USER STUDIES IN DIGITAL LIBRARIES: Models, Standards, Methods, Questions



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WHY DO WE NEED TO KNOW MORE ABOUT THE USERS?

- Providing better services
- Coping with information overflow
- Addressing issues of value and impact in the context of information society and knowledge economy
- Refining charging models (cost per view, subscription services)

User studies: current methods and challenges

MYTHS ABOUT USERS

MYTH 1: USERS? OF COURSE WE KNOW THEM!

 Mostly based on knowing ourselves ☺



- Beyond Humanities and Arts?
- Multilinguality/ Multicultural use
- Refinement of user needs and expectations
- Digital objects reuse and enrichment
- From informing users to rich user experiences

MYTH 2: IF WE BUILD IT THEY WILL COME



- Supply-driven logic
- Still many projects starts with the idea "this has to be of interest to a wider community" but do not check carefully what the community really wants

- Demand-driven
- Moving target
- Groups vs individuals personalisation

MYTH 3: "THE DIGITAL MCDONALDS"

• Offering several options makes everyone happy

- Knowledge about groups vs knowledge about individuals
- Personalisation / recommender systems



MYTH 4: USER STUDIES? ERR... THIS IS THE SAME AS EVALUATION... OR USABILITY?

- Not all methods for evaluation of DLs involve [end] users
- User studies also aim to understand better the user (e.g. information behaviour studies)
- Usability is only one aspect of those

Issues

• Users are often forgotten!



2008 FERNANDO TORRE HANN RUPERTICIALINE ALMENDECCH

MYTH 5: FOR USERS, QUALITY MEANS INNOVATION

 Assumption that all users want the latest technological gadgets and services.

- User satisfaction does not depend entirely on innovation! ISO/IEC 9126-1 - Information Technology. Software product quality: quality model
 - Quality: the capability of the software product to enable specified users to achieve specified goals with effectiveness, productivity, safety and satisfaction in specified contexts of use.



TOP FIVE REASONS **NOT** TO DO USER TESTING/STUDIES



User studies: current methods and challenges

DIGITAL LIBRARIES: USERS' PLACE IN KEY MODELS AND STANDARDS

INTERDEPENDENCE OF HUMAN-CENTRED DESIGN ACTIVITIES



ISO 9241-210:2010(E). Ergonomics of human–system interaction— Part 210: Human-centred design for interactive systems

DELOS DLRM DIGITAL LIBRARY REFERENCE MODEL



DELOS DLRM



The model does not provide an extensive set of roles: testing and evaluation are not included in the roles, even if they are essential in the DL lifecycle.

In addition, besides human actors, there are also bots, intelligent agents and other machine actors.

EXAMPLE: EUROPEANA USERS



4

5S MODEL



A representation of user needs could be done combining two points of view:

- what
 Scenarios are
 most typical
 for the users,
- what properties of a Society specify a particular community of users (like the designed community of OAIS model)

DIGITAL LIBRARIES AND THEIR IMPACT/VALUE





Harry Verwayen,

EDL Foundation **User studies: current methods and challenges**

EVALUATION OF DIGITAL LIBRARIES

BASIC EVALUATION ISSUES

- Quality
- Usability
- Accessibility
- Methods
 - Empirical (involve users)
 - Analytical
 - Heuristic evaluation
 - Cognitive walkthrough
 - Claims analysis
 - Attribute by attribute
 - Interaction triptych model
 - CASSM (Concept-based Analysis of Surface and Structural Misfits)
- Pivotal role of experts (intermediaries)

User studies: current methods and challenges

INFORMATION BEHAVIOUR STUDIES

INFORMATION BEHAVIOUR RESEARCH



- Change of focus
- Searching vs foraging
- Numerous theories

INFORMATION NEEDS

Information needs are not fundamental but secondary order needs arising from the desire to satisfy primary needs.

Classification of information needs (Taylor 1968):

- Visceral need the actual, but unexpressed need
- Conscious need the recognized need at a cognitive level.
- Formalized need a formal statement of the need.
- Compromised need –the question (query) as presented to the information system or intermediary.

WILSON'S MODEL (2000)

Information Behavior is the totality of human behavior in relation to sources and channels of information, including both active and passive information seeking, and information use. Thus, it includes face-to-face communication with others, as well as the passive reception of information as in, for example, watching TV advertisements, without any intention to act on the information given.

Information Seeking Behavior is the purposive seeking for information as a consequence of a need to satisfy some goal. In the course of seeking, the individual may interact with manual information systems (such as a newspaper or a library), or with computer-based systems (such as the World Wide Web).





WILSON'S MODEL (2000) CONT'D

Information Searching Behavior is the 'micro-level' of behavior employed by the searcher in interacting with information systems of all kinds. It consists of all the interactions with the system, whether at the level of human computer interaction (for example, use of the mouse and clicks on links) or at the intellectual level (for example, adopting a **Boolean** search strategy or determining the criteria for deciding which of two books selected from adjacent places on a library shelf is most useful), which will also involve mental acts, such as judging the relevance of data or information retrieved.

Information Use Behavior consists of the physical and mental acts involved in incorporating the information found into the person's existing knowledge base. It may involve, therefore, physical acts such as marking sections in a text to note their importance or significance, as well as mental acts that involve, for example, comparison of new information with existing knowledge.



CONNECTION TO INFORMATION SYSTEMS (JANSEN, RIEH)



User studies: current methods and challenges

METHODS FOR USER STUDIES IN DL

BACKGROUND

- Anneli Sundqvist (2007): "the general knowledge of user behaviour is a mixture of common sense, presumptions and prejudices" in a study of digitised archives.
- The Institute of Museum and Library Services: "The most frequently-used needs assessment methods do not directly involve the users" (2003).
- Michael Khoo et al.: "In the case of digital library researchers, the focus of research is often on technical issues (e.g., information retrieval methods, software architecture, etc.) rather than on usercentered issues. When these researchers turn to user based evaluations, they therefore often lack the necessary expertise to develop robust Human Computer Interaction (HCI) experiments, and their goals are typically limited to "proof of concept" tests, rather than prescribing user motivations or cognitive impacts." (2009).

Timeline



KEY QUESTIONS - METHODS

• How user studies help to understand better the *needs* in digital resources and their use?

 What questions could be answered by different types of studies?

• How to construct a study?

WHAT DATA CAN WE GATHER?

Wide range...

- Both through questioning and observation – direct, indirect
 - Quantitative
 - Qualitative
- Growing role of evidence-based
 research

HOW THE OUTCOMES COULD LOOK LIKE?

Ease of resource discovery

- Most participants found that the resource is very easy to use for resource discovery,. "easy to find what I was looking for" (P6); "it comes across as very well structured and provides searching flexibility for the user" (P8). There are participants which found the search "very simple and what else could I expect.... Although you do get a lot of hits on the first search, the vast majority of people like to type something in and then advance if they want to." (P3); a similar view was expressed by (P9). However, the multiple results are seen as beneficial in the teaching context "Initially you might get a lot of hits, but in the context of teaching you can never have too many." (P4). The resource as "a good research tool for students and academics" (P5). One interviewee noted that the appearance of the search term in the results should also be highlighted: "I like the highlighting of the search term in the index search" (P10)
- Google Analytics indicates that 4,210 of recorded visits, representing 44.16% of the total number of visitors, were directed through 10 search engines. It is worth noting what users had been searching for: 11 researchers who are searching for the Stormont Papers web site; 16 researchers who are searching for an online copy of the Stormont parliamentary debates, but are not necessarily aware or looking for the Stormont Papers; 23 searched for terms that returned as a result a resource from Stormont papers.

HOW THE OUTCOMES COULD LOOK LIKE?

Ease of resource discovery

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"a good re noted that the appearance of the search highlighted: "I like the highlighting of the s but I have no idea why I am retrieving in

Qualititative

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Quantitative



(SPHERE project, 2011)

erms

search

(P10)

6% of

ching



Example: Criteria for evaluating Web content by students, Head, Eisenberg, 2011



Example: Criteria for evaluating Web content by students, Head, Eisenberg, 2011

Average values of either $Precision_{[0+1]}$ or $Precision_{[0+2]}$ bare no significant difference for either library



Precision-based Metrics for Each Library



Example: Kruk et al., 2008









"Maria is a School teacher, comfortable with computers and the internet. Happily Googles but also



frequently having a specific target for her searches as she prepares for work. She uses her mobile to update her Facebook status, but mostly for calling and texting. Her aim is often to prepare for classes, but also to find new ways of motivating her pupils" - Personas (short version) from EuropeanaConnect.

"Maria is a School teacher, comfortable with **Summative** and the internet. Happily Googles frequently having searches as she uses her mobile i status, but mostly Her aim is often to also to find new ways of motivating her pupils" - Personas (short version) from EuropeanaConnect.





AND EVEN MORE CHOICES...



USER STUDIES IN THE DL CONTEXT

- In most cases the current studies are evaluating existing DLs; DLs in development are addressed less frequently.
- Many studies are "stand-alone"; they address a specific DL or a small group of DLs and to be able to compare DLs we need to know how to compare the user experiences.
- The studies focus mostly on specific aspects such as usability; more work needs to be done to contextualise better specific DL user studies and information behaviour as well as user experience studies.
- In many cases the studies address a limited set of user communities but in the WWW this is not sufficient.

SUMMARY OF METHODS

- Direct user involvement
 - Questionnaires
 - Focus groups
 - Diaries
 - Observation
- Indirect observation
 - User logs
 - Eye tracking
- Personae
- Ethnographic studies
- Use scenarios
- Growing use of mixed methods

TYPICAL FAULTS: INDIVIDUAL



Developer watching videotape of usability test.

Source: http://www.cadfanatic.com/2009/08/solidworks-usability-testing/

TYPICAL FAULTS: GROUPS



Source: http://smallbiztrends.com/2009/03/when-focus-groupsare-not-well-focused.html

Summary of methods

	SUMMATIVE	Personalisation models	Use scenarios	Personas Expert evaluation
TYPE	INDIRECT	Diaries Personal log analysis	Mid-size log analysis	Deep log analysis
	DIRECT	Interview Eye tracking	Focus groups Ethnographic studies	Questionnaires
		INDIVIDUAL	SAMPLES	POPULATION
			Involvement	

Cost of methods

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	·	INDIVIDUAL	SAMPLES	POPULATION
Involvement				

Timeframes for methods



TIMING OF STUDIES

Туре	What is it used for?
Front-end involvement	Users can take part in assessment on a variety of technical requirements , e.g. resolution, dimensions of digital objects, preferred formats for use. At this stage users can also take part in exploratory research, e.g. needs in new resources and defining requirements, as well as rationale for selection, appraisal and prioritisation of content.
Normative evaluation	This type of evaluation usually takes form of iterative circles of process-and-evaluation when implementing digitisation of collections. Most typically such evaluation will focus on usability , e.g. interfaces and presentation of digitised resources; coverage of identified needs for specific audiences.
Summative evaluation	Here the focus is the final output and the accordance to the expectations and requirements of target communities/organisation structures/the wider disciplinary domain.
Direct engagement in the digital resource creation	Direct user engagement can utilise social media tools which allow users to contribute their own digital objects or to take part in the enrichment of resources – e.g. supplying full texts, or metadata.

OPEN QUESTIONS...

- Why and when to involve users when digitising collections: front-end, normative, summative evaluation
- How to involve users?
- How to address needs of future users?
- How to evaluate impact and value of digital resources?

AND THIS IS NOT ALL...

Crowdsourcing



What are we going to adopt for OUR DL?

MY TWO PENCE...

- Knowledge about users is part of the professional expertise in digital libraries
- However we still face multiple
 misconceptions about users
- We need
 - Research agenda
 - Benchmarking
 - Wider professional discussion

Thank you!

User Studies for Digital Library

Development (forthcoming) Milena Dobreva, Andy O'Dwyer and Pierluigi Feliciati (eds) Facet Publishing ISBN: 978-1-85604-765-4



User Studies for Digital Library Development

United by Mirra Enterior, Anty Winger and Parkas Patron

