

Practical and scholarly implications of information behaviour research: a pilot study of research literature

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Introduction. *This pilot study examined how current information behaviour research addresses the implications and potential impacts of its findings. The goal was to understand what implications and contributions the field has made and how effectively authors communicate implications of their findings.*

Methods. *We conducted a content analysis of 30 randomly selected refereed research papers on information behaviour published between 2008 and 2012 in the U.S. and Canada.*

Analysis. *Analysed elements included journal, year, author affiliation, types of implications, theory, methodology, context and scope of implications, location of implications, intended audience, beneficiaries, and future research.*

Results. *Twenty-three papers offered practical implications; seven included both practical and scholarly implications. Only eight papers referenced theory and of these, only three generated theoretical implications. Seventy percent of studies discussed practical implications for librarians and archivists. Implications were often context-bound in that they related to a particular group or environment.*

Conclusion. *The impact of information behaviour research encompasses a range of areas. A stronger relationship between theory, practice and research must be achieved to advance the field. To facilitate generation of stronger*

implications, we proposed six components of implications and suggested criteria for strong, moderate and weak research implications.

Introduction

Information behaviour is a multi-disciplinary field of research that focuses on how people interact with information through various sources and channels in different contexts (Case, 2012; Fisher, Erdelez and McKechnie, 2005; Wilson, 2000). Information behaviour encompasses a range of human behaviour, including purposive behaviour such as seeking, using, sharing and creating information, as well as unintentional or passive behaviour, such as encountering information serendipitously and actively avoiding information. Researchers in this area are concerned with people's behavioural and cognitive activities as well as their affective states when they interact with information sources (SIG USE, 2014).

Overall, information behaviour studies have illuminated a broad range of information-related phenomena across formal and everyday life, personal and social spheres and physical and digital environments.

The field of information behaviour seeks to understand users' perspectives in information seeking and use, as well as how systems can take these perspectives into account. In order to discern users' experiences, it is necessary to understand their contexts – how their behaviour is a product of, and influenced by, the particular situations or communities they are a part of (Case, 2012). Information behaviour research in applied disciplines such as library and information science and information systems is interested in theories that explain information behaviour as well as the application of this knowledge about users in context in order to solve practical problems. That is, information behaviour studies are conducted to develop theory that informs us about information behaviour, as well as to develop relevant information services and systems that might meet the needs of users.

As in every discipline, it is critical that information behaviour researchers communicate and disseminate the value of their research through appropriate venues such as research journals or conferences. Regardless of how rigorously a research project is conducted, results are of limited value unless the implications are clearly communicated to scholars and practitioners (Powell and Connaway, 2004). Research papers must acquaint the reader with the questions of *so what, how does this apply to me, or how does this benefit users or society*, questions that point to how research impacts and influences the growth of academic disciplines. This study examined recent information behaviour literature to understand how information behaviour research represents the impacts and implications of the discipline and how these are discussed and built upon. As a basis for this study, we defined implications as what authors of information behaviour research papers explicitly addressed about how the results of their studies extended practical, theoretical and methodological research boundaries.

Problem statement

Despite its growth as a scholarly field and its relevance in today's information society, information behaviour research has been critiqued for the quality or, at times, lack of professional and scholarly implications. For example, some information behaviour-in-context research lacks practical implications; however, it is desirable that empirical studies are ultimately used to improve information systems and services (Fidel, 2012). Also, discrete research projects on information behaviour do not necessarily lead to either advancement of theory or an accumulation of comparable findings (Case, 2012). Vakkari (2008) pointed out that some information behaviour studies present '*unclear idea[s] of one's own contribution and therefore, lack of theoretical or even empirical growth*' (para. 36).

This pilot study comprised a content analysis of empirical research literature on information behaviour with the aim of identifying the ways authors address implications and the potential impact of their study results. This study is significant because there have been very few systematic attempts to review how information behaviour researchers address implications and potential impacts of information behaviour studies. This effort is meaningful in understanding (1) what implications and contributions the field has made and (2) how effectively information behaviour researchers communicate implications of their findings. The study results will call for and guide generation of stronger implication and broader potential impacts of information behaviour research.

As such, this study focuses on identifying the ways authors report implications, impacts and contributions of their findings in refereed research journals. The authors assume that research reports are supposed to delineate implications of their findings for scholarly and/or practical fields or the benefit of study results on users and society. Measuring actual impacts of each research project is beyond the scope of the study. This is a pilot study comprising a content analysis of research literature to develop a research protocol and generate preliminary findings on the implications of information behaviour research. It is not a comprehensive review of information behaviour research.

The overarching research question is: how does current information behaviour research address the implications and/or impacts of its findings? Specific sub-questions include:

- What kinds of implications and impacts are generated by information behaviour research?
- What needs to be improved in addressing the implications and impacts of information behaviour research?

Literature review

Research implications in *Information Seeking in Context* conference proceedings

Little research has comprehensively investigated how information behaviour researchers address implications of their findings. McKechnie, Julien and Oliphant (2008) examined if and how the results of information behaviour research are applicable to the work of library and information science practitioners. They conducted a content analysis of 117 research reports published in the 2006 Information Seeking in Context conference proceedings. They found that 59% of the papers included practical implications, but most of these implications (57%) were vague. McKechnie *et al.* also examined the readability of the implications as well as what strategies were used by authors to communicate their findings to practitioners. Ineffective strategies were found in vague statements that claimed

the study results had implications for practice without actually delineating any; implicit implications that were never explicitly stated; and implications for future research as the only implications that might inform practices. There were papers that signalled that practical implications would be given but then did not deliver any. Papers that applied effective strategies integrated practical implications throughout the paper, included short but explicit statements at the end of the paper and located specific implications in a clearly labelled separate section. The focus of their study, however, was on practical implications and did not address scholarly implications.

Vakkari (2008) conducted a content analysis of information behaviour papers accepted for the 1996 and 2008 *Information Seeking in Context* conferences. Among several theoretical and methodological trends discovered, he found that 56% of the papers presented in 2008 did not identify specific contributions while in 1996 40% did not delineate special contributions. He discussed promising features found in the papers, such as '*the growing versatility of research topics*' and '*increased variety of methods and the use of multiple methods*' (para. 39). Shortcomings included weak conceptual relationships to earlier studies, loose theoretical frameworks and a lack of explanation on how information behaviour is related to some features of information systems and services. In analysing how the theoretical frameworks of the studies were connected to earlier work and how their contributions were related to the existing body of knowledge, he offered a classification consisting of different categories, e.g., no connections, loose connections, medium connections and strong connections. The types of contributions that each study made to the existing body of knowledge included: empirical support, new categories or concepts, revision of a model, new methodological approaches and nothing special. Fidel (2012) analysed forty-two research papers presented at the 2006 and 2008 ISIC conferences and found that 48% of the papers '*offered no contribution, either to research or to practice*' (p. 156).

Besides these studies, which examined the Information Seeking in Context conference proceedings, it is rare to find studies that investigate how information behaviour researchers address the implications of their findings, or that assess the soundness of the implications presented in research papers. This study extends previous studies in that it reviews research papers in peer-reviewed journals rather than conference proceedings, extends beyond 2008 and also offers an in-depth analysis of the types of implications generated by information behaviour studies.

Implications in research methods books

The authors reviewed research methods textbooks that are used in Masters' and PhD research methodology courses taught in American Library Association (ALA) accredited schools with a PhD program. In the fall of 2013, an enquiry was sent to

instructors of methodology courses regarding methods textbooks adapted to their courses. A total of nineteen titles were collected. (See [Appendix 1](#) for a list of the methods textbooks.) All three authors inspected the textbooks to find what they had to say about generating and presenting research implications and potential impacts.

Only eight out of the nineteen textbooks explained generating and presenting research implications. Discussion about implications usually appeared in the chapter or section on reading, writing and evaluating research reports. These textbooks spent from a paragraph to a couple of pages to discuss issues related to implications of research findings. For example, Powell and Connaway (2004) presented a chapter devoted to writing the research report and explained the importance of communicating research implications through appropriate vehicles. They provided the following criteria for judging a research report regarding implications:

- Are applications and recommendations, when included, judiciously made?
- Did the research appear to be aware of the theoretical implications, if any, of the research?
- Did the researcher make recommendations for future research? (p. 275).

Williamson and Johanson (2013) concurred that research writing must answer the so what question:

What effect might the research have on users? While it is important to be aware that not all research is generalizable per se, how might your research affect general practices? Be conscious and clear about who benefits from the research. Do the findings imply changes to services and practice? Do they contribute to better theoretical understanding? Can policy be affected or practice improved by what you have discovered from your research? What further research questions arise from these findings? (p. 481).

Charmaz (2006) presented criteria for evaluating grounded theory studies in terms of originality, credibility and usefulness. She suggested implication-related criteria in the usefulness category with the following questions:

- *Does your analysis offer interpretations that people can use in their everyday worlds?*
- *Do your analytic categories suggest any generic processes?*
- *If so, have you examined these generic processes for tacit implications?*
- *Can the analysis spark further research in other substantive areas?*
- *How does your work contribute to knowledge? How does it contribute to making a better world? (p. 183).*

Palys and Atchison (2008, p. 386) suggested that authors must address in the discussion and conclusion sections *'what the implications of these results are for the bigger issues that made this research "interesting" for you in the first place'*. Miles and Huberman (1994, p. 304) mention researchers should *'describe their broader meaning in the worlds of ideas and action they affect'*.

Wallace and Van Fleet (2012) discussed benefits of empirical research in the field of library and information science and provided a categorization of benefits, that is, benefits to society, to the profession, to the institution and to the researcher. Benefits to society include improvement of quality of life of library and information service users and of the population in general. They suggested *'a library or information system that functions at an enhanced level of quality or produces an increased volume of output is an obvious and desirable outcome of research'* (p. 33). Research benefits to the library and information science profession include theory testing, action, universality and generality, cumulation and more (pp. 33-34). Wallace and Van Fleet addressed both scholarly and practical contributions to the field, such as testing of an explanatory, general theory to explain a discipline or professional field as well as translating research results into action. Regarding universality and generality, the authors suggested *'the development of broadly applicable standards and guidelines for professional practice both builds on and contributes to the development of universal general principle'* (p. 34). Cumulation refers to the cumulative impact of research and evaluation: *'as results are accumulated and synthesized it becomes possible to identify definitive patterns and variations that add to the depth and breadth with which the phenomenon can be understood'* (p. 34). Also, library and information research benefits the institution by increasing efficiency, reducing expense, improving managerial effectiveness and achieving institutional goals and public relations. In addition, research activities give the researcher personal and professional satisfaction.

In sum, while rather brief, the research methods textbooks used in ALA-accredited, PhD-awarding schools seem to agree that research in an applied area such as library and information science must generate both scholarly and practical implications, address benefits of the study to users, the society and the institution and recommend future research directions.

Research design

This pilot study is a content analysis of information behaviour research literature published between 2008 and 2012 in the U.S.A. and Canada. Table 1 shows the literature inclusion and exclusion criteria.

Parameters	Inclusion criteria	Exclusion criteria
Publication location	U.S.A. or Canada	Not U.S.A. or Canada
Language	Studies written in English	Studies not written in English

Time-frame	Studies published between Jan. 2008 and Dec. 2012	Studies published before Jan. 2008 or after Dec. 2012
Type of paper	Peer-reviewed, scholarly papers	Opinion papers, anecdotes
Methodology	Studies that reported the methodology used (e.g., data collection or analysis methods)	Studies that did not employ methodology

Table 1: Literature inclusion and exclusion criteria

Data collection

To operationalise *information behaviour* research, we used three strategies: using controlled vocabularies from the thesauri of major information science databases, applying a definition suggested by the Special Interest Group on Information Needs Seeking and Use of the Association for Information Science and Technology (SIG USE) and examining the existence of a methodology section in each reviewed paper. The research team (the three authors and two graduate assistants) conducted advanced database searches to identify information behaviour literature that met the above inclusion criteria in the *Library Literature*, *Library, Information Science & Technology Abstracts*, and *Library and Information Science Abstracts* databases. To determine which keywords to use for these searches, we consulted the thesauri of each database to see which controlled subject terms were used that were relevant to information behaviour. We used the controlled subject vocabularies assigned by each database, such as information-seeking behaviour, information needs, information-seeking strategies and information sharing, user behaviour and user needs. The *Ulrichsweb* database was consulted to determine refereed journals that are published in the U.S.A. and Canada.

For the purpose of the study, we followed a definition of information behaviour research suggested by SIG USE; to be considered as information behaviour literature, '*the behaviour of real people engaged in information activities (in contrast to imagined or presumed users) must be a central part*' (SIG USE, n.d.). As we analysed each paper, literature that did not meet this definition was eliminated. For example, we excluded system-centred research with a mention of the need of presumed or imagined users, in which neither understanding information behaviour was the focus nor actual human behaviour was observed in those studies.

The research team went through each paper to see if it had a methodology (e.g., study design, data collection and analysis) section. Papers that did not have any methodological description were removed from the pool. A total of 255 papers was collected. Because this was a pilot study, we used a small subset of the papers to determine the viability of the study. Thus, among the 255 papers, thirty papers were randomly selected using simple random sampling on Random.org.

Random sample

Thirty randomly selected papers appeared in the following journals in Table 2. Table 3 shows the years in which the papers were published.

Journals	The number of papers in the sample	The number of papers in the entire pool
Library Philosophy & Practice	9	43
Journal of the Association for Information Science & Technology	5	51
College & Research Libraries	2	20
Medical Reference Services Quarterly	2	6
The American Archivist	1	1
Journal of Archival Organization	1	1
Library Trends	1	5
Science & Technology Libraries	1	3
Journal of Organizational and End User Computing	1	5
Georgia Library Quarterly	1	1
Journal of the Medical Library Association	1	22
Journal of Medical Internet Research	1	14
Behavioral and Social Sciences Librarian	1	2
Journal of Map & Geography Libraries: Advances in Geospatial	1	2
Journal of Library Administration	1	5
Reference and User Services Quarterly	1	10

Table 2: Journal list

Year	The number of papers in the sample	Total number of papers published in sampled journals by year
2008	4	34
2009	3	22
2010	10	42
2011	5	25

Table 3: Number of papers per year

Data analysis

Each researcher read ten identical papers to determine important elements for answering the research questions. Then an initial codebook was developed to capture types and characteristics of implications explicitly stated in the literature. Based on the initial codebook, the researchers analysed additional, identical papers in sets of five until intercoder reliability was achieved. The codebook was also revised as necessary. All three researchers analysed the random sample of thirty papers.

[Dedoose](#), a web-based qualitative and mixed-methods data analysis software, was used to facilitate storing, sharing, excerpting, coding and analysing data. We extensively used descriptors, sets of information used to identify and describe the sources of data in Dedoose, to record characteristics of each study and implications it generated. These characteristics included: journal title, year, methodology, theory, author affiliation, existence of implications, location of the implication, the intended audience of the implication, beneficiaries, types of implications (e.g., practical and scholarly implications), scope of implications and future research. Excerpting and coding features were used to capture actual passages in which authors stated implications of their studies.

Findings

In this study, the term *implication* is defined as what authors of information behaviour research papers explicitly addressed about how the results of their studies extended practical, theoretical and methodological boundaries. All thirty papers presented implications of their findings to various degrees. Our analysis revealed several categories important to understanding how implications were generated and discussed: author affiliation, types of implications, use of theory, scope and context of implications, location of implications and future research.

Author affiliation

In our analysis, we looked at the affiliations and occupations of authors to consider if these attributes might be related to the types of implications they generated. We used the term *practitioners* to designate librarians and other types of professionals whose primary purpose was to engage in practical work endeavours, for example, systems designers, whether at universities or other institutions. *University scholars* included non-librarian faculty and researchers based at universities or colleges, and *industry researchers* referred to individuals affiliated with corporations. Out of the thirty papers in our random sample, thirteen (43.3%) were written by university scholars, and another thirteen were written by

practitioners (43.3%). Authors who are librarians were all university librarians (i.e., no public, school or special librarian). Four (13.3%) were collaborations between university scholars, professionals and industry researchers. The following sections address these findings in more detail.

Types of implications

We broadly designated two categories of implications: scholarly and practical. In this study, practical implications refer to those that would specifically enhance practice or have functional applications. Scholarly implications include theoretical and methodological contributions to existing bodies of knowledge. Twenty-three papers (76.7%) offered practical implications and seven papers (23.3%) included both scholarly and practical implications. None of the papers in our sample contained only scholarly implications.

There was a scarcity of scholarly implications within our entire sample, and those that did generate scholarly implications were primarily written by scholars. Among the thirteen authors who were university-affiliated scholars, five presented both scholarly and practical implications and the other eight articulated only practical implications. Only one out of thirteen authors who were practitioners discussed both scholarly and practical implications. One out of the four papers written by a collaborative team of scholars, practitioners and industry researchers presented both types of implications and the remaining three papers presented practical implications only. It should be noted that many of the papers in our randomly selected sample came from professional journals (see [Table 2: Journal list](#)), with the aim to address practice rather than theory.

Practical implications.

We examined who would be affected by the stated implications in each paper: we noted both the people who would implement the implications as well as those who would benefit from the findings. A majority (70%) of studies discussed practical implications for librarians and archivists. For example, one paper discussing the needs of international students stated that the university library should consider '*carrying textbooks that are in use in classes currently being taught*'. Other studies that included practical implications offered suggestions that would enhance or change systems, environments or processes that could be implemented by practitioners such as: information system designers and developers, knowledge managers, policy makers, university administrators, faculty and lecturers, health service providers and more. For example, an paper about access to information about folktales stated, '*Implications include the need for systems designers to devise methods for harvesting and integrating extant contextual material into search and discovery systems*'.

Implications for governments regarding their respective societies' information

infrastructures were found in papers from *Library Philosophy and Practice*; papers in this journal primarily reported research conducted in Nigeria, Pakistan and India, although it is published in the U.S.A. One paper studying the needs of tapioca farmers in a district in India suggested,

there should be a regular meeting with the staff of [the] tapioca research centre, staff of state agricultural department, tapioca officers, [and] development of officers of sago... for the purpose of exchanging information on [the] latest technology.

People who implement the implications	Number of papers*
Librarians and archivists	21
System developers	4
Health information providers	4
University faculty, scholars, lecturers	4
Government	3
Policy makers	1
Knowledge managers	1
*Note: The total number of papers exceeds the number of samples (30), because each study generated implications for one or more entities.	

Table 4: People who might implement practical implications

In addition, all of the papers analysed identified people who would benefit from the findings. Beneficiaries were primarily users; specifically, university library patrons, working women, farmers, scholars, lawyers, patients, international students, health information users, students and adolescents. It was common for authors to state implications that would be implemented by practitioners with particular benefits for users. For example, one paper noted that

[S]pecifically, information on barriers or facilitators of health-related Web use behavior can be a ground for practitioners to develop certain policies or services for facilitating the use of health-related Web sites for a certain group of users in their communities.

and

Information on barriers or facilitators of health-related Web use behavior can [help] practitioners...develop certain policies or services [to facilitate] the use of health-related Web sites for...users in their communities.

Beneficiaries	Number of papers*
Library users (students, researchers, and faculty)	22

Information system users	4
Farmers	2
System developers	1
Working women	1
Patients	1
Lawyers	1
Adolescents	1
*Note: The total number of papers exceeds the number of samples (30), because each study stated implications for one or more beneficiaries.	

Table 5: Stated beneficiaries

Another instance of practical implications included an paper in which the researchers indicated that they had communicated with the people who would implement their findings. In this example, the authors stated,

We have reported these findings to the administrators of the University Libraries to initiate improvement of wayfinding systems. The administrative team has made efforts to redesign signs and provide simpler floor maps to help patrons learn the areas in the library in a timely and effective manner.

Similarly, one paper written by university librarians reported on the actual implementation of their findings.

Scholarly implications.

Scholarly implications comprised explicitly stated implications that extended an existing body of conceptual and methodological knowledge, and could be useful for scholars and researchers. Seven papers in our sample stated that they added to existing knowledge through one or more of the following ways: (1) deepening understanding of topics under investigation, (2) theory/concept testing, (3) model building and (4) methodology development. Two studies stated their findings had scholarly implications but did not specify how they contributed to the scholarly field.

Scholarly implications	Number of papers*
Understanding of the phenomenon only	1
Theory testing and refinement	1
Model building	2
Methodological contribution	2
Stated in an unclear way	2
*Note: The total number of papers exceeds the number of papers with scholarly implications (7), because the studies presented scholarly	

implications in one or more ways.

Table 6: Types of scholarly implications stated in the sample

Our sample included papers that deepened conceptual understanding of the phenomenon under investigation. In one example of this, a study of the health information use of older adults, authors noted,

Through adopting a broader interpretation of information literacy and expanding the research territory...new insights into the contextual nature of information literacy...further reveal the complexity of information literacy as a phenomenon and focus of study.

Studies that applied theories provided scholarly contributions such as testing and further developing existing theories/concepts. A paper tested and confirmed Ellis's behavioural model, which was originally developed in the 1980s:

The study also explored the degree to which Ellis'[s] model remains relevant in the age of electronic resources and confirmed that the characteristics proposed by Ellis'[s] model continue to play viable roles in research activities.

The authors further extended the theory:

*In addition to the six original characteristics (starting, chaining, browsing, monitoring, differentiation, and extracting), this study suggests two new characteristics: **preparation and planning** and **information management**... suggest[ing] a need for additional research tools and for more flexible and user-friendly information systems.*

Another study operationalised concepts of existing theories, which might facilitate application of the theory in future research studies:

The immediate theoretical implication of the study relates to the measurements developed for this study. Because the theories (i.e., TPB [theory of planned behavior] and U&G [uses and gratifications approach]) employed for this study are context-specific, the measurement of each construct varies depending on the behavior under investigation and the user group chosen. Thus, the procedures of developing measurements in the context of health-related Web site use can be replicated in a similar context.

Further, studies provided scholarly contributions by developing new models. For example, one study developed 'a model to guide the design of KMS (Knowledge Management Systems) based on knowledge needs' and tested the new model in two different contexts. Another paper proposed 'a research model of middle-aged

women's health information seeking on the Web was proposed'.

Scholarly implications also included methodological contributions. A study suggested implications on how to approach wayfinding problems in libraries:

For revealing and predicting wayfinding problems that exist in libraries, it is beneficial to combine methods that address both the quantitative assessment of physical environments and allow for evaluating individual behaviors.

Another study suggested: 'This research also adds to the areas of information systems development methodologies...our study makes an important contribution to the methodology of design science guidelines'.

Use of theory and methodology

Twenty-two papers (76.7%) did not use theory at all to situate their research. Theories applied by the other eight papers were both information science theory (4), e.g., facet analysis theory, information retrieval theory and Ellis' model of information behaviour, and theory from other disciplines (4), such as knowledge management systems theory, learning theory, wayfinding theory and uses and gratifications theory.

Of the eight papers that referenced theory, the implications of five addressed both scholarly and practical implications, while the other three were practically focused only. Only three of the eight papers that applied a theory generated theoretical implications. Authors of the three papers reported that they tested, confirmed, extended or refined the applied theories as a contribution of their study. Our sample did not show any cases of theory rejection. The other five papers, which applied a theory, did not explain whether or not their findings made a theoretical contribution..

The following table shows further analysis of papers that articulated scholarly implications as well as papers that applied a theoretical framework.

Papers using theory					
Journal title	Author affiliation	Scholarly implications	Practical implications	Used theoretical framework	Methodology
JASIST*	University	X	X	Theory from other fields	Mixed
JASIST	University	—	X	Information science theory	Mixed
JASIST	University	X	X	Information science theory	Mixed
				Information	

JASIST	University	—	X	science theory	Quantitative
JASIST	University/collaboration	X	X	Theory from other fields	Quantitative
Journal of Map & Geography Libraries	University	X	X	Theory from other fields	Quantitative
College & Research Libraries	Libraries, museums and other information organizations	X	X	Information science theory	Qualitative
College & Research Libraries	Libraries, museums and other information organizations	—	X	Theory from other fields	Qualitative
Papers not using theory but generating scholarly implications					
Library Trends	Collaboration	X	X	None	Qualitative
Journal of Organizational and End User Computing	University	X	X	None	Mixed

Table 7: Theory application and scholarly implications

The studies in our sample used a variety of methodologies, with twelve (26.7%) using qualitative methods, eight (40%) using quantitative methods and ten (33.3%) using mixed methods. The eight papers using theory in their research were similar to the random sample of thirty in their use of methodologies: two (28.6%) were qualitative, three (42.8%) were quantitative and three (28.6%) used mixed methods.

Scope and context of implications

We analysed the scope of implications each study generated, i.e., what categories the authors stated their findings were applicable to or had a recommendation for. For example, Wallace and Van Fleet (2012) suggested categorisation of benefits of library and information science research: benefits to society, to the profession, to the institution and to the researcher. Papers in our sample provided implications that are applicable to or that benefit (1) the institution in which the study was conducted, (2) the information field, (3) multiple fields and (4) society.

Scope	Number of papers
The institution	4
The information field	16
Multiple fields	7
The society	3

Table 8: Scope of implications (Recommendation for or applicable to)

Implications presented by four papers were limited to a particular setting (e.g., a library in which the study was conducted). They focused on specific environments and groups of people, with an emphasis on individual libraries and librarians working in those libraries, certain types of library users such as graduate students and the design of information systems relevant to certain groups of users. Usually these studies reported what the researchers did in their own library and then made no suggestion for generalisation of their findings or scalability of their study to other settings.

More than half of the papers (16) suggested that their findings contribute to the information field, such as the library profession or information science. In contrast to the four papers whose implication scopes were limited to the institution, papers in this category provided rich descriptions of context and stated that they produced new knowledge that could be further tested in other contexts. For example, a study of Latino youth in Maryland to assess the potential of using text messages and social media as interventions to encourage healthy behaviour stated, '*It is critical to fully understand how adolescents from different communities and cultures use technology*' and '*Future studies should use more salient and robust measures that capture the complex and dynamic process of acculturation*'.

Implications presented by seven papers encompassed multiple fields. Some of these implications were applicable to different disciplines, such as business, management, health science, education and public policy, along with information fields, owing to the interdisciplinary nature of information science. Implications also reached beyond the information field when a study applied a theory from a different discipline and made a theoretical contribution.

Three studies suggested recommendations for society. One author stated that the implications should be implemented in '*every sector of society*'. However, the implications that some authors arrived at were not always grounded in their studies' findings and contexts. For instance, a study that investigated the information use of working women in a particular company suggested that '*every institution/organization to which a library is attached must earmark one hour as the library hour to encourage reading habits among the employees*'. Although the context of this study was one working environment and one group of people, the authors suggested implications for all institutions with libraries.

Location of implications

Our analysis also took note of where implications and impacts were located in each paper. All thirty papers presented implications at the end, i.e., Discussion or Conclusion. Nineteen papers (63.3%) stated their implications in multiple locations, usually in the abstract, the body and at the end, whereas eleven papers

(36.7%) specified their implications only at the end in the Discussion or Conclusion. In addition to these locations, one paper from the *Journal of the Medical Library Association* provided implications in a page inlay.

Location	Number of papers
Abstract	15
Introduction	4
Body	5
End	30
Inlay	1
Table	1

Table 9: Implication locations

Further research

Twenty-one papers contained suggestions for additional research that should be pursued in light of the findings and implications of their studies. Among these were future research plans for the authors themselves, such as, '*The team would like to expand on these findings by gathering information about specific elements by using other types of research methodologies*' and '*As the project continues, we will be extending our test collection of materials to include a greater number of scholarly resources. Similarly, we will be broadening our pool of informants...*'

Some authors encouraged others to build on or take advantage of their findings:

Future research should build on these ideas and expand the analysis to compare end-user behaviors across different online tasks, a variety of goods and services, and diverse types of end-user groups.

Others identified areas of further investigation on the problem: '*Further research could thus be oriented towards definition of set of context-specific success measures to evaluate KMS success*'.

Implication components

The implications stated by authors commonly had the following components: what implications are; who implements the implications; and who benefits from the implications. An example of this is, '*Implications for practice [by university librarians] include ensuring that services for distance students are comparable to those available to residential students, and are available to them wherever they are located*'.

Some implications did not offer further details, and often were broad and sweeping and/or strayed from the findings of the study. For example, one study stated: '*Information professionals can analyse the findings of the study and design,*

develop, and introduce new library and information services for humanists'. This implication relied heavily on the readers to analyse the findings without specifically suggesting how the study's findings impacted information behaviour. In another example, the authors provided a set of recommendations (implications), but they had little, if anything, to do with the actual findings presented in the study.

Other papers provided additional components, such as explicitly stating why they were significant, how they might be implemented, and *how* the findings linked to the implication. For example, a study examining online health information-seeking suggested implications that would inform web developers' design of health websites, development of site policies, and that the implications were significant because they '*would help practitioners (i.e., health information professionals, health-related Web designers, health services providers, etc.)*'.

Discussion

Types of implications: practical and scholarly contributions

While previous reviews of information behaviour research have been concerned about the applicability of information behaviour research to practice (McKechnie, Julien, and Oliphant 2008; Fidel, 2012), our study found a preponderance of practical implications. Findings of this pilot study suggest information behaviour research plays a significant role in designing and developing user-centred information systems and services. It is possible that we found substantial practical implications because the journals in our sample were overwhelmingly professional journals targeting practitioners, primarily librarians. In comparing the selection in our random sample to the larger list of papers from which the sample drew, our sample is reflective of the fact that a significant amount of papers investigating information behaviour do come from journals addressing practice. However, papers published in scholarly journals addressed practice as well, suggesting that information behaviour researchers from both academia and professional fields strive for generating practical implications that can be implemented by information professionals, system designers, policymakers, university faculty and administrators and more.

The analysis of our samples revealed unexpected issues that have been rarely addressed in previous research, especially in the reviews of the Information Seeking in Context conference proceedings. The major participants and audience of the conference are likely to be scholars, researchers and university faculty, therefore resulting in more scholarly implications reported in the proceedings. However, this pilot study provided a glimpse into the characteristics of information behaviour research implications published in practice-oriented journals as well as implications generated by the authors who are practitioners.

It was promising that many practitioners conduct information behaviour research to inform their practice. For example, one author stated: '*When we have better information about how people interact with our virtual resources, we can design more effective websites, and we hope, increase our users' satisfaction*'. In many cases, implications included specific suggestions that could improve practice, such as '*to maximise their use by researchers, library resources must be accessible via departmental websites*'. It was also encouraging that some authors communicated their findings with library administrators to implement suggested changes based on research evidence; a couple of examples showed that user studies made an immediate difference in practice by facilitating re-design of a library space and services. On the other hand, the gaps revealed in this study were often the limited scope of implications due to a lack of connection to previous research or other contexts as well as a dearth of theoretical frameworks. In addition, all library practitioners who conducted and published the information behaviour research in our sample were university librarians. Our sample did not include any author who was either a public or school librarian.

The effective and ineffective strategies of communicating results to practice that McKechnie *et al.* (2008) found in the ISIC proceedings seem to be true in the samples in this study. We also found several vague statements that claimed the study results had practical implications without actually delineating what they were, who could implement them and how. While McKechnie *et al.* found a lack of readability of research reports owing to highly specialised research jargon and complex conceptual ideas, these problems were rarely found in our sample. Rather, a more significant problem that might hinder a transfer of research findings to practice was lack of explanation on scalability, generalisability or transferability.

Meanwhile, only a small number of scholarly implications were found in our sample. In addition, a majority of papers in this study were not grounded in theory, although Fisher *et al.* (2005) suggested information behaviour researchers are among the highest users of theory within library and information science research. Again, this could be explained by the majority of papers in our sample being from practice-oriented refereed journals.

Our analysis of the refereed papers published between 2008 and 2012 suggests that some of the trends that Vakkari (2008) found do continue. For example, he suggested the growing versatility of research topics is a promising feature in information behaviour research. The variety of targeted audiences who might implement implications as well as beneficiaries identified in our study concurs that information behaviour research encompasses a range of areas. A lack or loose theoretical framework that Vakkari pointed out was salient in this study as well. The '*weaker ties to the earlier relevant research*' (para. 42) remained true, especially for those studies whose implications were limited to the institution in which the study was conducted only. While he was concerned about a lack of

research that connects certain features of information behaviour to certain features of systems or services, the majority of studies in our sample did address features of systems and services because many of the studies were conducted by practitioners to inform their practices.

In our study the application of theory itself did not determine the type of implications nor render stronger or weaker implications, although we thought those papers applying a theory could have stated whether their findings had any theoretical contributions. Yet, our samples showed that theories and concepts become the connections to other research studies that applied the same theory. In this case, the studies tended to generate scholarly implications for a body of research or community of scholars using the theory beyond implications for an isolated situation under investigation. On the other hand, we did not find any connection between applied methodology (e.g., qualitative, mixed methods or quantitative approaches) and the type of implications.

The scope and context of implications

Although each individual study successfully generated findings to solve a problem in a constrained context (e.g., a specific library), we did not find explicit efforts to forge connections among studies or promote the accumulation of research-based knowledge, except for when studies were connected through applied theory and concepts. Several studies aimed to identify how to solve a functional problem and improve a practice, instead of advancing theories or scientific progress. A few of them fall into the category of what Wallace and Van Fleet (2012) called the '*benefit to the institution*' level, rather than specifically stating the '*benefits to society*' or '*benefits to the profession*' level (p. 32). Even when the authors stated implications for society, we did not find that the implications were grounded in their findings or contexts. An effort to compare findings and find commonalities between discrete studies seems necessary to avoid amassment of similar projects with limited usefulness.

The contexts of researchers (e.g., their social roles, tasks and identities) were not necessarily an indication of the type of research implications they generated, although authors who were university affiliated scholars tended to generate more scholarly papers. Types of implications were more related to the context of publication venues (e.g., scholarly or practice-focused journals). Even when the researchers were university scholars, the research usually targeted practical problems with practical solutions. Illustrating this, of the nine papers in our sample from *Library Philosophy & Practice*, seven were written by university scholars; however, all the research papers from that journal were practice-related, ranging from information behaviour of rural female farmers, part-time students, graduate students, working women and others.

Location of implications

Our findings were congruent with McKechnie et al. (2008)'s findings in that the majority of papers presented implications at the end (Discussion and Conclusion) and in the abstracts. It was particularly effective when authors presented their implications up front, especially in a structured abstract with a specific section for implications. Implications were also highly noticeable when authors presented them in page inlays. Some journals impose a specific location for implications (such as a page inlay) and others do not. Designating certain areas of a journal paper to describe implications offers readers an expedient way to learn what authors considered to be the *so what?* aspects of their research.

Future research

Suggesting a future research direction was a key part of implications and twenty-one out of the thirty papers addressed implications for ongoing research in the problem area. Some authors offered how their findings could guide future studies or other scholars, and others explained their next research plans. Although learning about the authors' future plans was often informative, Recker (2013) suggests the future research section of a journal paper (or book) should not be confused with the future research component in conference papers or posters, which is '*a mere description of how the research presented at the conference will be continued after the presentation, to give an indication as to the type of findings that can be expected in the future*' (p. 133).

Implication components and categories

Based on the findings, we designated three categories of implications: weak, moderate and strong implications. As mentioned earlier, all of the papers stated what the implications were, who would implement them and who would benefit from them. However, we suggest implications are weak if they offer no further details and are broad and sweeping. Also, weak implications included those that had little to do with the actual findings presented in the study.

On the contrary, strong implications contained six components, addressing what the implications were, explicitly stating why they were significant, how they might be implemented, who would implement them, who benefited from them, and clearly explained how the findings linked to the implications. Filling the gap between weak and strong implications were papers with moderate implications, which incorporated only one or two elements in addition to the three basic components of implications.

Implication categories	Characteristics
	States: What implications are Why implications are significant

Strong implication	How implications might be implemented Who implements implications Who benefits from implications How findings link to implications
Moderate implication	States: What implications are Who implements the implications Who benefits from the implications Includes 1-2 of the following: Why implications are significant How implications might be implemented How findings link to implications
Weak implications	States: What implications are Who implements the implications Who benefits from the implications Often: No further details offered Broad and sweeping Strayed from the findings of the study

Table 10: Implication components and categories

Implications and recommendations

This pilot study examined how current information behaviour research addresses the implications and/or impacts of its findings. Considering a dearth of systematic analysis that focuses on implications generated by empirical research, our study provided a unique insight into what implications and contributions the field has made and how effectively information behaviour researchers communicate implications of their findings. It was noteworthy that there was discrepancy between our findings and previous reviews regarding the types of implications (i.e., practical and scholarly implications), because the corpus of our samples comprised research papers in refereed journals while the previous review studies discussed in the literature review section examined scholarly conference proceedings. Among the contributions our study offers is identification of the implication components and categories that are generated based on actual examples of current information behaviour research papers. The various levels of thoroughness, which we categorised as strong, moderate and weak, might guide authors in writing about their research as well as journal editors and reviewers in assessing the implication

part of an paper.

We suggest the following recommendations. First, authors should strive for producing thorough and strong implications; they must avoid broad and sweeping implications, and implications must be grounded in the findings. Authors might want to address the implication components identified in this study, including *what* the implications are, why the implications are significant, *how* they may be implemented, *who* could implement the findings and *who* benefits from them. In generating practical implications, the authors should situate their work in the existing body of research and address scalability or transferability of their findings. This applies to both practical and scholarly implications, but our sample showed particularly that practical implications lack the connection to previous research and/or other contexts. The way authors express scholarly implications could be clearer if they articulate one or more types of scholarly contribution identified in this study, i.e., deepening understanding of topics under investigation, theory/concept testing, model building and methodology development, or the classification suggested by Vakkari (2008), i.e., empirical support, new categories or concepts, revision of a model and new methodological approaches. Research studies that apply a theoretical framework might want to state what theoretical contribution their study generated in the implication section.

Secondly, journal editors and reviewers should encourage authors to state their implications specifically and explicitly. Journal submission instructions could provide a template for a structured abstract and/or page inlay that demands explicit presentation of implications and potential impacts. Third, research methods book authors and instructors should place greater emphasis on generating and communicating strong implications and broader impacts in the area of information behaviour research. Only eight out of the nineteen textbooks that are used in ALA accredited schools with a PhD program discussed issues related to implications of research findings, spending between one paragraph to a couple of pages. The fact that not many methods textbooks address the issue of research implications in detail might create a problem, considering many researchers conducting and publishing information behaviour research are likely to be trained with these books.

Finally, considering that most studies that aimed to inform practices did not use a theory, a closer relationship between theory, practice and research must be achieved to advance the field of information behaviour. It was promising that a number of information behaviour research studies have been conducted to enhance practices and implement evidence-based, user-centred practices. A gap revealed in this study, however, is the lack of theoretical discussion in professional journal papers. Greater efforts are necessary to promote theoretical and scholarly discussions that potentially provide a solid basis for practice and generate broader impacts. To do that, scholars might consider publishing some of their work with scholarly and theoretical discussion in practice-oriented journals, so that

practitioners are more likely to be exposed to theoretical work that applies to their environments. Also, practitioners conducting information behaviour research may want to be cognizant of previous research related to their own so they derive comparable findings and implications.

Limitations and future research

As a pilot study, a random sample of thirty papers was analysed. Collected research studies were published only in the U.S. and Canada between 2008 and 2012, and do not reflect the full corpus of information research. In addition, although these papers were published in the U.S. and Canada, not all studies were conducted in these countries. Future research might analyse papers published beyond the U.S. and Canada and include studies published in and after 2013.

It is important to note in this study we defined implication as what authors explicitly addressed about how the results of their studies extended practical and scholarly research boundaries. It is possible that some papers did have scholarly implications depending on individual readers' interpretations, but we did not count them unless the authors specifically stated them.

We found that using a content analysis approach on the research papers was appropriate for investigating what and how authors explicitly stated their implications, but it did not measure the actual impacts that each research project had made, which was beyond the scope of this study.

Conclusion

This pilot study investigated different types of implications that recent information behaviour research generated. The findings provided a different perspective from what previous literature review studies have suggested. Overall, we found that all of the peer-reviewed papers we analysed offered implications of their findings with various levels of thoroughness. All thirty papers presented practical implications to the field, while only seven papers included scholarly implications. Author affiliation or applied methodology was not an indication of the type of implications, but the publication venue, e.g., practice-oriented journals, largely influenced the type of research implications. Few research papers applied a theoretical framework. We proposed six components of implications and suggested criteria for strong, moderate and weak research implications; authors might find the components and categories useful in generating clearer and thorough implications of their research.

The analysis of implications stated in refereed journal papers provided an insight into understanding the current state of the information behaviour field. Based on our sample, the impacts and contributions of information behaviour research encompass a range of areas and people, such as primary and secondary education, universities, health professionals, archivists, system designers and lawyers, with a

particular concern about the ultimate benefit to users. Information behaviour researchers have not only advanced theoretical and methodological knowledge but have also impacted practice, which demonstrates the growth and value of the field for both scholarly and practical communities. Our findings, however, suggest a stronger relationship between theory, practice and research must be achieved in order to advance the field of information behaviour.

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Appendix 1: Research method books adopted in ALA accredited, PhD awarding programmes (inquiry sent in Fall 2013)

1. Babbie, E. (2013). *The basics of social research*. Belmont, CA: Wadsworth.
2. Babbie, E. (2013). *The practice of social research*. Belmont, CA: Wadsworth Cengage Learning.
3. Brase, C.H. & Brase, C.P. (2012). *Understandable statistics : concepts and methods*. Boston, MA: Brooks/Cole, Cengage Learning.
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