Testing Children’s Information Retrieval Systems: Challenges in a New Era

Jamshid Beheshti  
School of Information Studies, McGill University, Montreal, Canada  
jamshid.beheshti@mcgill.ca

Dania Bilal  
School of Information Studies, University of Tennessee, Knoxville, USA  
dania@utk.edu

Allison Druin  
College of Information Studies, University of Maryland, Maryland, USA  
allisond@umiacs.umd.edu

Andrew Large  
School of Information Studies, McGill University, Montreal, Canada  
andrew.large@mcgill.ca

Moderator

PURPOSE

The purpose of this Panel is to discuss and elaborate on testing and evaluation challenges facing the designers of new and novel information systems for children. Since 2002, ASIST has hosted 16 papers, panels, and posters on information retrieval systems, digital libraries, and user interfaces for children. Traditionally, much of the research on IRS has been experimental, where researchers strive to control as many variables as possible in a carefully regulated environment to minimize interference from external factors. Generally, research in the field has followed the Cranfield 2 model (Cleverdon, 1967), which to date remains the main approach for testing, and lead most of the research efforts in Text REtrieval Conference (TREC), and Cross-Language Evaluation Forum (CLEF) (Voorhees, 2002).

Given the difficulties experienced by children in interacting with conventional IRS, browsing may be an alternative method for searching for children requiring less cognitive load than other conventional techniques such as keyword searching. Children, in particular are more adapted to browsing, and may use this technique frequently to find information for both assigned and self-imposed tasks. Various mechanisms have been proposed to facilitate children’s browsing, ranging from alphabetical searching (Large et al, 2006) to conventional and visual subject taxonomies (Druin, 2005; Large et al, 2009), and virtual reality interfaces (Beheshti, Large, Julien, 2005). However, testing and evaluating these systems pose both theoretical and practical challenges for researchers.

CHALLENGES

Researchers engaged in designing novel IRS for children face new methodological challenges, beyond the traditional Cranfield 2 model:

• System evaluation: How is a system that is designed primarily for browsing rather than keyword searching tested? Are metrics such as recall and precision appropriate measures for a children IRS, which is designed for browsing? Is the testing framework proposed for interactive information retrieval systems (IIR) (Borlund, 2003) appropriate for a children’s system?

• User-system evaluation
  o Children do not form a homogenous group of users. Many factors such as Socio-economic and cultural differences (Bilal, Sarangthem, Bachir, 2008), and their age (Large, 2005) may affect their interaction with an IRS.
  o Numerous information seeking models have been proposed, including Wilson (1999),

BACKGROUND

Research has shown that the overwhelming majority of information retrieval systems (IRS) such as Google are unsuitable for children. Many of the problems typically encountered by children in information retrieval includes determining appropriate concepts, translating these concepts to keywords that the information retrieval system can understand, finding appropriate synonyms, and distinguishing homonyms (Bilal, 2000; Druin et al, 2009; Large, Nesset, Beheshti, 2008).

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PANELISTS

Children’s information retrieval systems. Discuss these and other challenges in testing and evaluating the session. The panelists will draw on their extensive experience to present and the ensuing discussions, the moderator will summarize the deliberations in the last 10 minutes of the session.

Andrew Large contends that in designing and developing a children’s retrieval system both experimental and operational testing pose challenges to researchers, but that each offers a unique insight into children’s reactions to information technologies. Large and Beheshti have developed a children’s web portal, History Trek (www.historytrek.ca), which has attracted more than 800,000 hits since its public début in September 2007. The portal was created by an intergenerational team comprising adult designers and young students and provides access to more than 2,300 web pages in English and French on Canadian history. The portal has been tested in experimental, and in actual operational (classroom) environments.

Biography: Andrew Large is an Associate Dean, Research and Graduate Students, at the Faculty of Education at McGill University. He is a member of the School of Information Studies, where he is the CN-Pratt-Grinstad Professor of Information Studies. He has conducted research and produced numerous articles, books, and book chapters on information retrieval, and children information seeking behavior in many prestigious international publications.

1. **Andrew Large:** *Experimental versus operational testing of a children’s portal*

Andrew Large contends that working with children on research is not only rewarding, but also “unique” and requires “specific” abilities and skills on the part of the researcher, and well as use of “appropriate,” and “innovative” research methodologies to reap significant results and benefits. She challenges system designers and will comment on their insufficient efforts in addressing children’s behavior, cognition, and affect in the design of interfaces. Bilal has been studying children’s holistic information behavior since 1997. She has published several studies including children’s interaction with and design of web search engines (e.g., Bilal, 2000, the International Children’s Digital Library (ICDL) (e.g., Bilal & Bachir, 2007); and on children’s cognitive structures of taxonomies in web directories. She has focused efforts on both children’s information behavior in uniculural and multicultural environments. She has employed empirical (quantitative) and qualitative research methods to investigate and test the usability of information retrieval systems from the children’s perspectives. She has recently developed models of children’s interaction with the International Children’s Digital Library (ICDL), the results of which have led to new proposed models for children’s information behavior consisting of seven modes of activities (e.g., Bilal, Sarangthem, & Bachir, 2008).

Biography: Dania Bilal is a Professor of information sciences at the School of Information Sciences (SIS) at the University of Tennessee, Knoxville. She published research on the cognitive and affective information behavior of children’s interaction with web search engines, developed measures for assessing the usability of cross-cultural international web interfaces, studied the design of web search engines’ directory structures against children’s cognitive structures of taxonomies, and modeled children’s information behavior in digital environments. Her recent research includes information behavior of children with cognitive

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disabilities; and query and browsing analysis of children’s web interaction.

3. Allison Druin: Testing the children’s information retrieval system on mobile devices

Allison Druin maintains that both quantitative and qualitative methodologies are needed to test new systems, such as the ICDL, in various environments. She argues that children, regardless of their diverse cultural backgrounds and their context, use visual tools to search and browse for information, and that systems should be age-sensitive. Druin and her intergenerational and interdisciplinary team at the University of Maryland have developed the International Children’s Digital Library (ICDL) (http://en.childrenslibrary.org/), which provides children with several search options, including a ‘flatten’ hierarchical subject category for easy navigation. ICDL contains more than 4,000 children’s books, used monthly by some 100,000 users from 150 countries. Druin and her team have built two ICDL applications for the iPhone and one for the iPad.

Bio: Allison Druin is an Associate Professor at the College of Information Studies at University of Maryland, where she is the Director of the Human-Computer Interaction Lab at the Institute for Advanced Computer Studies, and an Affiliate Faculty member at the College of Education. She has received major grants to design and develop the International Children’s Digital Library, and conduct research on its use across the world. She has published many articles on the ICDL, as well as on mobile technologies for children.

4. Jamshid Beheshti: Testing a virtual reality children’s information retrieval system

Jamshid Beheshti claims that when constructing a novel system, such as a virtual reality library, children’s participation at the design stage is far more limited than when developing more conventional systems. Testing such a system is equally unconventional. The system should be evaluated by how much information it can transfer to the child regardless of the immediate utility of that information. Beheshti and Large have designed a virtual reality library (VRLibrary), the objective of which is to assist children and young adults in browsing information available on the web for educational projects (Beheshti, Large, Julien, 2005). VRLibrary was constructed using the metaphor of a physical library with rooms, bookcases and books. The system was tested against a conventional portal under experimental conditions, and the data are currently being analyzed.

Bio: Jamshid Beheshti is an Associate Professor at the School of Information Studies at McGill University, where he was appointed as the Director of the School for six years, the Associate Dean of the Faculty of Education for four year, and the Interim Dean of the Faculty. He is the principal investigator on a Social Sciences and Humanities Research Council of Canada grant on Virtual Environments as an Intervention Agent in the Information-Seeking Process of Elementary School Students. In collaboration with his colleagues, he has obtained many research grants, has published widely, and has presented his research at national and international academic and professional conferences.

SIGs

List of all SIGs who might find this panel of interest:

- Digital Libraries (DL)
- Human-Computer Interaction (HCI)
- Information Needs, Seeking and Use (USE)

REFERENCES


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