

What do readers expect from book indexes and how do they use them? An exploratory user study

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Current indexing practice is based on assumptions rather than knowledge about the behaviour of book index users. This exploratory user study investigated readers' expectations and use of book indexes in order to fill this gap in knowledge. Qualitative interviews were conducted with six individuals who have regular exposure to books with indexes. Participants revealed that they have a clear understanding of the purpose and use of book indexes, despite being unable to recall any specific instruction in using indexes. They expect to find indexes in nonfiction books, and their choice of a book is influenced by the index. It is apparent from the results that users approach indexes in two ways – to gain a general overview of a book and to find specific topics in a book – depending on the context of index use and their familiarity with the book. It was also revealed that users have different expectations for ebook indexes than for print book indexes. The study was limited to participants who liked and used book indexes. Similar research into the expectations and behaviour of readers who do not use book indexes is needed to provide a complete picture; however, the results of this study could inform design of index usability testing and research on navigation within books.

Introduction

If you don't find it in the index, look very carefully through the entire catalogue.

(Sears, Roebuck, and Co., *Consumer's guide*, 1897)

This quote points directly to users' expectations of the usefulness of a book index. Do readers assume that the index will help them? What course of action will they take if they do not find it useful? To step back even further, what do readers think an index is?

While professional indexers may understand what a book index is, readers may not always work from the same definition. Digital formats for reading material have highlighted the difference between professional approaches to indexes and popular expectations (Johncocks, 2008b). For example, Hanson (2007: 83) states that indexes are unnecessary for ebooks because the reader can use the search function to locate information 'in a matter of seconds' and construct an 'index' by doing a 'keyword search'. Hanson's fundamental confusion between a concordance (a list of words used in a body of work) and an index (a finding aid that directs users not only to words in the text but to concepts and synonyms in order to provide multiple points of access) indicates that the first point of any user study of book indexes should be a careful definition of the meaning and purpose of a book index.

While there are many definitions of an index in the professional literature, such as Hans Wellisch's statement that an index is 'an alphabetically or otherwise ordered arrangement of *entries*, different than the order of the material in the indexed document, and designed to enable its users to locate *information* in it' (1991: xxiii), the more interesting material attempts to define what is meant by a 'good' index. Donald

and Ana Cleveland (1990: 143) define a good index as one that 'leads a user to the exact information that is needed, with no hurdles and no irrelevant material'. G. Norman Knight (1979: 20) quoted John Rothman, editor of the *New York Times Index*, who suggested that 'an index is as good as its users think it is'. Anderson and Pérez-Carballo (2005:14) define an index as 'any device that is (or can be) used to indicate or point to something of interest'. They suggest that a table of contents might also constitute an index, as it meets this definition (2005: 439). This is an interesting point, as many readers may use the finding aid at the front of the book (the table of contents) as well as the index at the back of the book.

Users may define indexes as concordances and expect nothing more than to find lists of words from the text in the 'index', or to be able to 'index' as well as professionals by using search functions in digital products. Whether readers understand the purpose of an index and their experience with using indexes should not be ignored in conducting indexing research. The user's expectations should also influence the indexing process (Bell, 1996). This exploratory user study investigated the expectations of book index users and considered how these expectations may influence indexing practice and the design of index usability testing.

Research on book index use

Book indexers have been calling for research on indexing for many years (Browne and Jerney, 2007; Knight, 1979; Wellisch, 1991). Bakewell (1993) suggested that the British Standard for Indexing was based on assumptions about users of indexes and that research into user behaviour was needed. His review of research activity revealed controversial issues

in indexing practices that remained unresolved because of the lack of evidence. He also pointed out that methods of researching user reactions to indexes had not been adequately developed. A year later, Milstead (1994) identified a 'near-total dearth' of research on print indexes. While applauding several recent studies that represented a counter-trend, she was particularly concerned that user studies were lacking. In stating her case, she noted that 'indexers need answers to a fundamental set of questions about users, particularly questions about their cognitive state, and the amount of effort that they can be expected to undertake and under what circumstances' (1994: 577).

A comprehensive review of the literature revealed that much of this research has been focused on book indexes as a system, with little focus on the perspective of index users (Coe, 2014). Most researchers have assumed that readers know what an index is and have had experience with using indexes; this may not always be the case. The sophisticated systems that professional indexers use to create their product may not be understood by users or even by publishers and editors (Bosschieter, 2006; Lipetz, 1989). Compounding this confusion is the lack of an evidence base for professional indexing standards and practices (Anderson, 1993; Bakewell, 1990; Bell, 1993; Bishop, Liddy and Settel, 1991a; Browne and Jermy, 2007; Cleveland and Cleveland, 1990; Gratch, Settel and Atherton, 1978; Kleinberg, 1993; Shuter, 1993; Weinberg, 1994; Wellisch, 1991).

Johncocks (2008a) notes that although indexing 'has always been essentially non-quantitative in character', there is still an interest in developing a metric for index quality, which he defines as 'ease of use'. Most of the quantitative studies of book indexes focus on index quality, and almost all of them conclude that index quality cannot readily be determined without more research into user behaviour (Bishop, Liddy and Settel, 1991b; Diodato and Gandt, 1991; Gratch et al., 1978; Wittmann, 1990).

Many index usability studies have been system-oriented and based on the Cranfield paradigm, using a static test collection of documents and questions to conduct task-based research with an emphasis on recall and precision metrics (Fidel, 2008; Harman, 2011; Regazzi, 1980; Vakkari, 2003). Regazzi (1980: 14) noted that the Cranfield studies were important because they highlighted the difficulty in measuring the quality of index systems, particularly when design of the system is not also considered. Vakkari (2003: 413) also commented that studies concentrating on search tasks without consideration of users' motivations for searching do not provide a complete picture that can inform effective system design. In contrast, user studies take a people-oriented approach to investigate user behaviour in context, often using more qualitative methods to obtain rich data (Banwell and Coulson, 2004; Wilson, 2000, 2006b).

Liddy and Jörgensen (1993, 1996) followed up Bishop, Liddy and Settel's index quality study (1991a, 1991b) with a task-based usability study. Their research goal was to observe print index usage in order to determine which index characteristics facilitated information access in print and electronic formats. Based on their observations, Liddy and Jörgensen surmise that many of the students in the study did not understand the basic structure of a book index, and

that many of the assumptions that indexers have about users may be incorrect. The results from this study indicate that future research should perhaps focus on users' awareness and understanding of indexes generally.

Williams and Bakewell (1999) conducted a British Library-sponsored investigation of the quality of indexes to children's books with the aim of improving the effectiveness of indexes. In addition to providing rich detail on children's approaches to indexes, the study also revealed that children mainly use indexes for the purpose of schoolwork and that they find indexes to be generally helpful. Flatoff's (2007) informal survey of index users, including children, also considered instruction in index use and questioned participants about frequency of index use. While these researchers also included task-based elements in their studies, their initial approach was to inquire about readers' experience with using indexes. No doubt this step was included because children were involved in the studies, but the assumption that adult users are somehow more familiar with indexes or trained in their use should be tested in a similar fashion.

Olason's (2000) task-based usability study is often cited in the literature and is well known in the professional indexing community. Olason, a professional indexer with a background in systems engineering, was inspired to conduct the study after hearing many people describe indexes as 'confusing'. She translated her findings into a rule-set for indexers that could also provide the basis for more formal usability studies. She also suggested that the quality of an index, as determined by the user, influences book selection.

Ryan and Henselmeier (2000) developed a naturalistic task-based strategy for conducting index usability tests at Macmillan USA. In their research report, they detailed the testing methods used in the study and provided recommendations for improvement of usability testing. In particular, they recommended use of a pre-testing questionnaire that asks participants how they look up information in a book, including use of not only the index but the table of contents. They also suggested that questions aimed at discovering how much effort a reader will put into using an index should be considered. Van der Meij (2002) studied the effect of indexing styles on task complexity and search efficiency. He concluded that 'there is more ground to be covered in examining task situations' and that users' ability to interact with a specific index style is dependent on the kind of search they are engaged in.

Ebooks could provide an unexpected source for research into the behaviour of print book index users. Research into ebook search and navigation tools has already provided some interesting insights. Barnum and colleagues' (2004) study compared an ebook with and without a hyperlinked index and full-text search capability, and noted that users' perceptions of the tools they are using to navigate ebooks are an important element in their use. They also noted the many flaws in the ebook navigation tools used in the study. They quote Richard Evans (2002), who suggested that if free text search tools replace indexes in ebooks, 'important information will no longer be made retrievable. Instead, information will become important simply because it is retrievable.'

Noorhidawati Abdullah, primarily in conjunction with

Forbes Gibb, has conducted several qualitative and quantitative studies of university students' attitudes towards ebooks (Abdullah, 2008; Abdullah and Gibb, 2007, 2008a, 2008b, 2008c, 2009; Noorhidawati and Gibb, 2008). These studies revealed that students find browsing of ebook indexes to be an easy task to perform (Noorhidawati and Gibb, 2008) and that students prefer using indexes to other search tools available in ebooks (Abdullah and Gibb, 2009). Task-based usability studies conducted by Abdullah and Gibb suggest that an index is a more efficient and effective search tool than free text search or table of contents in ebooks (Abdullah and Gibb, 2008c, 2009).

Berg, Hoffman and Dawson's (2010) qualitative task-based study of undergraduate students' use of ebooks compared with print books revealed that although students successfully used the indexes in print books to find information, they did not expect to find indexes in ebooks. Consequently, they were more successful in finding information in the print books than in the ebooks. Berg and colleagues state that 'use of the index was the method least likely to be transferred from print to electronic'. Comparison with Abdullah's research would suggest that if readers are aware that indexes are available in ebooks, they might prefer to use them and would find them to be the most effective search tool.

There have been many changes in how people access information. Most notably, the widespread use of search engines such as Google and the development of Web 2.0 have greatly eased the retrieval and sharing of online information. As Johncocks (2008b) points out, exposure to these tools may have also changed the way that users approach indexes. Johncocks urges indexers to question their assumptions about users and to also consider the task of educating users. Wilson (2006a) has considered how information-seeking behaviour has changed over time, not only in the wider context of the digital world, but in the individual context, suggesting that users learn as they use various information retrieval systems. Drawing on the classic chicken or egg theory, Ménard (2011) has asked 'which comes first, indexing or retrieval?' If we do not know how readers actually approach indexes, how can we produce a product that they will want to use? Studies in the field of human information behaviour may assist indexers to reconsider their old ways and question why readers may view the index as the tool of last resort when they can more easily use Google.

Research aims and objectives

The purpose of this research was to investigate and describe readers' expectations of book indexes and how they use them. The following research questions guided the study:

- What do readers think a book index is for?
- What do readers find useful in indexes and what do they find not useful/confusing?
- Why do some readers use book indexes and other readers not use them?
- Why, when, and how do readers use book indexes?

Method

A qualitative, exploratory approach using semi-structured interviews was selected as a method of data collection. Interviews were conducted in November and December 2014 with six participants, who were adult students and academic staff from an Australian university. The intent of sampling was to obtain participants who had a high degree of literacy and opportunities to interact with books and indexes on a regular basis. This particular group was recruited in order to gain insight into their use of indexes, not to obtain a representative sample of the population. The majority of participants were from an Information Studies course and employed as information professionals. Attempts to recruit participants in other courses or academic domains were unsuccessful. After initial coding of transcripts from the six interviews was conducted, the sample was judged to provide sufficient data saturation for thematic analysis (Guest, Bunce and Johnson, 2006; Pickard, 2007). The sample is a major limitation of this study, however, as it contained only participants who like indexes and use them on a regular basis. Because of the nature of the sample, the research question 'Why do some readers use book indexes and other readers not use them?' was not answered.

The study took an exploratory, descriptive and inductive approach which allowed the researcher to observe, reflect and develop understanding (Marshall, 2010: 102; Neuman, 2011: 38,70). Asking participants to provide or discuss examples of indexes that they were using proved to be a significant factor in this approach. It not only allowed the researcher to glimpse 'real life' usage of indexes but provided a platform for further discussion. Participants engaged with the books provided by the researcher to discuss the format of indexes and to illustrate their approach to an unfamiliar text. Several participants picked up these books expecting to be asked to demonstrate their ability to use an index; however, pilot testing of this technique revealed that richer detail about user expectations could be gathered by avoiding this task-based approach. All participants were aware of the researcher's background as a professional indexer; consequently, a 'devil's advocate' approach (Rubin and Chisnell, 2008: 239) was used during interviewing in order to elicit comments from participants about what they disliked about using indexes. This was also a useful technique, and demonstrated that examples of bad indexes generated useful discussion about how indexes are constructed and how users attempt to make sense of indexes.

Data collection and analysis

Data was collected during one-on-one, in-person interviews with six participants, who were asked general questions about book indexes and their use. Although the interviewer had access to an interview script, the aim was to conduct a purposeful conversation with participants rather than to obtain predetermined responses to questions (Marshall and Rossman, 1999: 108). Changes were made to the interview script after pilot testing and during interviewing in order to meet this aim and elicit natural responses from participants. Follow-up questions were generated spontaneously from discussion during interviews and were also added by the

researcher as the study progressed. Appendix A contains a list of interview questions. Participants were invited to illustrate their answers with use of a print book containing an index. Appendix B contains a list of the books used during the interviews. Several were provided by the interviewer and were available to all interviewees; others were provided by the interviewees.

Interviews were recorded using audio equipment and written notes, and were 30 minutes to one hour in length. Audio recordings were transcribed and integrated with researcher's notes for analysis. Open coding was used initially in order to identify discrete concepts and begin sorting data into related groups; this initial step was followed by axial coding, which enabled identification of patterns in the data (Pickard, 2007: 269–72). Dedicated indexing software (CINDEX) was used to organize coding, particularly as categories and subcategories emerged from the data. Data coded and analysed using CINDEX is displayed in Appendix C.

Results

Definition of an index

Participants' definitions of an index focused on how they use them:

The index is my memory of what was in the book. (P3)

It's basically a shortcut to what's in the text. (P5)

I use an index when I am looking for something particular in a book, and I do not wish to read the whole book at that particular time. (P6)

Most participants understand that index entries are linked to concepts as well as to words found in the text. For example, in demonstrating her use of a cookbook index, Participant 2 explained that when looking for 'béchamel sauce', she would go to the entry for 'sauces' as a concept rather than simply looking directly for the specific 'béchamel sauce' entry. Participant 5 expected to see different words in an index to explain the same concept. The expectation was that that both concepts and specific terms from the text would be indexed, where possible. This distinction, while not always apparent in the participants' definitions, became important during more in-depth discussion of how they use indexes.

Expectation of finding an index

Participants expect nonfiction books to have indexes. They were very clear on this point and made comments such as:

Basically, for nonfiction. So, anywhere where I want to be able to pick it up and find a specific bit of information, I would expect there would be an index, even if it's a biography. (P4)

I would expect *any* [emphasis added] work of nonfiction to have an index. (P6)

Their reactions to books without indexes were also emphatic. Participant 3 stated that if she was searching through several books on the same topic for specific information, the books without indexes would be of no use to her and she would discard them. Other comments included:

I would assume that it was either so short or so superficial that it wasn't considered worth indexing. I expect that a serious book is going to have an index at the end. (P4)

If I was in a library, and I was looking at two books on a particular topic, I would choose the one with the better index, with the more detailed index, because that's going to help me find what I want from the book. Indexes are important to me. There's nothing I hate more than a book with no index! (P5)

How indexes are made

Responses to the question about how indexes are made elicited a variety of responses. All participants assume that indexes are written by human beings. Those who have some knowledge of the process, mainly due to their backgrounds as information professionals, consider indexing to be difficult:

I assume that the people making them have had to read through the text and be very brave and come up with what they think the concepts are in the book, which I would find very stressful. (P3)

You do know whether an index is any good or not but you don't know how it's been created. (P6)

Learning how to use an index

None of the participants can remember having any direct instruction in how to use indexes, though many surmised that they had learned in primary school, probably from library teachers. The majority of responses to this question elaborated on the intuitive nature of using an index:

I've just always used them; for me, it was intuitive. (P1)

I think that I learned about them by using them. (P5)

How indexes are used

Indexes are used by participants in two ways – for a general overview of a book and to find specific content in a book. Participant 1 stated that she goes straight to the index, particularly if she is not familiar with the book or topic, and scans it to see how the book is set up. Indexes to online products, such as legal databases, were mentioned by Participant 2, who uses them to help orient new users to the system. He commented:

I rely on the index to make it easier. (P2)

All participants would go to the index to look for specific

content in a book. In some cases, they would use the index to find out if a book that they were unfamiliar with contained specific content, and at other times, they would use the index to find content they had already read. Participants offered detailed comments about this use of an index:

I usually use an index because I'm looking for something specific. I need to know if it's in that book. There are some books that I read cover to cover and use the index only to go back to find something after I've read it. If I pick up a book and go to the index first, it's really because I don't intend to read the whole book, I just want to get a specific piece of information. (P4)

I use an index when I'm looking for something particular in a book and I do not wish to read the whole book at that particular time. So, I will use the index first, because I'm usually hoping that will give me greater granularity, access at a deeper level than the table of contents. (P6)

When asked what they do if they cannot find what they are looking for in an index, participants responded that they try looking under alternative terms. How much effort they will put into continued search depends on their interest in the task. Participants said they will use the table of contents or cross-references as a way to find additional terms in the index that might lead them to the desired content. All but one participant stated that if they cannot find a concept in the index, they assume it is not in the book:

You have to trust the index! (P2)

I would trust the index. If I've given it a red hot try, say a student has come to me with a specific topic in mind and I can't find it looking for that specific topic or the next higher-level thing, then I would put that book aside and pick up another one. I might also check the table of contents then for that bigger idea. If I couldn't find any sign of something in the index, I would assume it's not there. (P4)

Participant 6 explicitly stated that she does not always trust the index because she has learned that not all indexes are good.

All participants discussed their use of a table of contents in conjunction with an index. Several use the table of contents rather than the index as a way of getting a general overview of a book. The table of contents was described as 'the big picture' more than once. In comparing an index and a table of contents, one participant stated:

I see it as different to a table of contents because you get less of an idea of the fine-grained content from a table of contents than you do from the index. If I was in a library, and I was looking at two books on a particular topic, I would choose the one with the better index, with the more detailed index, because that's going to help me find what I want from the book. That would be my reasoning. If I picked up a book wanting something specific from it, I think I would probably go first to the index rather

than the table of contents because I'm looking either for someone or a reference to something very specific. (P5)

Participants said that they will move back and forth between the index and table of contents to get an overview of a book, to find additional terms to look for in an index, or, in the case of Participant 6, when they did not trust the index. Two participants pointed out that books without good chapter titles often do not have good tables of content, in which case, the index is more important to them.

How much effort participants are willing to expend in using an index depends on how important the task of finding that particular information is to them. Using long lists of undifferentiated locators compared with using subentries in index entries elicited several comments:

I would follow them all [locators], if it was important to me. (P3)

I find that [long lists of locators] frustrating because you have to look at every page to see which is relevant. It's much quicker [using subentries] than going to each page. And, this [example] is a little one. I have to say that the bigger the book, the more important the index is! (P6)

Subentries would be excellent, that is actually even more useful [than lists of locators] because it's refining the search. That's definitely time saving! (P3)

One participant enjoys the intellectual exercise of using an index:

I just like the hunt of it [using cross-references]. I like to see what other terms that they might use for it. I like learning. (P1)

However, reflecting on their professional experiences, many participants had comments about users' experiences with online search tools and how that may influence their willingness to engage with book indexes, such as:

Google is making people lazier. It's making me lazier! (P4)

Quality of indexes

While all participants like indexes and use them, they recognize that indexes differ in quality. Participants talked about 'bad' or not very useful indexes mainly by providing examples (see Appendix B for a list of book indexes used during interviews). They described feeling 'lost' in indexes that were too complicated and disliking the format of some indexes. Participant 3 considered an index to a cookbook that was simply a list of recipe titles as 'not so helpful', and Participant 1 judged an index to be 'wishy-washy' and not well constructed. Other comments included:

I find this book frustrating because there's detail but it's not the detail that I want. The index is very detailed, but it's not detailed in the way that I want it to be detailed! I

wonder what the intention of the indexer was, what they were doing? (P5)

Generally, an index makes sense and you can follow it, although sometimes it's harder to do that. The format and the usefulness, and that's just such a subjective thing, are only the two reasons that I would dislike them. (P6)

Perhaps the clearest explanation of a 'good' or useful index was this one:

What makes it good is that it does what I want. (P6)

Other participants talked about specific index elements and about format. For example, when discussing the many cross-references in the index that she was examining, one participant stated:

Some may find it overcomprehensive, but if it's a topic you're not aware of, it's fabulous. They didn't leave anything to chance. (P1)

Subentries were noted by many participants:

Personally, the more I see this kind of nesting of entries, the more I like an index. I like to be able to see the main heading and then the specific subheadings. (P4)

I've looked at this index and thought, 'I don't know how any of these things work'. I would be wanting a bit more subheads. (P3)

Not all participants were happy with subentries, however; Participant 4 suggested that they are only be helpful when she is looking for something very specific, otherwise she is uncertain which page to go to.

Participants said that they like cross-references and think they are easy to use. None remembered being taught specifically about cross-references, they described using them as 'intuitive', 'logical' and 'pretty obvious.' They like using a cross-reference because:

It may lead you to something that may answer your question better. (P1)

It means that there's more in the book related to the thing that I'm looking for. (P3)

While all participants understand the purpose of cross-references, they were often very specific about when they are helpful:

So my understanding of it is that should these not be what you're looking for, this is somewhere else you could look. But, I find it I don't find it helpful in an index. [Looking at an example of a cross reference that was an acronym leading to an entry that consisted of the spelled-out word] ... could you not put that in brackets and put it in the same place? (P5)

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It was apparent that the format of indexes was important, although participants did not always consciously consider it:

I don't consciously think about that [format of an index], particularly if the indexer had made sure that the main headings and subentries were indented well. (P6)

The look of it is not good. It's the numbers [from long strings of undifferentiated locators] and quite possibly it's the font. (P5)

None of the participants look for headnotes to explain specific notations used in index entries (for example, use of t, f or n following page numbers to indicate tables, figures or footnotes). They said that they guess what these symbols mean and do not consider going to the front of the index for an explanation. The topic of these notations mainly arose in discussion of the format of an index that was provided as an example. Although one participant does like using locators with footnote numbers, others ignore them. Participant 4 described such notations as 'a secret language'. Page numbers in boldface were noted by many participants and recognized as indicating the location of important topics or definitions of terms, although again they did not consider looking for a headnote explaining this.

Ebook indexes

While the topic of ebook indexes was not initially included as a research question in this study, it often arose in discussion. The search function in ebooks is popular, and not everyone is aware that indexes exist in ebooks. Several participants stated that they do not use indexes in ebooks, only the search function; however, others described using the search function alongside an index:

If I'm looking for something, but they haven't put it in the index, that's annoying and I will then go to Google Books to search. I like Google Books where you can look at all of the instances, where they've got the short excerpts where you see the search word in context and how it's used [rather than the long lists of undifferentiated locators in the print index]. (P5)

I would definitely go the index to find the concepts and keywords, then use the index as a launching pad for searching. (P3)

The distinction between searching for specific words and using the index to find concepts was repeated by many participants. One stated:

I'm guessing that probably where an index is helpful is where the word that they are looking for isn't in the text itself, but the concept is. The term might come up in the index and then they would be able to track back to find it. (P4)

Frustration with ebooks was often expressed. Comments

on using a static index [providing only page numbers, not hyperlinked to the text] included:

I found it really annoying. It would have been better to be a 'proper index'. I ended up doing a word search because I couldn't use the index. I would be happy to pay the same cost for an ebook, if I'm getting the same functionality, but I don't want to pay the same for basically a photocopy and scan version of a print book. (P1)

An ebook index published without page numbers (see Appendix B for an example) would make one participant angry. She stated:

If you've got this electronic format, then you fully make it functional. I would actually get angry at that! You've got this technology that's all about making connections, and you've deliberately cut the link. (P3)

Having to obtain ebooks in different formats from various suppliers and often as individual chapters was described as a common problem that complicates the ability to search an ebook or download an index. Not everyone dislikes ebooks, however; Participant 2 noted that there is no search function in a print book, you have to go to the index instead!

Discussion

Participants in this study have a clear understanding of the purpose and use of a book index. Their comments on what makes a good index mirror the definitions in the literature. The ability to navigate within the index is important to them. It was evident from responses that participants had given some thought to how indexes are constructed while they were using them and trying to 'follow' them, although most professed to have minimal knowledge of the process. It was clear that they know that an index could provide access to concepts as well as to terms in the text. This particular group of index users could not remember specific instruction in how to use an index, and their comments indicate that it is an intuitive process. They are generally comfortable using subentries or cross-references to help them navigate within the index. However, these findings could certainly not be considered as representative of index users as a whole. As mentioned earlier, the sample is a major limitation of this study, as it contained only participants who like indexes and use them on a regular basis. Research into the attitudes and behaviour of those who do not like to use indexes is needed to clarify what makes a good index as well as what makes a good index user. As one participant noted, 'Not all indexes are created equal, nor are all users.'

The two ways that participants use book indexes (to gain a general overview of a book and to find specific topics in a book) is an important theme in the results. Familiarity with the books they were using also significantly influenced participants' approaches to indexes. These factors are important even in participants' definitions of an index. These findings suggest that context may be important when studying how people use indexes. Even the effort that participants are willing to put into using an index is dependent on

their engagement with the task. Participants use indexes in conjunction with tables of content. Based on this finding, it may be more appropriate to study how readers navigate in books generally, rather than focusing exclusively on index use. In Liddy and Jörgensen's (1993) usability study, data collected from one participant had to be discarded because the search was conducted using only the table of contents and not the index. Rather than separate these two tools, it may be better to consider them jointly. This usage would certainly support Anderson and Pérez-Carballo's (2005: 14) suggestion that a table of contents might also meet the definition of an index.

It is apparent from the results that for users who like and use indexes, the context of index use and their familiarity with the book are important factors. Most of the usability studies already conducted have selected participants based on their assumed exposure to books or assumed knowledge of using indexes. For example, Liddy and Jörgensen (1993) recruited university students from a School of Information Studies and used a text from undergraduate courses with which the participants were presumably familiar. The researchers do not provide any information about the participants' knowledge about indexes or whether they considered this factor. The index that they used in the study was created by a team of three qualified indexers and was deemed to be a 'good' basic index for the text (presumably by the researchers).

This study is not the only one to include these types of assumptions. Olason (2000) describes her sample population as 'a good cross-section of index users' but does not indicate how she determined that they were index users or whether they were familiar with the books used in the study (although she did question their subject matter experience). Ryan and Henselmeier (2000) developed a pre-usability testing questionnaire which asked about participants' attitudes toward and use of indexes as well as their knowledge of the topic of the book used, but unfortunately there is no discussion of the data gathered by the questionnaire or how it was used in the study. Participants in Barnum and colleagues' (2004) study were provided with a tutorial on how to use the digital tools but there is no indication that they were questioned about their general ability to use an index or their familiarity with the book. For a usability study of back-of-book indexes in an ebook environment, Abdullah and Gibb (2008c) recruited users who were assumed to have knowledge of the subject field and similar computer skills, but there is no information about their previous use of indexes or familiarity with the text.

The indexer's mantra 'there are no rules, only context' may apply to index usability studies as well as to the indexing process. Rubin and Chisnell (2008) state that usability testing should include a representative sample of end users, who do not have to be randomly chosen, and a natural representation of the work environment. Careful selection of participants and books for usability studies may produce results that achieve this goal and more accurately reflect usage in context. A screening tool for this purpose may be a useful addition to index usability studies, and could be developed from the interview script used in this study. The quality of indexes used in usability studies should also be

considered in the context of user expectations and behaviour. As there are no clear, evidence-based guidelines for index construction, choosing a 'good' index for a usability study is perhaps a 'catch-22 situation' in any case. The user's judgment of a 'good' index might fill this gap.

Not finding an index in a print book when they expected to do so influenced participants' decisions about using the book to find information. If they do find an index, they generally trust that it will help them to find what they want in the book. This contrasts sharply with their approach to ebooks. Several participants stated that they do not expect to find an index in an ebook and that they are more likely to use the search function even if they do find an index. Those that do use indexes in ebooks use them in conjunction with a search tool. This finding supports earlier observations that it may be advantageous to study navigation within ebooks as a whole, rather than separate index use from the other tools available (Browne and Coe, 2012).

While participants understand that print book indexes include concepts, not just terms from the text, they do not appear to have entirely transferred this knowledge of indexes to the ebook context. While they often expressed frustration with following long lists of undifferentiated locators in print book index entries, they do not consider following undifferentiated search results to be a similar frustration in ebooks. This finding would add an additional element to Zipf's principle of least effort, which explains that people will follow the course of action that involves the least amount of work (Case, 2012: 174). It suggests that people will follow the course of action they *expect* will involve the least amount of work.

Participants also described using the index as a method of determining terms to use for search, but they did not always consider whether the search term they had chosen from the index would exist in that form in the text. One participant did comment that being able to see short excerpts of where a term was being used in the text in ebook search results was helpful, but generally this distinction was not made. Use of an index as a method of gaining a general view of the book's content does not appear to make the transition from the print context to ebooks for this group, although this may be influenced by the fact that not all of them look for an index in ebooks. One participant commented that placing an index at the front of ebooks could entirely change her approach to their use. Frustration with using ebooks was a dominant theme, but this was focused on the challenges of using a variety of formats and suppliers, and mainly a reflection on their professional experiences. However, this points to the advantages of recruiting a sample of similar participants for further research, as information professionals and academics appear to have frequent exposure to nonfiction ebooks.

Solomon (2002: 238) cites studies suggesting that rather than emphasize finality, information systems should support reflection, thinking and learning. Markey (2007: 1,128) suggests that although users prefer to use simple search tools, we should design systems that 'covertly teach and advise at the same time'. The findings of this study support these ideas, particularly comments by participants on the intellectual effort of using an index. They also reiterate Zipf's principle of least effort (Case, 2012: 174) and Mooer's Law (Mooers, 1996), which states that 'an information

retrieval system [in this case, a book index] will tend not to be used whenever it is more painful and troublesome for a customer [sic] to have information than for him [sic] not to have it'.

Use of cross-references not only to navigate the index but as a method of learning about the terminology in the book is also relevant. Elliston's (Williams and Bakewell, 1999) indexing workshop revealed that once children were shown how to find an index and how it differed from a table of contents, they were able to quickly grasp the purpose of an index and found it helpful in to searching for information in a book. Based on the results of these studies, users do not need specific instruction in how to use indexes but rather information about their value as thinking and learning tools, particularly for their use in conjunction with search functions in ebooks. However, further study with a broader section of index users (or non-users) and digital products is needed to clarify this.

Conclusion

This exploratory user study investigated the expectations of book index users. Participants in the study have a clear understanding of the purpose and use of a book index. They expect nonfiction books to include indexes, and trust that the index will help them to find information. Indexes are used by participants in two ways: to gain a general overview of a book and to find a specific topic in a book. The amount of effort they are willing to put into using an index is dependent on their engagement in the task of searching for information. Participants do not always look for ebook indexes and do not necessarily use them in the same way as they use print book indexes. The results of this study could inform design of index usability testing and research on navigation within print books and ebooks. The study was limited to participants who liked and used book indexes. Similar research into the expectations and behaviour of readers who do not use book indexes is needed to provide a complete picture.

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Appendix A: Interview questions

Initial interview questions

- What is an index in a book?
- Do you expect all books to have indexes?
- How are book indexes made?

- Do you use indexes in books? If yes, why? If not, why not?
- How did you learn to use book indexes?
- What do you find useful about book indexes? What do you find not useful about book indexes?

Questions and topics added during the interview process

- Do you use cross-references in indexes?
- Do you prefer subentries or undifferentiated locators in index entries?
- How much effort will you put into using indexes?
- What do you think about the format of indexes?
- Do you use indexes in ebooks?

Appendix B: Indexes discussed during interviews

- Australian Society of Authors (2001) *Australian book contracts*, 3rd edn. Strawberry Hills, NSW: Keesing Press.³
- Bopp, R. E. and Smith, L. C. (2009) *Reference and information services*. Colorado: Libraries Unlimited.²
- Breaden, M. (1990) *The commonsense cookery book, Book 2*. North Ryde, NSW: Collins/Angus & Robertson.¹
- Bryson, J. (2011) *Managing information services: a sustainable approach*. Aldershot, UK: Ashgate.²
- Cassell, K. A. and Hiremath, U. (2013) *Reference and information services: an introduction*. London: Facet.¹
- Coleman, R. and Ringrose, J. (eds) (2013) *Deleuze and research methodologies*. Edinburgh: Edinburgh University Press.¹
- Deleuze, G. and Guattari, F. (2004) *A thousand plateaus: capitalism and schizophrenia*. London: Continuum.²
- Hider, P. (2012) *Information resource description: creating and managing metadata*. London: Facet.^{1,3}
- Rodrik, D. (1997) *Has globalization gone too far?* Washington DC: Institute for International Economics.³

Coding:

- 1 Book provided by a participant as an example of an index that they liked.
- 2 Book provided by a participant as an example of an index that they did not like.
- 3 Book provided by the researcher.

Ebook index sample

Rubin, J., and Chisnell, D. (2008) *Handbook of usability testing: how to plan, design, and conduct effective tests* Retrieved from EBL database. [This is a sample of an ebook that provides an index without page numbers in the ePub format, and static indexes in the PDF and online formats.]

Appendix C: Data coding and analysis (using CINDEXTM software)

Locators refer to line numbers in interview transcripts, sorted by participant.

cross-references

as intuitive, P1.56, P3.191, P4.329, P5.505
as way to see other terms, P1.16, P1.33, P5.459, P6.603, P6.619

cross-references (cont.)

dislikes, P5.460, P5.466
likes, P1.11, P1.28, P3.191, P6.601, P6.607
versus double posting, P1.12, P3.204, P4.347

definition of an index, P3.153, P3.156, P5.404, P6.560

concepts *versus* words on page, P2.141, P3.164, P5.446, P5.534

ebooks

access to index in, P1.68, P4.379, P6.643
as frustrating to use, P1.44, P3.184, P4.392, P5.516, P6.621
indexes without page numbers in, P3.182, P4.320, P6.646
navigation in, P4.299
versus search function, P2.127, P3.179, P4.312, P4.332, P4.341, P5.538, P6.621

effort in using indexes

as intellectual exercise, P1.16, P1.49, P1.58, P1.95, P1.105, P4.345, P5.470
with long lists of page numbers, P3.199, P5.477, P5.486, P5.521, P6.598, P6.657

examples of indexes

not-useful indexes, P1.59, P1.99, P2.131, P3.160, P5.434, P5.457, P6.656
useful indexes, P1.30, P1.81, P1.98, P3.162, P6.584

expectation of finding an index, P3.168, P4.260, P5.413, P5.551, P6.565

format of indexes

cross-references (*See* cross-references)
headnotes, P3.212, P4.354, P5.506
page numbers (*See* locators)
run-in *versus* indented, P1.90, P5.451, P6.594
subentries, P1.36, P3.201, P3.254, P4.363, P4.372, P6.598
visual impact, P1.88, P1.98, P3.209, P5.455, P5.475, P5.486, P6.594, P6.653, P6.659

how indexes are made, P1.42, P1.72, P2.132, P3.219, P4.288, P5.439, P5.479, P5.487, P6.580, P6.647

knowledge of indexes

general, P1.9, P1.76, P1.112, P2.139
librarian's, P1.46, P6.606

learning how to use indexes, P1.24, P2.133, P3.187, P4.327, P4.397, P5.501, P6.611

locators (page numbers)

bold format, P1.84, P3.194, P4.351
long lists of
as frustrating, P6.596, P6.657
how much effort in following, P3.199, P5.477, P5.521
versus subentries, P1.38, P3.201, P3.254, P6.598
visual impact of, P5.486
tables/figures/footnotes indicated in, P4.356, P5.455, P5.507, P5.529

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use of indexes

- as general overview of book, P1.3, P2.122, P2.142, P5.410, P5.483
- effort required (*See* effort in using index)
- format (*See* format of index)
- if topic not found in index, what then?, P1.52, P2.125, P2.138, P3.158, P3.169, P4.280, P5.420, P5.469, P5.494, P6.576
- specific (task-based) use, P1.5, P2.137, P4.274, P5.416, P5.426, P6.561
- versus table of contents, P1.2, P2.122, P2.126, P2.137, P2.143, P3.173, P3.247, P4.268, P4.271, P4.277, P4.285, P5.410, P5.421, P6.561, P6.578

value of indexes, P1.26, P1.66, P1.115, P2.128, P5.549

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People and place: new initiatives in database indexing for Indigenous collections in Australia

Jenny Wood and Judith Cannon

The Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS) has maintained the Aboriginal and Torres Strait Islander Biographical Index (ABI) for a number of years. The ABI is a personal name index to published material held in the AIATSIS print collection. The authors explore current indexing practices for the ABI, the challenges of database indexing, the Outreach programme via online tutorials (Talkin' names and Connecting to country), and new initiatives for the creation and discovery of ABI records.

This paper may contain references to deceased people which may cause sadness or distress.

Introduction

The Aboriginal and Torres Strait Islander Biographical Index (ABI) is a person and place index designed for Aboriginal and Torres Strait Islander family history research. The index has grown from its beginning as a standalone database to now being discoverable through big data. AIATSIS is a world leader in culturally appropriate protocols and practices in the collections context. There is a comprehensive list of links to all the sites mentioned at the end of the article.

Gold standard

It is quite unusual for individual indexers to have to work to strong policy documents. Having policies in place supports a governance capability and adherence to standards. AIATSIS has developed a suite of documents to support the index and maintain its integrity and longevity.

ATSILIRN protocols

Protocols endorsed by the Aboriginal and Torres Strait Islander Resource and Information Network (ATSILIRN) are in place. These protocols ensure that staff work in an environment which is culturally appropriate for Aboriginal and Torres Strait Islander peoples.