lacović and Gordana Gašo (University of Osijek, Croatia).
Student use of library physical spaces: Unobtrusive observation of study spaces in an academic library

11:00 – 11:30 **Coffee Break**

11:30 –12:30 **Invited Speaker (Theme I)**
Donald Case (University of Kentucky, USA) - Aula Magna, Main University Building
Sixty years of measuring the use of information and its sources: from consultation to application

13:00 – 14:30 **Break/Visit to State Archives,**
Archeological Museum, Gold and Silver of Zadar Exhibition or Museum of Antique Glass

13:00 – 17:30 **Workshop D (*Brown Bag Lunch included*)** – Rectorate Building, Room 2.3
B. Wildemuth (University of North Carolina, Chapel Hill, USA).
Applying grounded theory methods to library and user assessment

16:00 –17:00 **Accepted Papers (Theme I)** – *Aula Magna, Main University Building*
Yolande Maury and Susan Kovacs (University Lille Nord de France – Lille 3, France).
Studying user appropriation of university and secondary school «Learning Centres»: Methodological questions and issues
Larry White (SUNY, University at Buffalo, USA).
Head library administrators' competitiveness and use of performance and competitive information in decision making

17:00 –17:30 **Coffee Break**

17:30 –19:00 **Guest of Honor's Talk** – Aula Magna, Main University Building
Professor Gary Marchionini (Univeristy of North Carolina, Chapel Hill, USA).
Libraries and literacies: from I to we

20:00 **Conference Dinner** – Restaurant Foša

FRIDAY, JUNE 20 – Aula Magna, Main University Building

8:30 – 10:30 **PhD Forum (sponsored by ASIST)**
Darko Lacović (PhD program, University of Zadar, Croatia).

Information needs and information behaviour of Catholic priests in pastoral work
Leo Appleton (Edinburgh Napier University, UK).
How do public libraries measure their socio-economic value and impact upon citizenship in the UK?
Mate Juric (PhD Program, University of Zadar, Croatia).
Reading in print and digital media

10:30 –11:00 **Coffee Break**

11:00 –12:00 **Accepted Papers (Theme I)** – Aula Magna, Main University Building
Sheila Corrall (University of Pittsburgh, USA).
Library service capital: The case for measuring and managing intangible assets
Carol Gordon (Gordon Consulting, USA).
The convergence of performance and program assessment: A three-dimensional action research model

12:00 – 12:30 **Closing of LIDA 2014 and Introducing LIDA 2016**

Break

15:00 – 16:30 **10th Anniversary of the Department of Information Sciences in Zadar** – Aula Magna, Main University Building

Round Table on the Information Science Education

Panel Chair: Tatjana Aparac-Jelušić

Panelists: Sheilla Corrall, Donald Case, Elke Greinefelder, Gary Marchionini, Marc Rittenberger, Christian Schlögl, Ivanka Stričević and Tefko Saracevic

Poster presentations:

Ivana Pažur.
Library services/ resources and handheld mobile devices
John Dove.
User-centered design as it pertains to online reference systems
Lovela Machala Poplašen and Lana Zrnić.
A is for altmetrics: metric for all!
Kristina Romić and Goranka Mitrović.
Citation analysis as quantitative method of library's collection evaluation: on specimen of Collection of dissertations and master thesis in 2013 in National and University Library in Zagreb
Dina Vrkić.
Scholarly and social visibility of top hundred most cited articles affiliated by Croatian authors
Cathal Hoare and Humphrey Sorensen.
On modelling mobile context
Alessandro Gandolfo, Mate Juric and Srećko Jelušić.
Quantitative and qualitative methods applied in comparative student reading habits and book buying research in Croatia, Italy and China: Pilot study
Tamara Krajna and Andreja Tominac.
The extent of academic library services support to e-learning
Kate-Riin Kont.
Acquisition process: A case study in Estonian university libraries
Salima Rehemtula, Maria De Lurdes Rosa, Paulo Leitão and Rosario Arquero Avilés.
Altmetrics in institutional repositories: new perspectives for assessing research impact
Narcisa Rastoder and Biserka Sabljaković.
How often student graded papers are used in creating new student papers?
Marina Mihalić.
National and University Library in Zagreb - from usage to quality measures – establishing baselines for service
Dejana Golenko.
Application of qualitative methods in researching academic library users: Some practical experience
Alisa Martek and Snježana Šute.
Library collections availability in online environment though processing user requests : case study in the Croatian State Archives Library
Marica Šapro-Ficović.
How qualitative methods can show value of libraries : results from an unusual study
Larry White.
Impacts of work experience and gender on the use of performance and competitive information by library administrators
Marija Primorac and Sanja Škugor.
Online databases and students: Why don't they use them?
Mirko Duić.
Film collection management: methodological approaches
Marton Nemeth and András Simon.
ELDORADO project : a major upgrade of digital library services in Hungary

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LIDA 2014 was co-organized by the Department of Information Sciences, University of Osijek, Croatia

Invitation to the 14th LIDA
University of Zadar, Zadar, Croatia, June 13-18, 2016

List of participants of LIDA 2014 conference

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