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User preferences for the design of interfaces for library search pages

A thesis

submitted in partial fulfillment

of the requirements for the degree

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Abstract

As the digital revolution continues and the use of the Internet further develops, digital libraries have become an important tool for communication and development of digital culture during the Internet era. Digital libraries will also play a more important role in the future development of digital culture and society. Searching for both printed books and E-books is now frequently done through a digital library interface. This is important when considering the development of digital media and mobile devices.

People will have a preference for how they interact with a mobile device to search a digital library. How do people search for books? What is required in a digital library interface? Do people have a preference for how they search for books? What are the factors that affect people's preferences for library search interfaces? These are the main issues that need to be explained and studied in this thesis.

The features of a digital library interface can affect people's preferences. There are nine features that could help to improve library search interface design, which involves book title, author, publisher, time, little book cover, bigger book cover, introduction, location, and price. This research concerns on assessment of people's display preferences for digital library interfaces on a mobile device or computer. The researcher investigates examples of different library search interfaces to assess people's display preferences for a library search interface on a mobile device. By analyzing and discussing the results of this research, the researcher investigates the factors that affect people's preferences for library search interfaces.

This thesis shows different preferences of readers for different library search interfaces. The conclusion is that people who participated prefer different

factors of the digital library search interfaces. People with different backgrounds tend to prefer the traditional library search interface with book title, author, publisher, time, and little book cover. This trend is not affected by the order of examples of different library search interfaces.

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Chapter 1 - Introduction

This research assesses people's display preferences for digital library interfaces. The researcher compares previous work on the development and use of digital libraries, and work in related areas to new investigations with digital library users. Through this research, participants' preferences for the display of book meta-data in digital library interfaces was collected and analyzed. By analyzing and discussing the results of this research, the researcher investigates the factors that affect people's preferences for library search interfaces.

1.1 Motivation

As the digital revolution continues and the use of the Internet further develops, digital libraries have become an important tool for communication and development of digital culture during the Internet era. Digital libraries will also play a more important role in the future development of digital culture and society. This is important when considering the development of digital media and mobile devices. E-books are also important, and searching for both printed books and E-books is now frequently done through a digital library interface. For further development, this research considers the influences that could help to improve library search interface design when using a mobile device. The look of this search interface is potentially important for how intuitive it feels for people to search for books within this interface.

1.2 Thesis hypothesis

The hypothesis of this research is:

People will have a preference for how they interact with a library search interface.

The purpose of this thesis is to study how the features of a digital library interface can affect people's preferences. The researcher investigates examples of different library search interfaces to assess people's display preferences for a library search interface. The research will also try to establish what preferences people have for interacting with a mobile device to search a digital library.

1.3 Research questions

To investigate this hypothesis, four main research questions were addressed. These questions were related to the way people search for books, the features of a digital library interface on a mobile, the preferences of participants when they search for books, and the factors that affect people's preferences for library search interfaces.

The key research questions were:

RQ1: How do people search for books?

RQ2: What is required in a digital library interface?

RQ3: Do people have a preference for how they search for books?

RQ4: What are the factors that affect people's preferences for library search interfaces?

1.3.1 How do people search for books? (RQ1)

This question is required to gain understanding of the processes that people use to search for books, and to find out what preferences people have for selecting books in both digital and physical libraries. This research question is addressed in the literature review section (Chapter 2).

To understand how people search for books, the researcher firstly gives an overview of the history and the development of E-books, as well as the differences between printed books and E-books (see Section 2.1 and Section 2.2). Then the researcher lists the steps that people take when choosing books, and summarizes the reasons that drive people searching for books from a physical or digital library (see Section 2.4).

1.3.2 What is required in a digital library interface? (RQ2)

Research Question 2 promotes investigation and understanding of how the elements in digital library interfaces are presented. These features of digital library interfaces may affect people's preferences for library search interfaces. Knowing what features affect people's preferences could help the researcher to provide recommendations for developing better digital library interfaces. This research question is addressed in Chapter 2 and Chapter 3.

Through understanding the process that people use for choosing books from digital and physical libraries (see Section 2.3), the researcher gains a general view of people's current ways for choosing books. Chapter 2 discusses the related work and explains the development and use of digital libraries by users (see Section 2.3). Through this section the researcher sums up and analyzes what features help to improve digital library interface design (see Section 2.5), and how to use these design elements to develop library interfaces for users. Chapter 3 discusses a study of the design of several different library search interfaces. In Chapter 3, the advantages and disadvantages of the different major categories of library search interfaces are described (see Section 3.1). The researcher analyzes the features of each digital library search interface, proposes the elements that may be most important in a digital library interface, and considers how these elements could help in designing the usability study of this thesis (see Section 3.2).

1.3.3 Do people have a preference for how they search for books?

(RQ3)

Research Question 3 is required to be answered before RQ4. Before determining the factors that affect people's preferences for library search interfaces, firstly it needs to be determined whether people actually have a preference for how they search for books. This research question is addressed in Chapter 4. Chapter 4 describes the design of eight different digital library search interface prototypes on a mobile device. This research also assesses people's display preferences for how they search for books on a mobile device. The researcher develops different design ideas for digital library interfaces on a mobile device (see Section 4.2.1 and Section 4.2.2), and designs a total of eight different ways to navigate these library search interface pages (see Section 4.2.3). A survey of these eight electronic interactive examples is described, and the results of this study are discussed to answer this research question (see Section 4.4 and Section 4.5).

1.3.4 What are the factors that affect people's preferences for library search interfaces? (RQ4)

Research Question 4 is required to understand and explore the factors that affect people's preferences for library search interfaces. This question gets back to the thesis hypothesis of this study: *what preferences do people have for interacting with a mobile device to search a digital library?* This research question (RQ4) is addressed in Chapter 4. In Chapter 4, the researcher proposes eight different design approaches for a library search interface and assesses people's preferences for these (see Sections 4.2 and 4.3). During the guided interview of this research, the researcher asks participants a series of

questions to determine their preference for different aspect of the interface design. By analyzing and discussing the results of this research, the researcher answers RQ4 (see Sections 5.4 and 5.5).

1.4 Structure of this thesis

The structure of this thesis is outlined below:

Chapter 2: This chapter addresses background information on E-books, and the literature on the development and use of digital libraries by users. Then it discusses the steps and reasons that people have when choosing books from physical and digital libraries. In this chapter, the researcher discusses definitions and concepts relevant to the investigation of E-book history, the differences between printed books and E-books. The researcher continues to detail the literature regarding people's preference for choosing books, and sum up the reasons that determine peoples search for books. The research undertaken into how to design and develop digital libraries for users is described. This section begins to address *RQ 1: how do people search for books;* and *RQ2: what is required in a digital library interface?*

Chapter 3: This chapter addresses the study of several different library search interfaces. The four main types of current library book search pages and books sale websites are discussed. In this chapter, several different major categories of library search interface are identified, and the advantages and disadvantages of these categories are described. This chapter continues to discuss RQ2. Through this library interface study the features of each search interface are analyzed to determine how this could help the usability study developed in the subsequent chapters.

Chapter 4: This chapter addresses the investigation of several different library search interface examples, and the research concerns assessing people's

display preferences for a library search interface design. In this chapter, the researcher sets out eight electronic interactive examples of variations of a library search interface on a device based on preliminary design models developed from what was learnt in Chapter 4. A survey of these eight electronic interactive examples was done, and the results of this study are discussed. This section begins to address *RQ3: do people have a preference for how they search for books;* and *RQ4: what are the factors that affect people's preferences for library search interfaces?*

Chapter 5: This chapter summarizes the results of the work conducted for this thesis, which assesses people's display preferences for a library search interface design. The researcher provides more suggestions on how to design a library search interface.

Chapter 2 – Related Work

This chapter covers the background information on E-books, with discussing of definitions and concepts relevant to this investigation of E-book history, the differences between printed books and E-books, and discusses the literature on the development and use of digital libraries. The researcher considers people's preference for choosing books, and summarizes the reasons that people search for books. The research is undertaken into how to design and develop digital libraries for users. This chapter begins to address *RQ1: how do people search for books;* and *RQ2: what is required in a digital library interface?*

2.1 E-books

This section reports the related work regarding E-Books, E-readers, and E-reading. This section discusses the definitions and concepts of E-books, E-book history, and the contrasts between printed books and E-books.

2.1.1 E-book definition

The word E-book is a shortened form of the word 'electronic book', which means "a digital file that contains several text and images, and makes it suitable to display on a screen which is similar to a printed book" (Attwell, 2010). There are two ways to create E-books. The first way is to create E-books by transferring the printer source files to digital formats, while the second way is to form E-books from a database or series of text files after a systematic process, and finally can be read and used through various E-reading devices (Attwell, 2010).

Browne and Coe (2012) studied people reading and using nonfiction E-books. According to Browne and Coe (2012), users can browse, search, and use the

index to navigate nonfiction E-books, and consider possible improvements in this task. Browne and Coe (2012) hypothesized that E-books would provide key navigation capabilities in printed books in future development, and will identify several tools based on their ability to search for electronic text.

2.1.2 E-book history

During the 1990 to 2000 period, computers increased in popularity and became more commonplace in the home and the office. This led to the development of E-book editing software. E-books started to take their first step with the growth of various software formats for E-reading (Clark, 2013). At this time, the content of E-books could only be read through specific software installed in personal computers, and most of the contents were text-based. After 2000, electronic books broke away from the text limitations, largely due to the significant improvements to the Internet and digital cloud technology. They began to have more file types including text, pictures and sound during this time (Liu, 2015).

With the development of mobile phones and pads, people began to use mobile devices to read E-books, but several drawbacks existed such as small screen and conversion problems (Liu, 2015). By 2010, tablets and smartphones were everywhere and it was no longer difficult for people to read E-books through mobile devices. E-book use is increasing, Amazon purchasing more E-books than printed books even back in 2011 (Hamblen, 2011). Some disciplines have shown more use of E-books than printed books as early as 2002 (Christianson & Aucoin, 2005). At this stage, multimedia and interactive E-books were developed and companies such as Amazon also created special devices to make it easier for their customers to read E-books.

In the last decade, many devices such as the personal computer, digital note

E-book, tablet, mobile phone and a special E-book device, allow readers to download text and read it on the screen more easily. In addition, design of devices and other details can also influence users' satisfaction and usability concerns. One article contained a survey relating to five main leading E-book reading devices, and used the data to evaluate the user satisfaction. Some respondents valued the reader's portability, and prefer the ability to have more than one book on a single reading device (Richardson & Mahmood, 2012).

Another survey research made by Gibson and Gibb (2011) evaluated the selection of second-generation E-book reading devices, in order to find out which E-book readers could offer the user the best functionality experience. While many of the problems associated with size, weight, and screen quality have been improved in the second-generation E-book reading devices, there are still some issues. E-books still have several problems such as copyright issues, no recognized standard-setting organizations, too many mobile devices, and applications update too quickly. Designers and readers can use the E-book readers for seeking academic information, and the favorable development of E-books will almost certainly continue. (Gibson & Gibb, 2011).

2.2 Printed books and E-books

It is important to realize the difference between E-books and printed books. The differences in the use patterns between the E-books and printed books do exist. People are more inclined to choose printed books. However, assuming that he or she has time to consult the literature in a laboratory far away from the library, E-books could be a sensible choice (Christianson & Aucoin, 2005).

E-books are not another format of printed books. They are different from printed books. E-books can include some functions that printed books not

have, such as the connection function. E-books cannot only link parts of the book together, but also can link E-books to external content (Browne & Coe, 2012). E-books are no longer a copy or translation from printed books to screen-based books (Martin & Aitken, 2012).

An E-book has to be searchable, quotable, a source for new editions or republication of old editions, and be trivial to read, search, quote, and all those things via all common hardware/software combinations.
(Hart, 1971, cited in Richardson & Mahmood, 2012, p. 171)

E-reading becomes an increased choice for readers in recent years. Library electronic book collection dramatically increased over the decade to 2010 (Wu & Mitchell, 2010). During the year 2012, 21% of American adults report having read E-books, and the number of E-book reading devices has been increased significantly (Rainie, Zickuhr, Purcell, Madden, & Brenner, 2012). However, despite the increase in E-book circulation, budgets and purchases, there are still academic groups who like printed books, regardless of their year, degree or location. The paper format becomes the most common reason why users choose not to read E-book formats (Cassidy, Martinez, & Shen, 2012).

One study done by Roesnita and Zainab (2013) identified the usage pattern of E-books by undergraduates at the University of Malaya library. The results showed that, although the students and Internet users have more Internet technology proficiency with a positive attitude towards E-book reading, E-book use level is still not high with 39% of E-book users (Roesnita & Zainab, 2013).

There are still a number of problems with the availability and desirability of E-book reading devices. The most important problem is that the functions of various E-book readers will eventually need to meet the needs of library users. Equipment design and other types of details can change consumer satisfaction

and availability issues (Martin & Aitken, 2012).

2.3 Digital libraries

This section discusses the related work regarding development of digital libraries by talking about the concepts and navigation of digital libraries.

2.3.1 Digital library definition

A digital library is a special library with “focused collections of digital objects, including text, video, and audio, along with methods for access and retrieval, and for selection, organization, and maintenance” (Witten, 2009, p. 19). According to Witten (2009), there were big differences between digital libraries. The size and scope of different digital libraries may be related to individuals, organizations, or library buildings and academic institutions that affiliated with existing libraries. The digital libraries are a kind of information retrieval system.

Digital library was increasingly defined as an indicator of collecting resources based on the Web rather than keeping the own resources (Francisco-Revilla et al., 2001). Digital library search webpage is one example according to this definition. As a new form of multimedia information systems, digital libraries could be used to support the creation of digital content, search and use the information (Borgman et al., 2000).

2.3.2 Recent improvement of digital library

There was an early project focused on creating an E-card directory called the Online Public Access Catalog (OPAC). By the 1980s, OPAC replaced the traditional card catalogs of many libraries (academic, public and special) (Bell, 2015). In this way, the library can support library resource sharing and library

information expansion outside the library through the additional useful cooperation. In 1994, digital library was first improved by the NSF / DARPA / NASA Digital Libraries Initiative (Fox, 1999).

Digital libraries have several advantages compared with traditional physical libraries. Firstly, the resources in digital libraries are stored in digital form, which makes the reader track books more easily. Secondly, digital library could allow readers to access library collections remotely, quickly and thoroughly. Finally, search technology provides readers flexibility and efficiency (Wiederhold, 1995).

2.3.3 Data management

Digital data management has many difficulties. These include the diversity of unstructured documents that need to be incorporated into the data infrastructure of digital libraries, including the results of physical, natural and computer experiments; 3D objects; time series and multimedia (Trachtengerts, Erkimbaev, Zitserman, & Kobzev, 2015). Some scientific departments, such as Earth and Space Science, Biomedicine, Materials Science, etc., generate large amounts of data resulting in "big data problems" and digital libraries are a way to assist with the management of this type of data (Trachtengerts et al., 2015).

Another type of data management is that of the digital book collection which differs from the physical book collection. Library E-book collection has dramatically increased in the past decade. Currently, suppliers, service models, and content types are diversified for catalog preparation and directory maintenance, which caused various problems. Many libraries provided bibliographic records for E-books through external data providers, but the catalogs are mainly focused on personal record rules and standards

rather than data management collection (Wu & Mitchell, 2010).

2.4 Choosing books

This section discusses the process of selecting books from physical and digital libraries. When people choose books from physical libraries and digital libraries, a process is needed. According to (Hinze, McKay, Vanderschantz, Timpany, & Cunningham, 2012), getting a book from a physical or digital library could be divided into four steps:

- (1) Identifying books of interest (e.g. via the catalogue);
- (2) Physically retrieving the books from the shelves;
- (3) Choosing among the available options;
- (4) Accessing and reading the book for the desired content.

(Hinze et al., 2012, p. 305)

These steps are similar to the steps that were summed up in another study of McKay et al. (2011). When people borrow or choose books from digital or physical libraries, their behavior could be divided into three steps. Firstly a reader gathers or collects data to find candidates. Then the reader examines each candidate and evaluates the relevance. Finally the reader borrows those books related to his / her information needs (McKay et al., 2011).

Another analysis by Ross (2000) suggests that the choice of the reading process of the book must include five relevant elements: reader's reading experience; available resources using by reader; the elements of a book that the reader considers in the book selection; book navigation details; and the reader's spending when visiting a particular book.

Many researches have observed and discussed the process of how people choose books. These researches could be divided into two sections: people selecting books from physical library, and people selecting books from digital

library.

2.4.1 Book searching and browsing

Book selection is a very important part for book using. McKay et al. (2012) analyzed the E-book records of university library books and wanted to know how the readers working with them were making the relevant decisions. This study raised the question as how readers make decisions about E-books. The interface reviewed by McKay et al. in that study provided readers with three navigation methods: the ToC on the left, the top navigation and scrolling. (McKay et al., 2011).

E-books numbers in library collections have increased dramatically over the past few years (Browne & Coe, 2012). According to Browne and Coe (2012), E-book navigation should rely on searching, browsing and using indexes. Compared with the printed books, E-books have additional features, but may also lose the index and image components. These navigation methods could not work properly for some E-books and reading devices. With the development of E-book improvements, E-books can provide the key navigation features provided in the printed book, and can also provide a variety of other tools based on the search for electronic text functions. Different users have different navigation needs and preferences, through browsing, searching and indexing E-book navigation, by providing users with access options, including efficient free text search and easy viewing (Browne & Coe, 2012).

2.4.2 Selecting books from a physical library

According to the study by Cunningham et al. (2013) of children in public libraries there was a great deal of interaction between the reader and the

library shelf (Cunningham et al., 2013), and most of the work focuses on two research directions: students and children.

It has been shown that people still like to search and select books from the bookshelves (Hinze et al., 2012). Hinze et al. (2012) described how people get a physical library book from a library bookshelf. This study was conducted in academic and government libraries. The researchers in this study visited the library alone or in pairs to observe the reader's book selection behavior. According to this research, physical shelves are hard to navigate: only the tallest readers can see books that sit on the top shelves easily, and books on the lowest shelves are difficult for many readers to see easily. The physical interaction with the book in the selection process showed that the interface worthy of research enables people to "touch" a book quickly, easily and intuitively. As a decision-making behavior, quick reading may not be transferred directly into the current E-book environment (Hinze et al., 2012).

Rinehart, Gerlach, Wisell and Welker (1998) investigated eighth grade students and wanted to know how they chose books for entertainment reading. The research determined and analyzed the strategies used in the book selection process and the type of information that students think is important according to their experience. The students were able to use abstracts, headings, and cover illustrations as important information when searching for books. They will predict whether they want to read their respective books accurately through this information. This study also demonstrated the complexity of student predictions and assessments as well as the impact of personal experience and perspectives. Many students focused on their favorite stories to discuss the relationship between their lives and the features, and revealed their emotions in the process of reading (Rinehart et al., 1998).

Dungworth, Grimshaw, McKnight and Morris (2004) did a research analyzing the preferences of 132 children when reading books. Dungworth et al. (2004) found that females prefer to read more than males. Pupils were mainly reading to enjoy and relax. Books like comics or magazines were popular. 25% of the males and less than 25% of the females used computers to read at home. One in five of the pupils chose to read books on a computer (Dungworth et al., 2004).

In the study of the virtual book spine by Dushay (2004), the user can visually browse a lot of information. The function of book spine is multifaceted. Publishers can use book spines to visually "brand" their book. Bookstores can use book spines to help sort books by subject, and then place the book on the shelves by the author. The bookstore customers can use book spines to identify the required books. The library staff may use book spines to order books. Readers may use book spines to identify books (Dushay, 2004).

2.4.3 Selecting books from a digital library

McKay et al. (2012) made a study of how readers decided on E-books. It takes into account a specific aspect of the process of selecting books from digital libraries. Through this study, McKay et al. (2012) reviewed a currently used interface to provide readers with three navigation methods: the left side of the directory, the top navigation and scrolling. The five most common parts of the book include the previous chapter, chapter title, directory, first page content and presentation. Readers are seen moving through the interface page by page, flipping to the middle of the content section and navigating directly to the chapter title. The readers usually make quick decisions about the book, or use all of their available browsing time.

2.4.4 Reasons for people choosing books

The reasons that readers choose books tend to be similar. However, these reasons were different for readers of different age range.

Kragler (2000) did a study of students' choice of book selection. The students in this study were randomly selected, and used the optional literature-reading program. The result found out that the criteria of the younger students when viewing books included viewing the pictures, reading the authors they were familiar with, and listening to friends' suggestions. In the research of Kragler (2000), the book searching reasons mentioned by the students included the length of the word, the size of the print, the length of the book, and other factors related to the book.

Children mainly used reading to enjoy and relax themselves. The more popular kind of items for them were the comics or magazines (Dungworth et al., 2004). Reutzel and Gali (1998) found that children usually chose books based on books' physical characteristics. They tended to have an overall view of their preferred books. The time limitation, restriction of the observation, personal reasons and self-conscious will also affect children's book selection behavior. The children would like to choose the first book they saw on any shelves associated with the topic they want, rather than browsing the most suitable volume according to their needs (Reutzel and Gali, 1998).

2.5 Interface design of E-books and digital libraries

The development of E-book reading equipment provides a broad space for collaboration between designers and authors. In earlier versions of the technology, many old models recorded and contacted new media. As for paging, story narration, static interface and other functions, E-books are mainly like traditional printed books. The development of second-generation

technology provides a chance for people to change their minds, and the new tablet platform offers a lot of possibilities (Martin & Aitken, 2012). New forms of E-books may include pictures, sounds, videos, multimedia and social interactions that can be provided in a hierarchical way, so that readers can explore a topic and then go to another topic. In this way, the traditional author's concept is often not appropriate. According to Martin and Aitken (2012), digital literacy has influenced the cooperation and creation between designers and writers. Designers should change their roles from historical design to collaborators. This item shows the designer's potential need for a new model on the tablet as an "imaginator". Wang (2012) gives another way to prove this theory that the use of simple design techniques help showing book cover design simplicity. This will be a feasible way to design simple book covers, which could help readers choose books.

2.5.1 Display and search results

Digital library researchers faced with several challenges that focus on helping readers find the things they were looking for. These included designing a overview that makes it easy and meaningful to identify patterns, creating understandable interfaces to identify what the readers want, and making the search results effectively displayed (Shneiderman, 2000).

Digital library studies have shown that the display of E-book content has an impact on reader's ability to find and read books. McKay et al. (2012) studied how E-book structure affected the use of these E-books. Their study showed that presentation issues could increase the number of readers who choose to discontinue reading in a relatively short period of time compared with other documents, which appeared not to have those same presentation issues (McKay et al., 2012).

Many studies have focused on book design or library academic book design. Cataloging and browsing book interface design was rarely studied. Some interface design studies mainly focused on children. Borgman et al. (2000) designed a search system based on the tendency of children's natural exploration, and used this system to explore the information search behavior of children. The results showed that the bookshelf metaphor was a successful tool for promoting effective browsing of digital library catalogs. This result supports the applicability of bookshelf metaphor in children's digital environment.

Vanderschantz, Timpany, and Hinze (2015) investigated the design preferences of people in the personal digital library catalog (eReaders) on mobile devices. Vanderschantz et al. (2015) created five paper prototype interfaces, and used these interfaces when conducting a survey of nine E-book reader interfaces to evaluate their design principles. The results showed that E-book selection also could be influenced by the contents of book cover, book-related information, metadata and book content. The interfaces of E-books in the digital library on mobile devices tended to use a bookshelf metaphor. The features of the preferred paper prototype interface by the participants included: easy to understand, browsing effectively, efficient information found rapidly, and suitable for the device. This paper prototype interface was found to be the easiest to understand because it provided a clear layout, and delivered visual and textual information. In this study, personal digital library users preferred to choose the paper prototype interface adding metadata (such as title and description), or using some way to achieve the visual representation of the book such as showing the book cover (Vanderschantz et al., 2015).

2.6 Conclusion

This chapter introduced the history and development of E-books, as well as the differences between printed book and E-book. In the past two decades, the history of E-books has developed rapidly, the differences between printed books and E-books both have advantages and disadvantages, but it cannot be denied that E-books are gradually reaching a dominant position in peoples reading activities, in particular in academic environment.

The researcher discussed definitions and concepts of digital library, and discusses the process and reasons of selecting books from physical and digital libraries. Digital libraries have several advantages compared with traditional physical libraries. Readers could track books more easily, access library collections remotely, quickly and thoroughly. The global spread of platforms, such as Network and electronic reading devices, has improved the potential of digital library in the teaching and learning area. This is important when considering the further development of digital media and mobile devices, which could help students set their goals and manage educational content.

2.6.1 Answering RQ1

This chapter addressed *RQ1: how do people search for books?*

Book selection is a very important part of the book use process. People's preference for choosing books could be mainly divided into a four step process: identify interest books through the catalog, retrieve the books from the shelves, select available options, access and read the desired content of the book (Hinze et al., 2012). The future study of people's book selection behavior in physical libraries, which focused on the book search process, could also give better recommendations for people to choose digital library books.

There are many reasons for determining how people choose books. The book

searching reasons for students included the length of a word, the size of the print, the length of the book, and other books related factors (Kragler, 2000). Children usually chose books based on the books' physical characteristics. Many things such as time limitation, restriction of the observation, personal reasons and self-conscious would affect children's book selection behavior (Reutzler & Gali, 1998).

Recently, there are not very much studies talking about the process of people's book choosing behavior, especially for the groups of people except of students and children. The research of people's behavior of selecting books from physical libraries has not been studied enough. Different people may have different preferences for choosing books. The reasons how people search for books show a great deal of variety. More research needs to be done in these areas in the future.

2.6.2 Answering RQ2

This chapter also began to discuss *RQ2: what is required in a digital library interface?*

Researchers have found that many elements that can help improve the library search interface design. The new form of E-books may include pictures, sound, video, multimedia and social interaction that can be provided in a hierarchical way so that the reader can explore the subject and then go to another topic.

The design of digital library interface should make it easy to identify patterns, create understandable interfaces to identify what the readers want, and make the search results displayed effectively (Shneiderman, 2000). The use of simple design techniques could help showing book cover design simplicity (Wang, 2012). The content presentation of digital library has a big impact on readers' search and reading behavior (McKay et al., 2012). The bookshelf

metaphor was a successful tool for promoting effective browsing of digital library catalogs (Borgman et al., 2000). In the study of Vanderschantz et al., digital library users preferred to choose interfaces with metadata (such as title and description), or using some way to achieve the visual representation of the book (such as book cover) (Vanderschantz et al., 2015). The digital library interface requires simple and understandable content presentation.

There are many elements such as the interaction connection method and content presentation ways that can help improve the library search interface design. Studies to date of the factors that are required in a digital library interface are not comprehensive. More factors of connection method and content presentation can be designed to study whether they are required in a digital library interface in the future.

Chapter 3 - Library Interface Case Study

This chapter reports the case study of several different library Search Result Pages (SRPs). Here we discuss the distinct forms of four main types of current library book search pages and books sale websites. In this chapter, we will try to identify several different major categories of library SRP, and describe the advantages and disadvantages of these categories.

With the growing awareness and use of digital libraries, people are more inclined to choose digital media or use a website to select and search for books instead of getting them from a physical library (Rainie et al., 2012). Differences in library SRPs could impact a users ability to successfully find and use books. Six university libraries, two city libraries, one E-book catalogue, and three books sale websites have been chosen as the objects of study in this chapter. This chapter continues to discuss *RQ2: what is required in a digital library interface?* Through this library SRP study we analyze the features of each search page, and find out how this could help the usability study of the subsequent chapters.

3.1 Method

The researcher selected six university libraries, two city libraries, one E-book catalogue, and three books sale websites have been chosen as the objects of study in this chapter. Students can use abstracts, titles, and cover illustrations as important information when searching for books (Rinehart et al., 1998).

Table 1 below shows the six interfaces that were included in this study. The examples that were searched and analyzed in this study could be divided into four main types: university library, city library, E-book catalogue, and book sale website.

Table 1: Different types of library SRPs

Type of Interface	Language of Interface	Name of Interface
University library	Chinese language interface	Tsinghua University
		Shandong University
	English language interface	Victoria University of Wellington
		The University of Auckland
Cambridge University		
The University of Waikato		
City library		Hamilton City Library
		Christchurch City Library
E-book catalogue		Google Books
Books sale website		Amazon Books
		Books on Google Play
		NZ Online Book Store

As shown in Table 1, the researcher also reviewed two Chinese language interfaces. These were university libraries in Mainland China, Tsinghua University Library and Shandong University Library. The English language interfaces of library websites reviewed included four university libraries in New Zealand and England, two city libraries in New Zealand. The researcher also reviewed one E-book catalogue and three Online Book Stores with English language interfaces.

The researcher used the word "design" as a keyword to search in each of the library SRPs. The researcher created screenshots of Tsinghua University Library, Shandong University Library, Victoria University of Wellington Library, The University of Auckland Library, Cambridge University Library, The University of Waikato Library, Hamilton City Library, Christchurch City Library, Google Books, Amazon Books, Books on Google Play, and NZ Online

Book Store. These screenshots were used to compare the differences in the way the results are displayed between several major library book search pages and book sale websites.

3.1.1 Screenshots

After determining the SRPs to be used as examples in the study, the researcher used the screenshot software that comes with the Windows system to take a screenshot of the page. After that, the researcher clicked on one title of the first book in the list, and went to the page that displayed more detailed information of that book. Then the researcher took another screenshot of the Book Result Page (BRP) using the screenshot software. Each of the library search interfaces were reviewed on a desktop computer and a mobile tablet device. Very few reportable differences were present for these interfaces such as different book cover sizes. For comparison between the different interfaces, screenshots were recorded using a Windows Surface Pro tablet-like laptop. The desktop version of the interfaces is analyzed because these interfaces carried the most consistent set of features across the interfaces sampled. The intention of this study is therefore to identify a common set of elements seen in desktop library search interfaces that may be applied to a future mobile interface design study.

3.2 Results

Table 2 and Table 3 were drawn up for showing the features of different library SRPs. These features are included in Section 3.2. Table 2 and Table 3 demonstrate the different elements of library SRPs, and divides them into four main types.

Table 2 shows the nine features that were identified within the SRPs that would be analyzed in each search pages. In this table, the nine features are

book title, author, publisher, publication date, little book cover, bigger book cover, introduction, location, and price. These nine features are the information contained in most of the book SRPs. In these tables a tick indicates a feature that was present on the first page of a particular library SRP, while a cross indicates a feature was not present in the particular library SRP.

Table 2: Features of different library SRPs

Library search result pages	Book Title	Author	Publisher	Publication date	Little Book Cover	Bigger Book Cover	Introduction	Location	Price
Tsinghua University	✓	×	×	✓	×	×	×	×	×
Shandong University	✓	✓	✓	✓	×	×	×	✓	×
Victoria University of Wellington	✓	✓	×	✓	✓	×	×	✓	×
The University of Auckland	✓	✓	✓	✓	✓	×	×	✓	×
Cambridge University	✓	✓	✓	✓	✓	×	×	✓	×
The University of Waikato	✓	✓	✓	✓	✓	×	✓	×	×
Hamilton City Library	✓	✓	✓	✓	✓	×	✓	✓	×
Google Books	✓	✓	×	✓	✓	×	✓	×	×
Christchurch City Library	✓	✓	×	✓	×	✓	×	✓	×
Amazon Books	✓	✓	×	✓	×	✓	×	×	✓
Books on Google Play	✓	×	×	×	×	✓	×	×	✓
NZ Online Book Store	✓	✓	×	×	×	✓	×	×	✓

As shown in Table 2, all the 12 examples display the feature of book title, and most of them show the feature of author. Only two examples (Tsinghua University and Books on Google Play) do not include the author information. Five of the 12 examples (Shandong University, The University of Auckland, Cambridge University, The University of Waikato, Hamilton City Library)

display the feature of publisher. Only two examples (Books on Google Play and NZ Online Book Store) do not include the feature of publication date. Six of the 12 examples (Victoria University of Wellington, The University of Auckland, Cambridge University, The University of Waikato, Hamilton City Library, Google Books) display the feature of little book cover. Four of the 12 examples (Christchurch City Library, Amazon Books, Books on Google Play and NZ Online Book Store) display the feature of bigger book cover. Only three examples (The University of Waikato, Hamilton City Library, Google Books) display the feature of introduction. Six of the 12 examples (Shandong University, Victoria University of Wellington, The University of Auckland, Cambridge University, Hamilton City Library, Christchurch City Library) that display the location of a book, most of them are libraries. Three of the 12 examples (Amazon Books, Books on Google Play and NZ Online Book Store) that have the feature of price, all of them are the book sale websites.

3.2.1 Text title

Digital library search results are usually displayed by the text list of 10-20 items per page (Shneiderman, 2000). So far, most of the library SRPs are still more inclined to use book title texts as search result display options. Most of the Chinese university library SRPs and literature SRPs tend to use book titles, author information, and publication date, such as Tsinghua University Library and Shandong University.

Figure 1 shows a SRP of Tsinghua University Library. According to this figure, the information on this SRP only includes book title and publication date, without any author information or the location of the book. In order to see more details about the book that people want, they need to click on a book title. When a user clicks on a book title (the blue lowercase 'a', Figure 1) it will take them to the page below and show further information on the book such

as author and location.

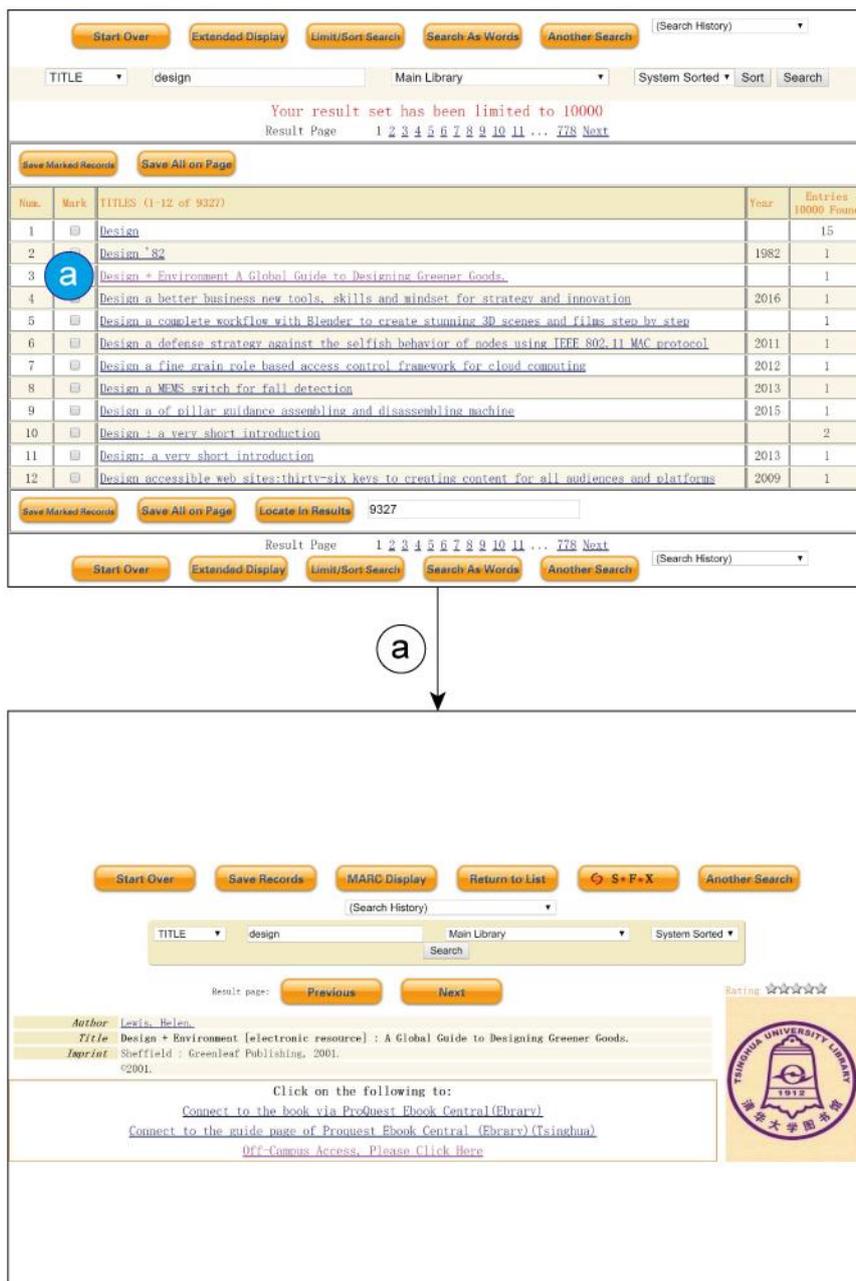


Figure 1. Tsinghua University Library SRP

Figure 2 shows a SRP of Shandong University Library, which is similar to the example of Figure 1. Except that in Figure 2, the SRP contains more text information, including book title, author information, publication date, and also the location (catalogue number) of the book. When clicking on the book title, (the blue lowercase 'a', Figure 2), it connects to the page below and

shows more details. This more detailed information includes the author, publisher, book ISBN number, book location, and even borrowing frequency and the number of borrowings.

In these two examples, people can only see the list of book titles in the initial SRP. If they want to know more specific information they have to click on the search result item. This SRP design has a very traditional feel, however, it may not be intuitive for people or fulfill more precise information needs.

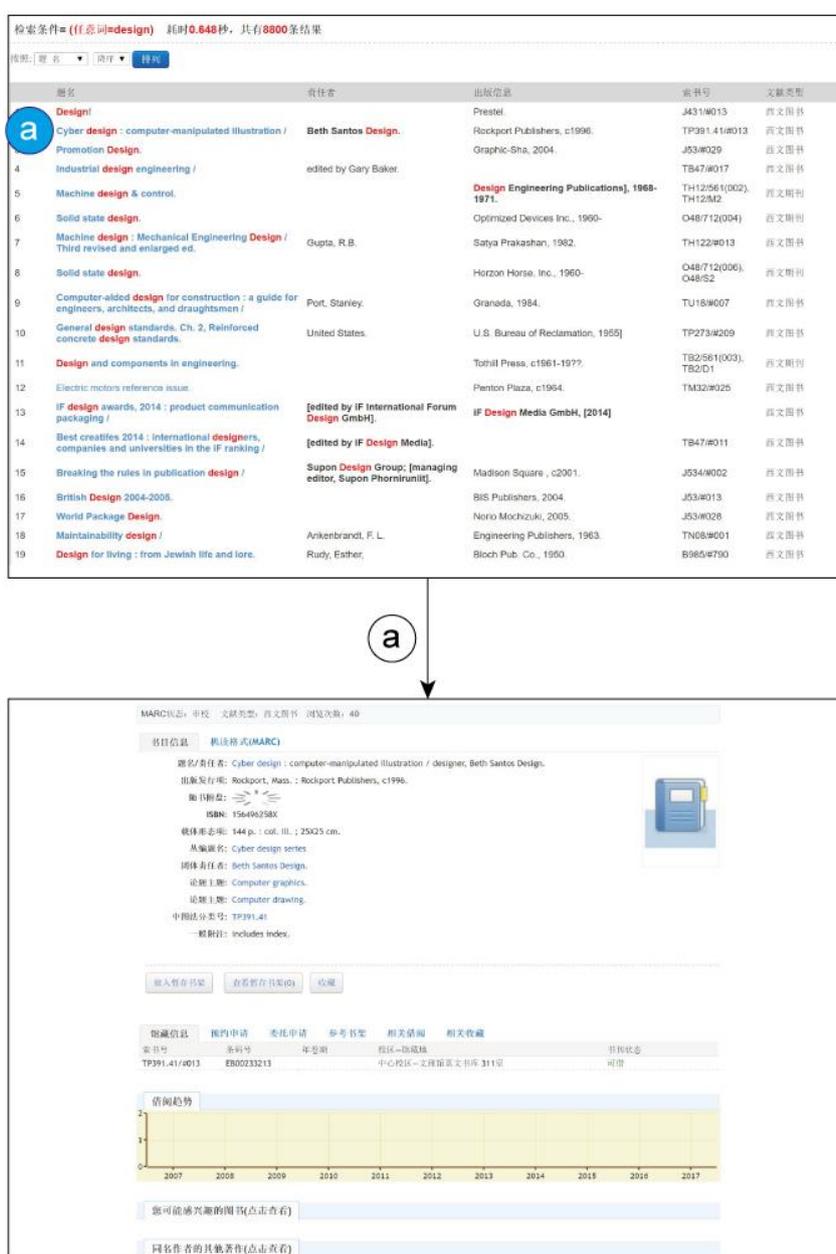


Figure 2. Shandong University Library SRP

3.2.2 Title with cover

Most university libraries use the format of title and cover image for their SRP design according to the search work done in preparation for this study. The information on the SRP generally includes book title, author information, publication date and the location of the book (catalogue number) with the book cover. Typical examples include Victoria University of Wellington, The University of Auckland, and Cambridge University.

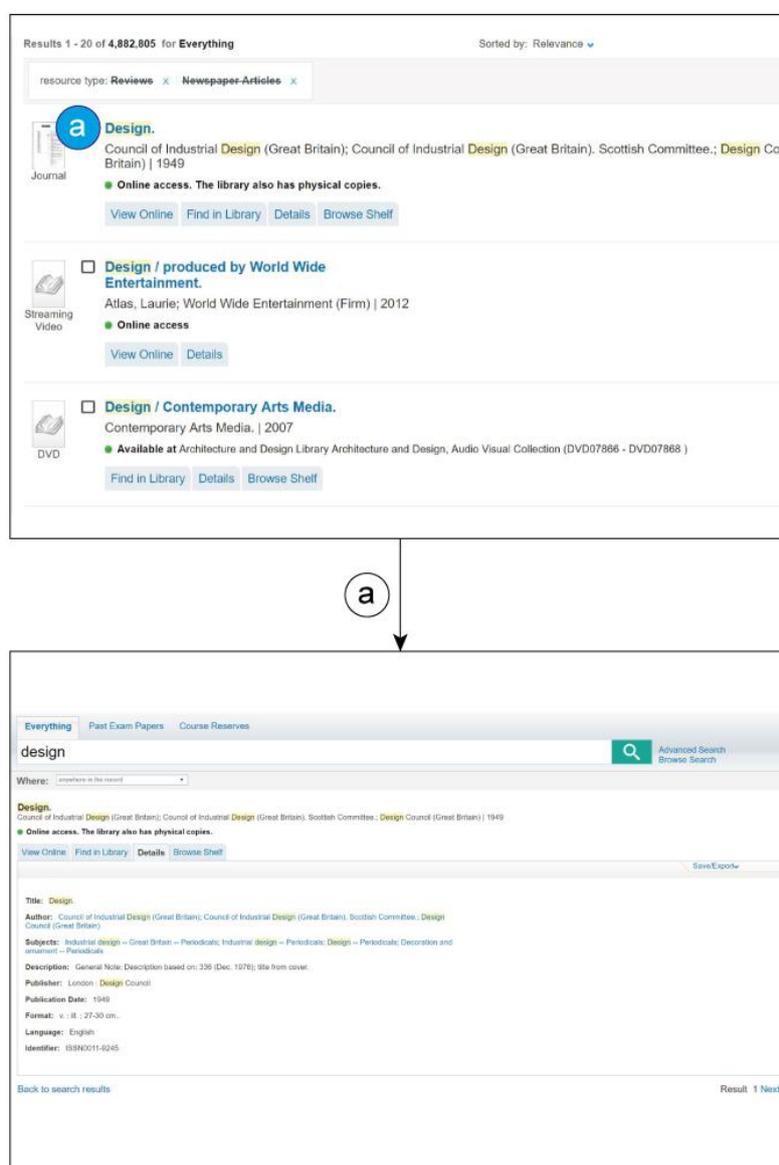


Figure 3. Victoria University of Wellington Library SRP

Figure 3 shows the SRP for Victoria University of Wellington Library. In this figure, the SRP at the top includes the information of book title, author information, publication date, and location of the book with small book cover images. When clicking on the book title, (the blue lowercase 'a', Figure 3), it will take the user to the page below and show more information on the chosen book, such as the author, subject information, publisher, publication date and book ISBN number.

Figure 4 shows the SRP of The University of Auckland Library when the word "design" is entered as a search term. Compared with the example in Figure 3, the SRP at the top in Figure 4 has slightly larger book covers. The design gives a more spacious and open feeling. It includes the information of book title, author information, and publication date. When clicking on the book title, (the blue lowercase 'a', Figure 4) on the top part, it will take the user to the page shown in the bottom of the figure and display more detailed information, such as publisher, book ISBN number, book location, and a short introduction to the book.

Figure 5 shows the SRP of Cambridge University Library. The book information at the top of this figure is more detailed, which involves author's life information, publisher address, and the category of this book in the library.

Compared to the previous type of text title only, these three examples give people more information about the books, and also provide the readers who searched for books an intuitive book impression through the small book cover images.

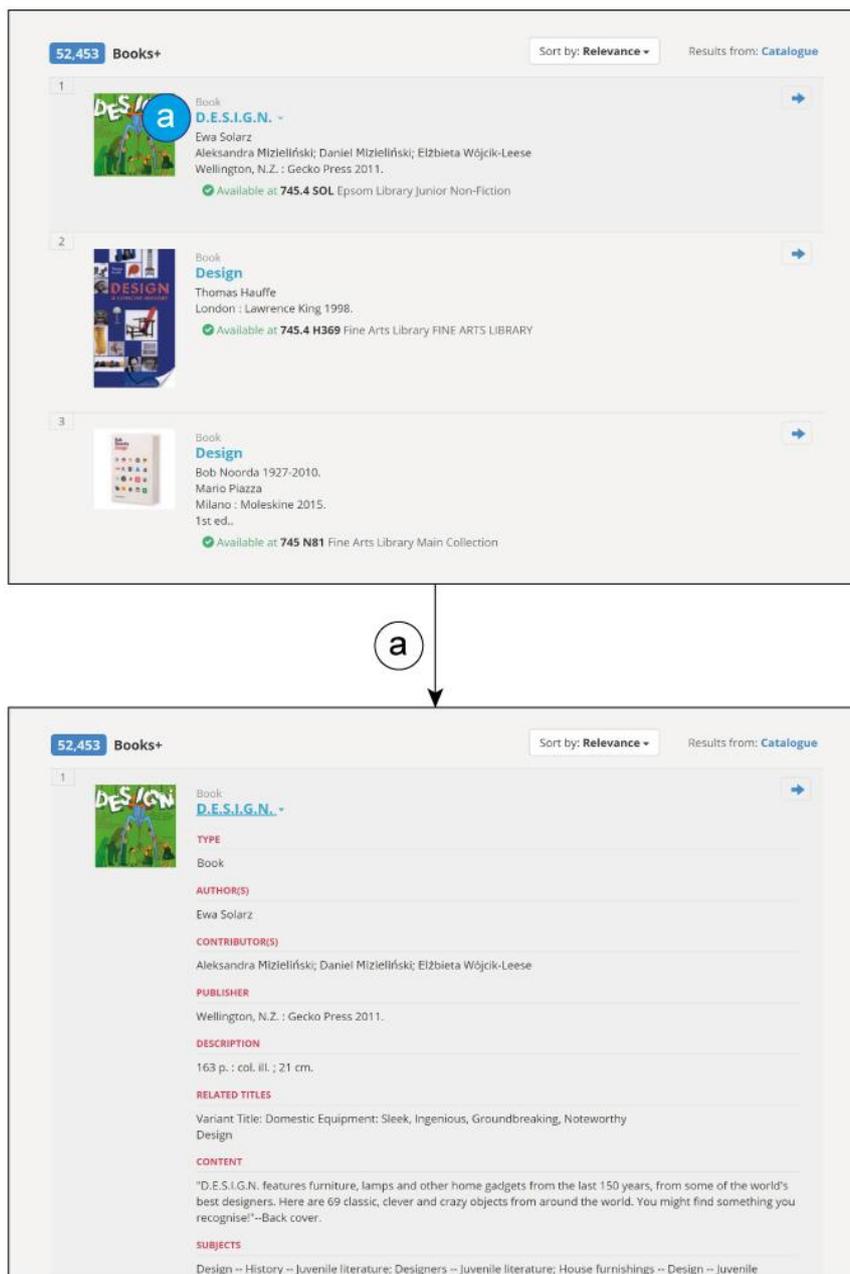


Figure 4. The University of Auckland Library SRP

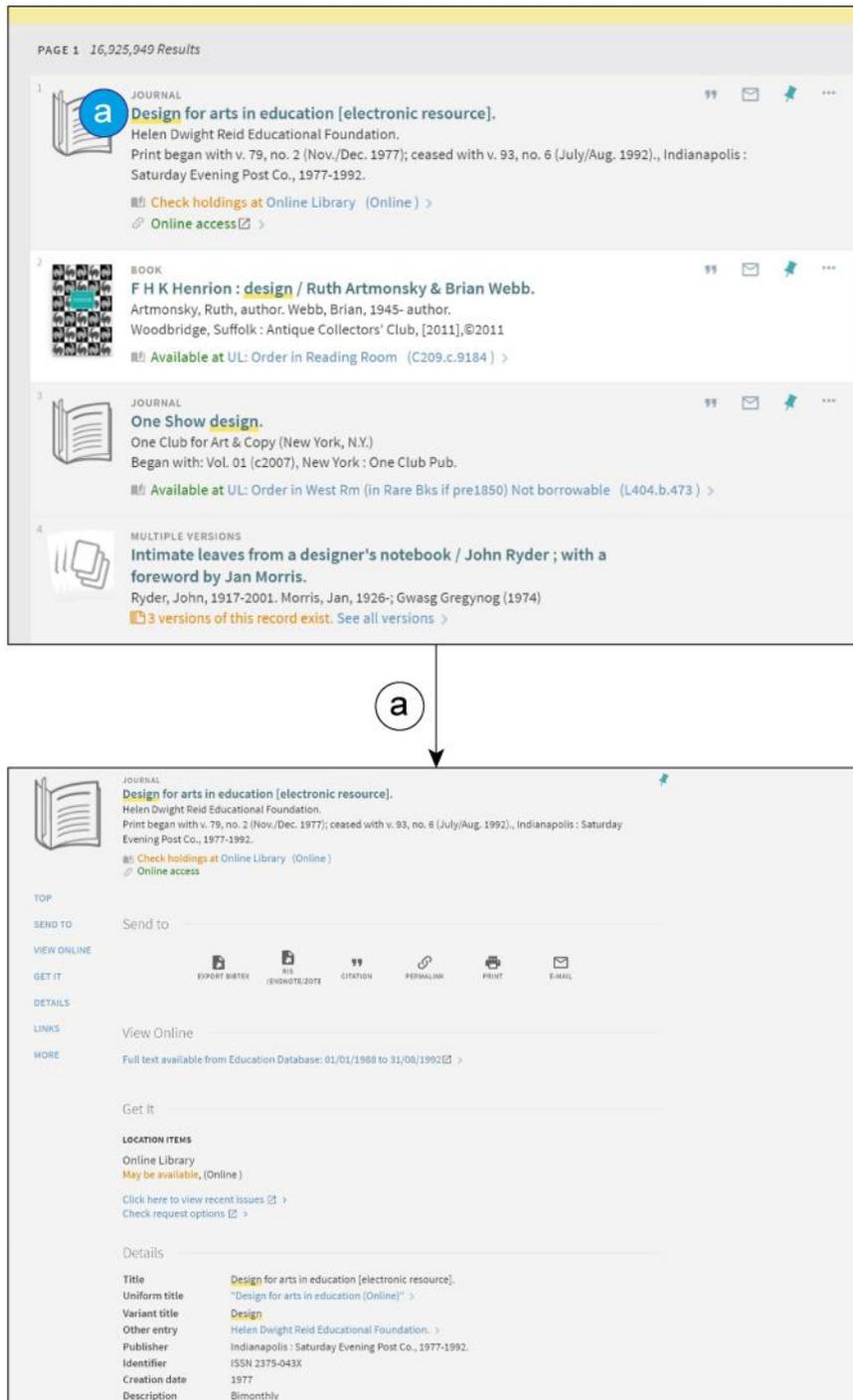


Figure 5. Cambridge University Library SRP

3.2.3 Brief introduction and location information

Some library SRPs show results with a brief introduction to each of the search results. Typical examples of results being displayed in this way are the University of Waikato Library, Hamilton City Library, and Google Book Search results.

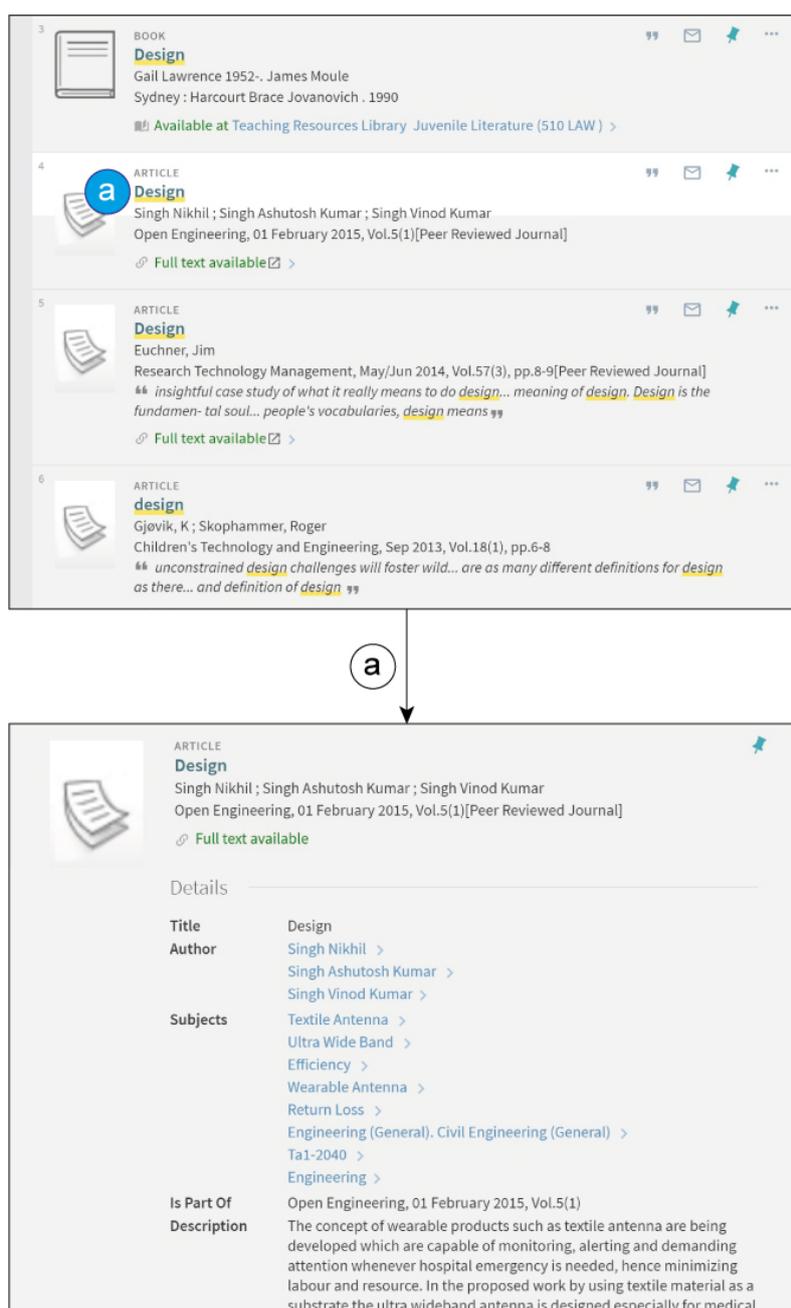


Figure 6. Waikato University Library SRP

Figure 6 shows the SRP of the University of Waikato Library when searching for the word "design". According to this figure, the information on this SRP at the top includes book title, author information, and publication date with a small image of the book cover. Among them, some books also have a brief introduction. Compared with the previous examples, this example in Figure 6 makes more information available to the readers. To see more details about the book, people could click on the book title, (the blue lowercase 'a', Figure 6) on the top part, and it takes the user to the page below and shows more detailed information of the book. The more detailed information includes the book title, book subjects, related titles, publisher and publication date, book format, and book ISSN number in this library.

Figure 7 shows a SRP for Hamilton City Library when searching for the word "design". The SRP at the top in this figure contains the information of book title, author information, publication date, and also a short summary of the book with small book cover image. The differences this example and Figure 6 are that the top SRP uses a grid layout to give the location of the book, the call number, and the status to let their reader know if the book is available. When clicking on the book title, (the blue lowercase 'a', Figure 7) in the top part, it connects to the page below and show more details, including author information, publisher, book ISBN number, book location, and even the content and abstract of the book.

Figure 8 shows a SRP of Google Books when searching the word "design". In this figure, the information in the SRP at the top includes book title, author information, and publication date with small book cover images. The differences between this and the previous two examples is that, the example in Figure 8 gives a brief, but accurate view, of the contents of the books, which gives the reader more precise information for making their choice. When people click on the book title, (the blue lowercase 'a', Figure 8) in the top part,

it connects to the page below and shows more detailed information, including title, editor, publisher, book ISBN number, book location, a short introduction, and also a QR code for the book.

1.  **Garden design** Place Hold
 Young, Chris.
Publication Date(s) 2009 
Summary From the publisher of category-killer garden books including encyclopedias on gardening, perennials, plants and garden plans, here is the only book yo
Available: 1

Library	Call Number	Shelf Location	Status
Hillcrest Library	712.6 GAR	Adult Non-fiction	Available

2.  **Living design** Place Hold
 Durie, Jamie, author.
Publication Date(s) 2016 
Summary Designer and TV host Jamie Durie has long been passionate about creating outdoor rooms - luxurious living spaces where we can cook, eat, bathe and sle
Available: 0

Library	Call Number	Shelf Location	Status
Chartwell Library	747 DUR	Adult Non-fiction	On Loan

a

 **Title: Garden design** Select an Action ▼
Author: Young, Chris. [Librarian's View](#)
ISBN: 9780756642747
Additional ISBN: 0756642744 9780756642747
Edition: 1st American ed.
Publication Information: New York : DK, 2009.
Physical Description: 360 p. : col. ill., plans (some col.) ; 30 cm.
General Note: Includes index.
Contents: How to design. First principles ; Designing with plants ; Creating a plan ; Choosing materials ; Assessing your garden ; Design case study -- Choosing a style. Garden styles explained ; Cottage gardens ; Modernist gardens ; Foliage gardens ; Productive gardens ; Sustainable gardens ; Country gardens ; Formal gardens ; Mediterranean gardens ; Japanese gardens ; Fusion gardens ; Family gardens ; Urban gardens ; Concept gardens -- Making a garden. Building garden structures ; Planting techniques -- Plant and materials guides.
Subject Term: Gardens -- Design. Landscape gardening.
Added Author: Young, Chris.
Language: English
Abstract: From the publisher of category-killer

Figure 7. Hamilton City Library SRP

About 11,900,000 results (0.60 seconds)

a **The Design Book**
<https://books.google.co.nz/books?isbn=0714865796>
 Editors of Phaidon - 2013 - No preview
 The Design Book presents iconic pieces by Le Corbusier, Philippe Starck, the Eames, and the Apple design team, alongside classic objects such as the paper clip, the hurricane lantern, and the martini glass.

Design of Machine Elements
<https://books.google.co.nz/books?isbn=1259083519>
 V. B. Bhandari - 2010 - Preview - More editions
 This hallmark text on Machine Design almost covers the entire syllabus of all Indian Universities and Polytechnics.

Design
<https://books.google.co.nz/books?isbn=1856691349>
 Thomas Hauffe - 1998 - Preview
 Aiming to place design developments in their broader context, this text describes the history of design from its emergence as a separate discipline around 1750 to the present.

a

The Design Book



Editors of Phaidon
 Phaidon Press, 16/09/2013 - Art - 511 pages
 ★★★★★
 0 Reviews
 0

Discover 500 of the most innovative, influential, and enduring products from the last five centuries in one compact and highly collectable volume. *The Design Book* presents iconic pieces by Le Corbusier, Philippe Starck, the Eames, and the Apple design team, alongside classic objects such as the paper clip, the hurricane lantern, and the martini glass. Each entry

[More »](#)

About the author (2013)
 Phaidon Editors

Bibliographic information

Title	The Design Book
Editor	Editors of Phaidon
Edition	illustrated
Publisher	Phaidon Press, 2013
ISBN	0714865796, 9780714865799
Length	511 pages
Subjects	Art › General



Figure 8. Google Books SRP

3.2.4 Bigger book cover

Some library SRPs like to use a large and prominent book cover to attract the attention of the searcher, for example the Christchurch City Library. This situation is more common in some books sale website, such as Amazon, Google Play and NZ Online Book Store.

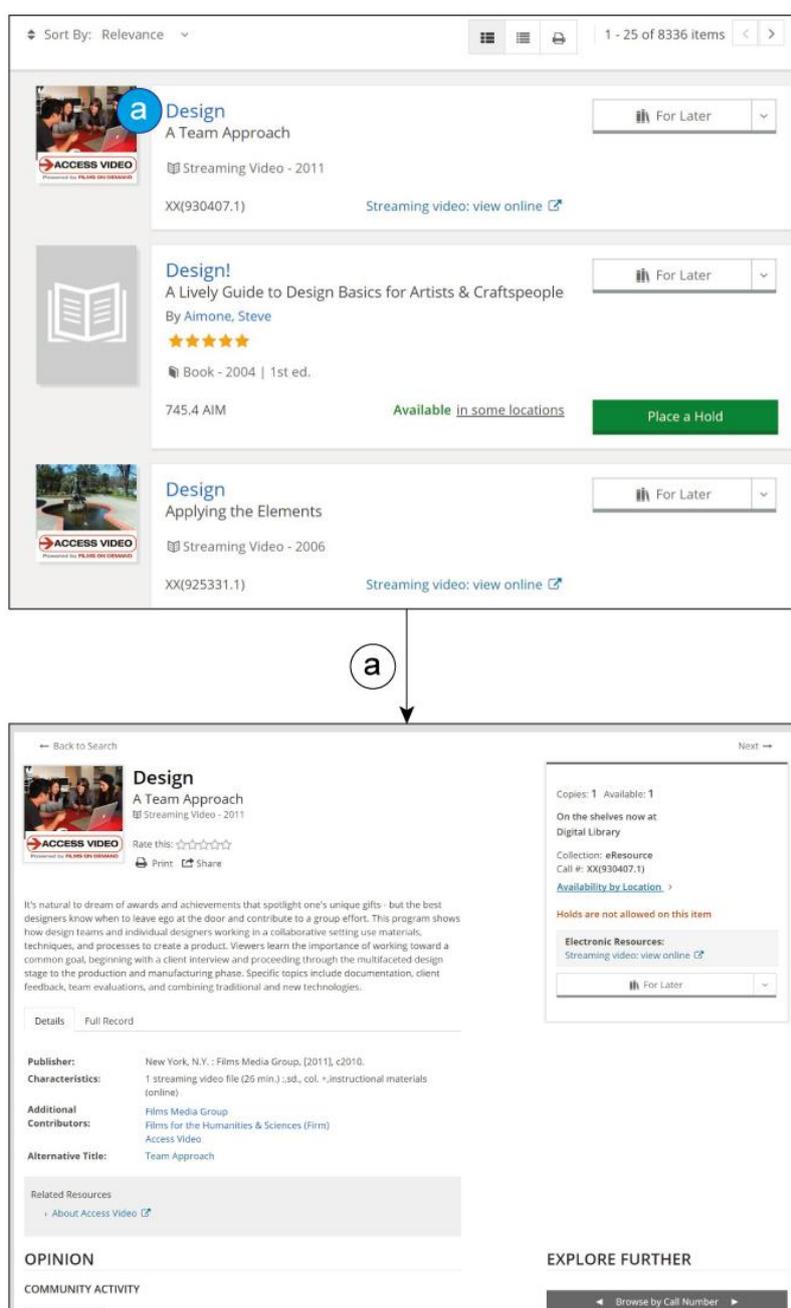


Figure 9. Christchurch City Library SRP

Figure 9 shows the SRP of Christchurch City Library. According to this figure, the SRP on the top includes bigger book covers, with the information of the book title, author information, and publication date. When clicking on the book title, (the blue lowercase 'a', Figure 9) at the top of this figure, it takes the user to the page below and shows more information of the chosen book, including author information, publisher, and a short summary of the book.

Figure 10 shows a SRP of Amazon Book when searching the word "design". Compared to the example in Figure 9, the SRP at the top in Figure 10 has even larger book covers. Besides the information of book title, author information, publication date, it also mentions the book price in an obvious position. When clicking on the book title, (the blue lowercase 'a', Figure 10) at the top, it shows the page below with a short introduction about the book. However, beyond that this page places more emphasis on book prices and related purchases.

Figure 11 shows a SRP when searching the word "design" in books on Google Play. The differences between this and the previous two examples is that, beside the large book cover, the book information on the top of Figure 11 only includes the book title and the book price. People can get more information about the books by clicking on the book cover, (the blue lowercase 'a', Figure 11) at the top. It shows a short introduction about the book, the writer profile, and how other readers felt about the book.

Figure 12 shows a SRP of searching the word "design" in NZ Online Book Store. This example is similar to the example shown in Figure 11. The differences between them is that in Figure 12, the page below shows more information about the chosen book when clicking on the book cover, (the blue lowercase 'a', Figure 12) at the top of this figure, including author information, publisher, and a short summary of the book.

Compared to the previous types of examples, the books sale websites information was more focused on the design of the cover, which can be more attractive to capture the attention of consumers, as well as an emphasis on the price.

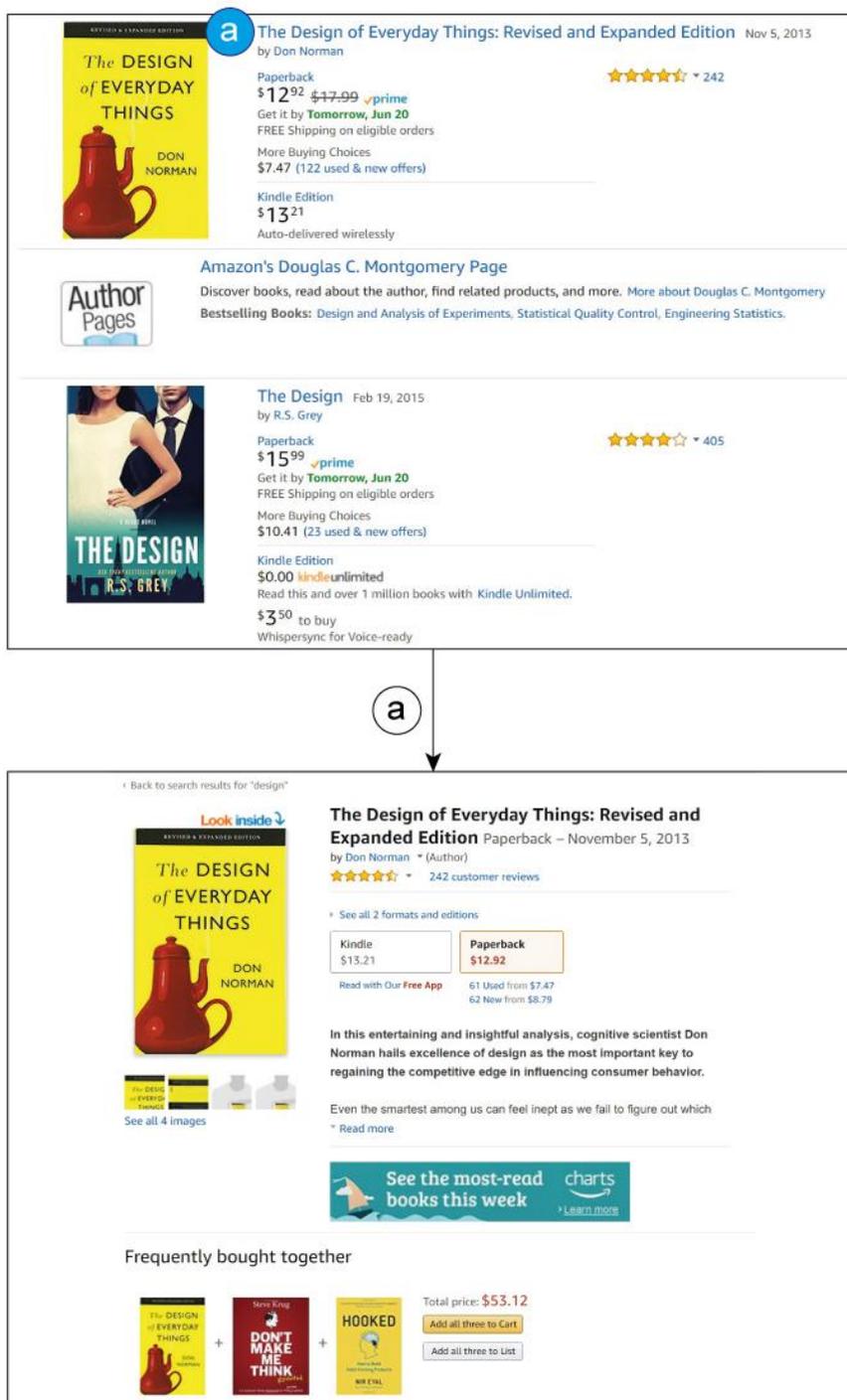


Figure 10. Amazon Books SRP

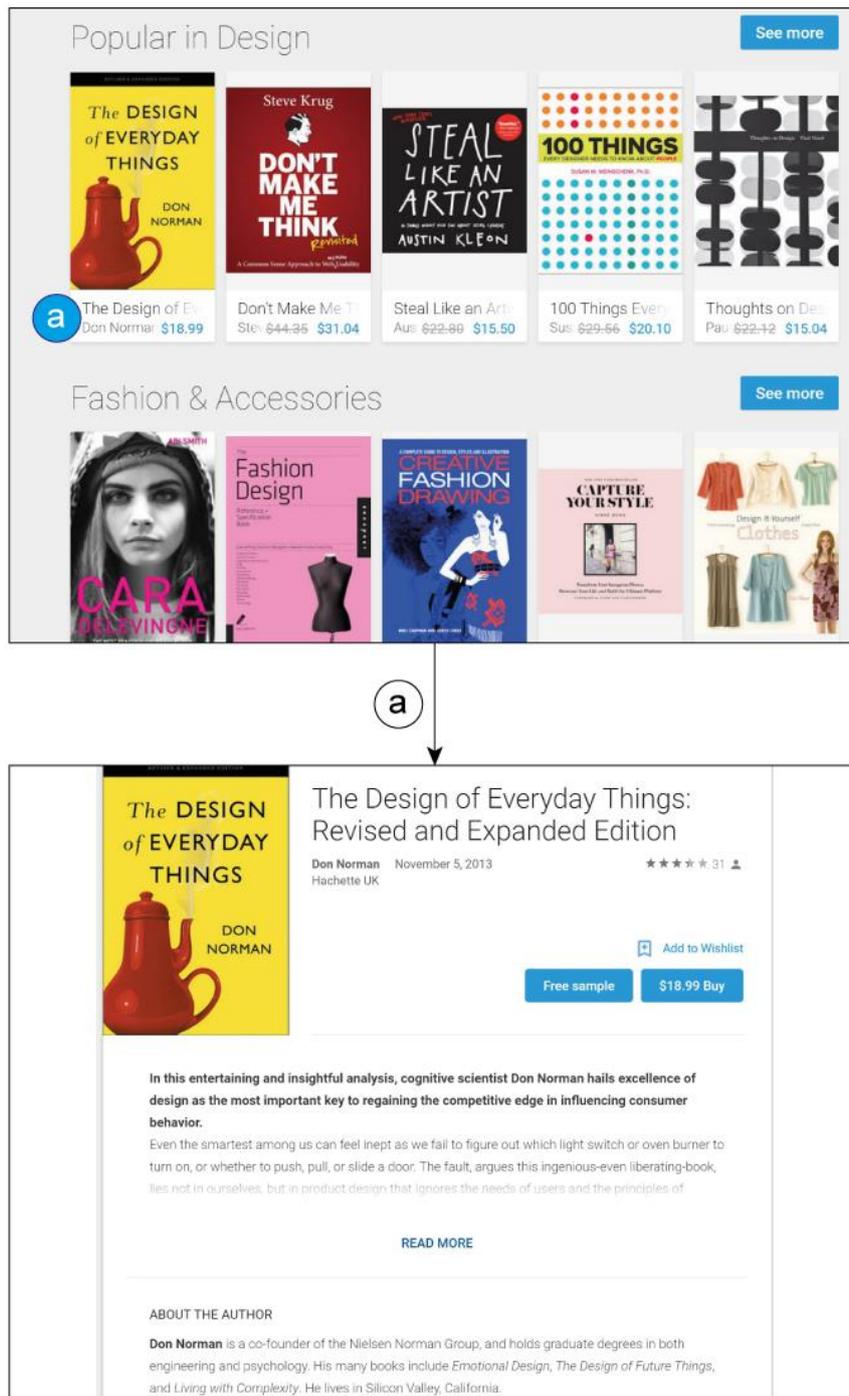


Figure 11. Books on Google Play SRP

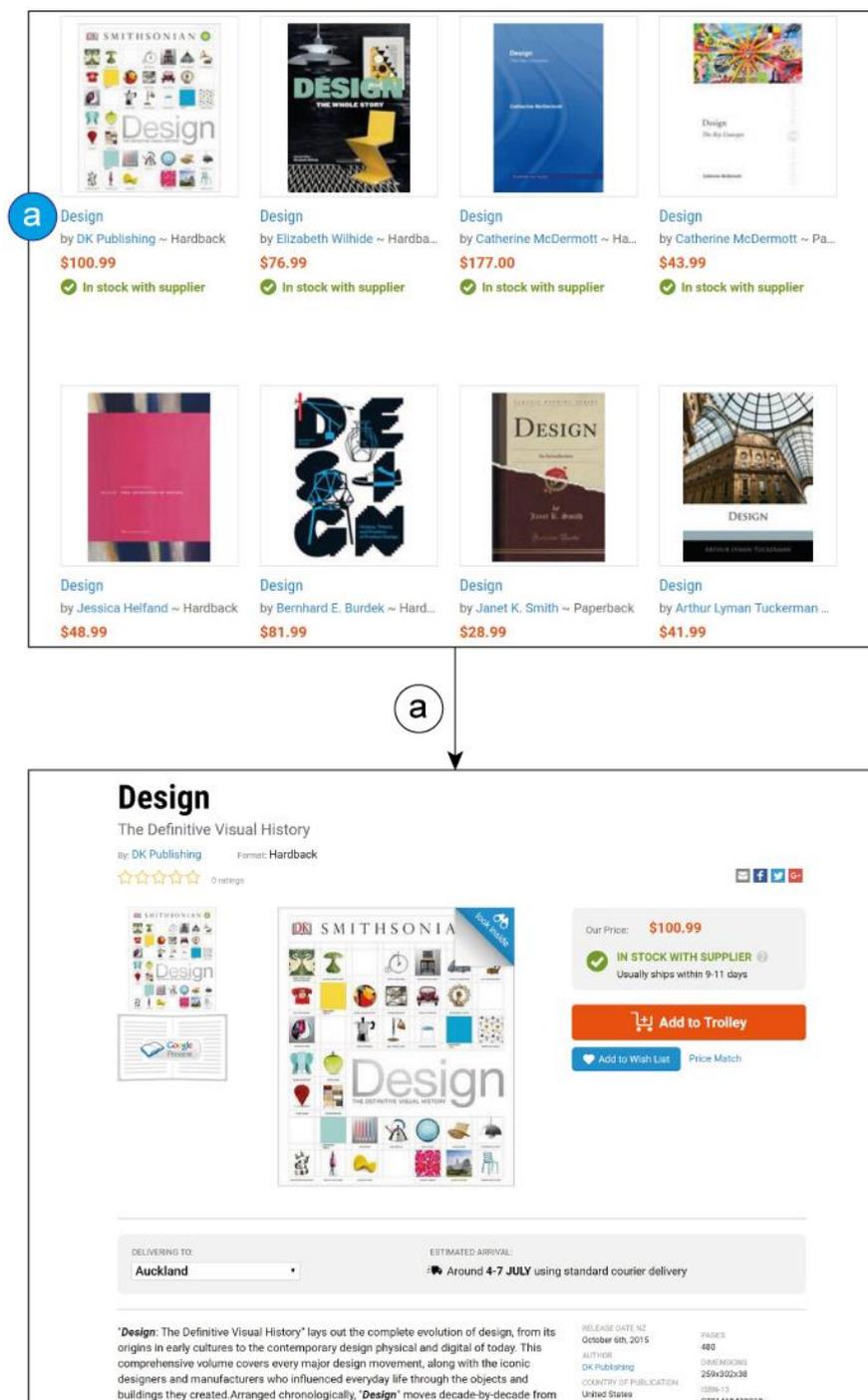


Figure 12. NZ Online Book Store SRP

3.3 Discussion

Table 3 shows the main types of different library SRPs. As the table indicates, the library SRPs used in this study could be divided into the following main types: text title; title with cover; brief introduction and location information;

and bigger book cover. A table tick indicates the method for displaying results for the first page of a particular library SRP.

Table 3: Main types of library SRPs

Library search result pages	Text title	Title with cover	Brief introduction and location information	Bigger book cover
Tsinghua University	✓			
Shandong University	✓			
Victoria University of Wellington		✓		
The University of Auckland		✓		
Cambridge University		✓		
The University of Waikato			✓	
Hamilton City Library			✓	
Google Books			✓	
Christchurch City Library				✓
Amazon Books				✓
Books on Google Play				✓
NZ Online Book Store				✓

As shown in Table 3, the library interface used a text title includes Tsinghua University Library and Shandong University Library two examples. The library interface used text title with book covers included Victoria University of Wellington Library, The University of Auckland Library, and Cambridge University Library. The library interface used brief introduction and location information includes The University of Waikato Library, Hamilton City Library and Google Books. The library interface used the bigger book covers included Christchurch City Library, Amazon Books, Books on Google Play, and NZ Online Book Store. Overall, there were two examples belonging to

text title types, three examples being a part of title with cover types. Brief introduction and location information types included three examples, and bigger book cover types showed four examples. The types of features typical of each interface type were explained in sections 3.2.1, 3.2.2, 3.2.3 and 3.2.4.

For the library interfaces used a text title, people could only see the list of book titles and have to click on the search result item to get more specific information. Compared to the text title interfaces, the interfaces used a text title with book covers gave people more information about the books, and also provide the readers who searched for books an intuitive book impression through the small book cover images. The interfaces of books sale websites paid more attention to the design of bigger book covers, which could be more attractive to the consumers.

3.4 Conclusion

The difference between the library Search Result Pages (SRPs) could have a big impact on people when they choosing books from library book search pages and books sale websites. In this chapter, the researcher looked at six university libraries, two city libraries, one E-book catalogue, and three books sale websites as the objects of this study. The researcher identified that there are four major categories of the library SRP that the current library search page can be divided into: text title, title with cover, brief introduction and location information, and bigger book cover.

Each of the six type of SRP had its own advantages and disadvantages. For text title examples, people would be able to only see the title list of book titles in the initial SRP. Compared to the text title only type, the examples of title with cover would give people more information about the books. Examples of brief introduction showed results with a brief introduction to each of the search results, while examples with bigger book cover was more focused on

the design of the cover, which could be more attractive to capture the attention of consumers.

3.4.1 Answering RQ2

This chapter continued to answer *RQ2: what is required in a digital library interface?*

According to Chapter 2, many elements could help improve the library search interface design. The content displayed on the digital library interface would have a significant impact on reader's search and reading behavior (McKay et al., 2012). According to another study of McKay (2011), there were five parts of the book that viewed most commonly by readers. These parts include front matter, title of the chapter, contents, first page of content, and the introduction. This was similar with the features required in a digital library interface.

In Chapter 3, the researcher summed up several factors through four major categories of the library search interfaces. There were nine features that were commonly used in a digital library interface. These features involved book title, author, publisher, publication date, little book cover, bigger book cover, introduction, location, and price. By analyzing these factors systematically, the researcher would apply it to the next usability study of library search interface design.

Chapter 4 - Usability Study

In this chapter, several different library search interface examples are designed and tested. This research is about assessing people's display preferences for a library search interface design. The researcher designed models of nine typical library Search Result Pages (SRPs), and combined these in ten proposed Navigation Flows (NFs) to connect these nine library SRP models. The researcher then chose eight of these models to develop into electronic interactive examples of variations of a library search interface on a mobile device. A survey of these eight electronic interactive examples was done with 75 participants, and the results of this study were discussed in Section 4.4. This section begins to address *RQ3: do people have a preference for how they search for books;* and *RQ4: what are the factors that affect people's preferences for library search interfaces?*

4.1 Introduction

Through this research, information was collected and analyzed regarding people's preferences for the display of books in a library search interface. The researcher designed nine main library SRP modes, and combined these in ten proposed NFs to connect these nine library SRP models. Then the researcher designed seven main type of the library SRPs based on the nine different simple library SRP modes, and designed eight different navigating ways of the seven library SRPs. The features of these library SRP modes were commonly used in a digital library interface according to Chapter 3. The library search interface featured (meta-data) included several (1-5) books with their cover, book title, author's name, publication date, book introduction, and spine. For each single search interface, it contains several different meta-data. For example, some SRPs may use little book covers with book title,

author's name, and publication date, while other search interface uses only book covers. The research involved asking participants for their visual display preferences and how much meta-data they prefer when viewing books in a library SRP. The data gathered included people's preferred choices of the book's cover, author's name, publication date, book introduction, and book spine, and combinations of some and/or all of these choices. The information gathered helped to determine the level of detail required and user preferences for the presentation of E-books to ensure ease of selection in a library search interface.

4.2 Method

The study was performed as an observed task using an electronic display on a tablet (Nexus7 ASUS, 200 mm × 114 mm × 8.65 mm) supplied by the researcher, a questionnaire, and a guided interview (that is, using an electronic display and an array of questions to guide the participants through the interview). The interview studies were conducted on the University of Waikato (UoW), and Ocean University of China (OUC) grounds. Participants in the study took no longer than 20 minutes. The researcher designed seven main types of the library SRPs and eight electronic interactive examples. Participants were shown eight electronic interactive examples of variations of a library search interface on a device. The researcher would let participants navigate and explore these eight electronic interactive examples by themselves. Then the researcher asked the participant questions in a guided interview to understand the preferences and choices made by the participant. During the guided interview, participants were asked to choose one of these examples of each question according to their preference regarding the level of detail displayed after reviewing all of the interfaces, and explain the reasons. Observation was made of the participant using the electronic display and

information gathered through the process of a guided interview.

4.2.1 Preliminary design

The goal of this part was to create a range of electronic interactive library SRP examples to test. According to Chapter 3, there were nine features that are commonly used in a digital library interface on a mobile device, which involved book title, author, publisher, publication date, little book cover, bigger book cover, introduction, location, and price. The researcher designed the library SRP modes and their navigating ways based on this study.

4.2.1.1 Library search interface models

To do this the researcher designed nine potential variations of library SRP models based on the previous search of the current library SRPs, as was discussed in Chapter 3.

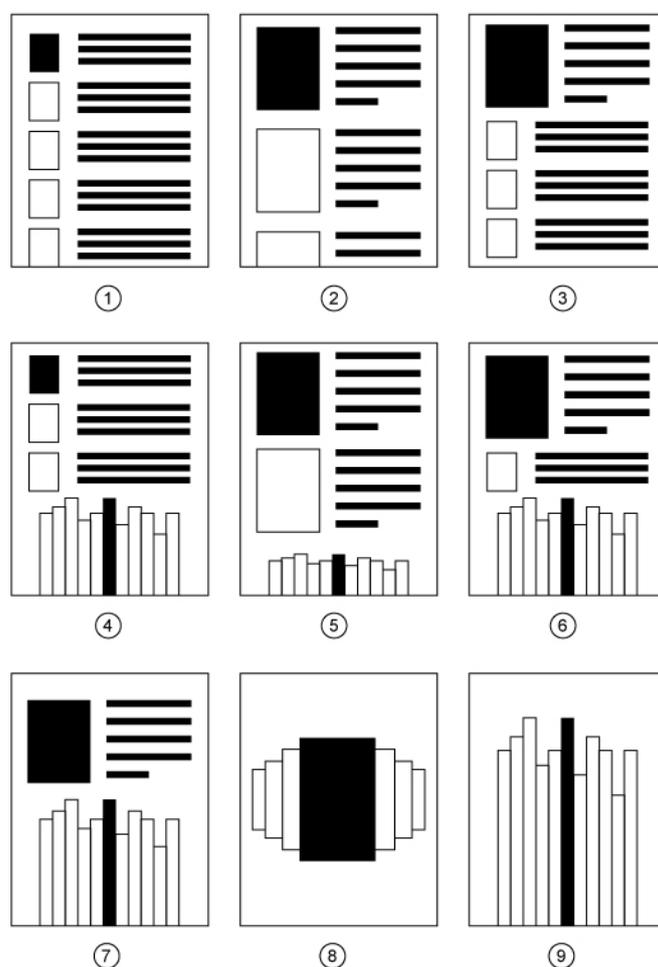


Figure 13. Nine main library SRP models

Figure 13 shows nine different library SRP models that were developed based on the findings of chapter 3.

Of the nine examples, 1, 2 and 3, as shown in Figure 13, are based on the traditional library SRPs reviewed in Section 3.2.2. The information included in this type of SRP generally includes book title, author, publication date and the location of the book with either a small or large book cover. Search Result Page 1 (SRP 1) in this figure uses a relatively small cover with several book details. Contrast to SRP 1, SRP 2 used a bigger book cover, which meant that fewer books could be displayed on a single screen. SRP 3 used the mixture of book cover sizes. On the search page of SRP 3, the first book was displayed

with a bigger book cover, and the following books on this page were shown with small covers.

SRP 4, SRP 5 and SRP 6 were based on the SRP 1, SRP 2 and SRP 3. These three examples added a section at the bottom of the page with book spines, this also meant less books were able to be displayed on a single screen. According to Tillett (1998), book spine could used by publishers to visually “brand” their books, and also may used by readers to identify their desired books. In a way, book spine could be one feature that helps people choose books in a digital library interface.

The remaining three SRP examples (7, 8 and 9) were much simpler than SRP 4, SRP 5, and SRP 6. SRP 7 showed the meta-data of only one book with its cover and features (author’s name, publication date, book introduction), then showed the position of this book in a row of spines. SRP 8 displayed books only with their covers. In this example, it showed the covers prominently of different books in a row. This design was based on some common books sale website SRPs as mentioned in Section 3.2.4. Corresponding to it, SRP 9 displayed books only with their spines. In a sense, only showing book spines could make people feel more like they are in a physical library when choosing books on the library search page.

4.2.1.2 Navigation of library search interface models

The researcher designed ten different Navigation Flows (NFs) of the nine library SRP models as mentioned in Section 4.2.1.1.

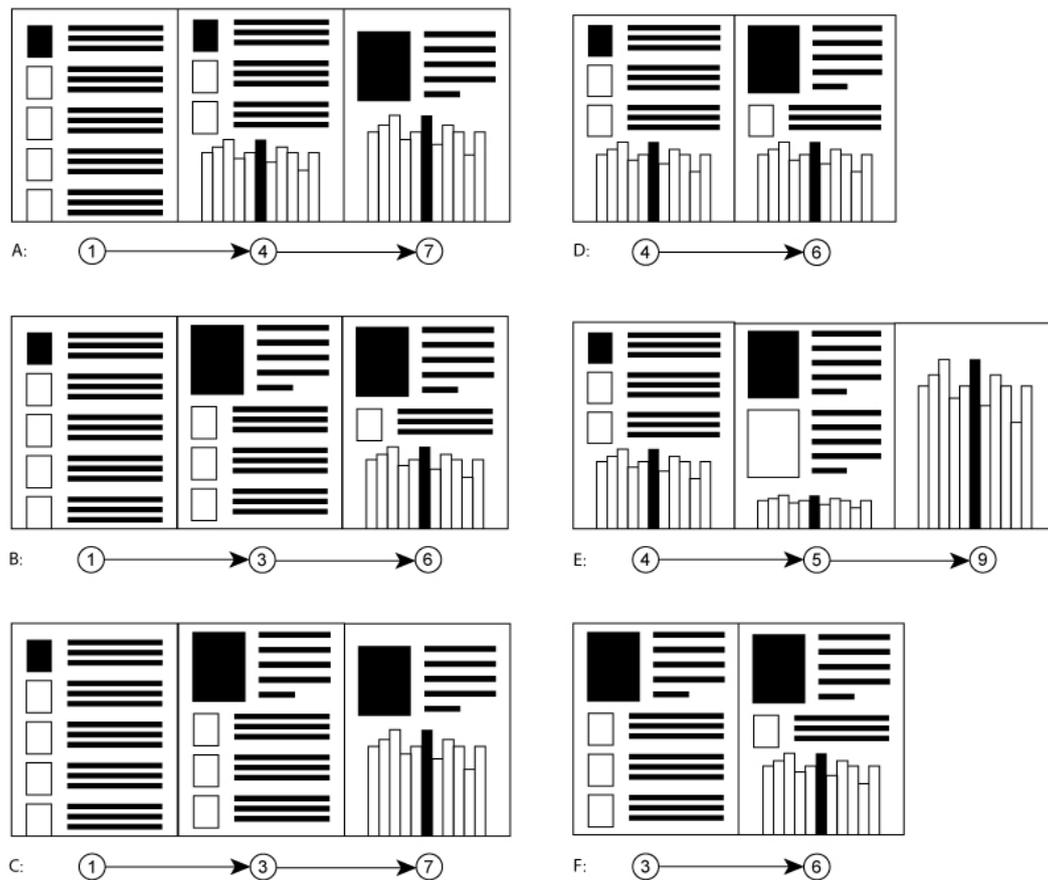


Figure 14. Different NFs of the 9 library SRP models (part 1)

Figure 14 shows six of the ten different NFs the researcher combined for navigating within a library SRP models mentioned in Section 4.2.1.1.

According to Figure 14, Navigation Flow A (NF A) shows one way to connect these library SRP models. In this NF, the interface started from SRP 1, then moved to SRP 4 when the user selected a book, and then to SRP 7 when they chose the book again. When using this NF to navigate the library SRP, participants would get the book spine information when choosing one specific book, and more meta-data features of this book could be given after touching the book spine.

NF B shows another way to navigate the library SRP models. In this NF, the page started from SRP 1, then navigated to SRP 3, and then connected to SRP 6. Participants would get more meta-data features of one specific book when

choosing it (also with other books), and then it would show the position of this book in a row of spines when using this NF. As mentioned in Section 2.4.3, book spine in a way could help readers to identify the books.

NF C was similar with NF B. The only difference between them was the third step. NF C was navigated from SRP 3 to SRP 7 in the last stage. In the third step of this NF, participants would only get the information of the specific book that they chose.

NF D only had two steps. The page started from SRP 4, then navigated to SRP 6. Participants would get more meta-data features of one specific book appearing above when they touch the book spine. They can also see the second book with less meta-data features following it.

In NF E, the interface started from SRP 4, then navigated to SRP 5, and then changed to SRP 9. SRP 9 showed a row of book spines, which could let the users feel a sense of in a real physical library. When touching one specific book, participants could get more meta-data features with a bigger book cover, and then get the position of this book in a row of spine.

NF F also only had two steps. In this example, the page started from SRP 3, then navigated to SRP 6. Participants could get the meta-data features of the book from beginning, and then knew where the specific book is with the book spine information.

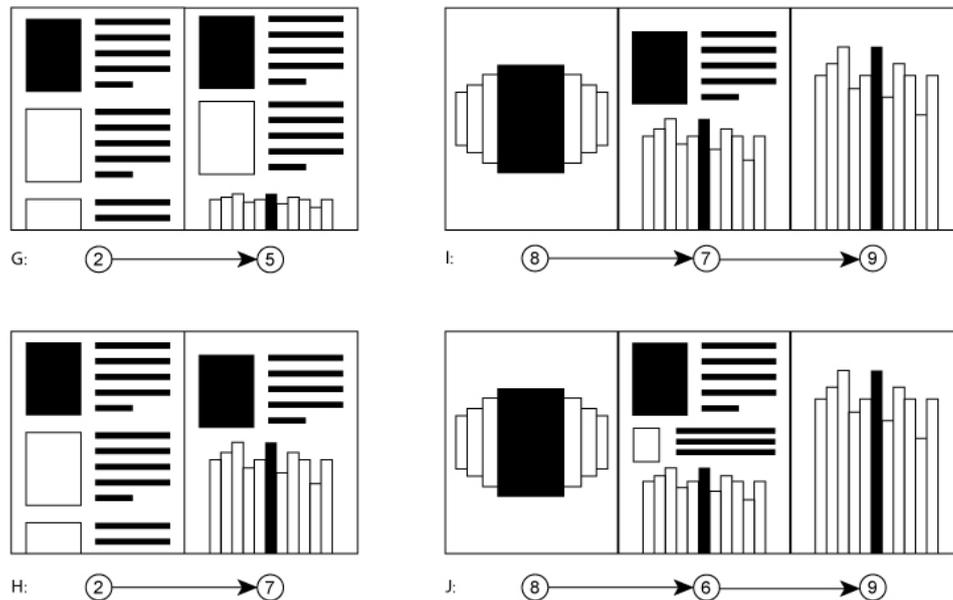


Figure 15. Different NFs of the 9 library SRP models (part 2)

Figure 15 shows another four of the ten different NFs combined the nine library SRP modes mentioned in Section 4.2.1.1.

NF G had two steps. The page started from SRP 2, then navigated to SRP 5. Participants could get the meta-data features of books from first page with bigger book covers, and then it would show the position of one specific book that they chose in a row of spine.

NF H also had two steps. The page started from SRP 2, then navigated to SRP 7. Comparing this example with NF G, the difference between them was that in NF G, it could also show other books' information in the second page. However, in NF H, it only shown the information of the specific book that participants chose.

In NF I, the page started from SRP 8, then navigated to SRP 7, and then connected to SRP 9. In the first step participants only got the book cover information of all the books, then they would get more meta-data features of

one specific book in the second step, and the position of this book in a row of spine in the third step.

NF J was similar with NF I. The difference between these two NFs was the second step. NF J was navigated from SRP 8 to SRP 6 in the second stage. In this step of this NF, participants would also get the information of other books except the specific book that they chose.

4.2.2 Interface design

The researcher created a range of electronic interactive library Search Result Pages (SRPs) based on the preliminary design work noted in Section 4.2.1 to test. The researcher designed three main types of the library SRPs based on the nine different simple library SRP models mentioned in Section 4.2.1.1. The three main types of the library SRPs were Search Result Page (SRP), Supplementary Search Result Page (SSRP), and Book Result Page (BRP). SRP was the first result page when the word "design" is entered as a search term. SSRP was the supplementary result page that SRP navigated to when participants choosing one specific book and clicking on it. More meta-data features of the selected book could be given in SSRP. BRP was the final search result page of the library search interface. In this Section, the researcher designed four SRPs, three SSRPs, and one BRP. There was one navigation page for the text software, which could navigate to different navigation flows of the electronic interface examples.

The features in the four SRPs and three SSRPs should include the book title, author, publisher, publication date, book cover, short introduction and location information. This study is about the library search interface. In this case the features did not consider the price. In order to use the most concise interface to include these features, the researcher decided to use SRP 1, SRP 2,

SRP 3, SRP 7, SRP 8 and SRP 9 from the 9 main library SRP models in Figure 13 in Section 4.2.1. SRP 1 and SRP 2 represented the library search interface with book title, author, publisher, publication date, and different size of book covers. SRP 3 represented the library search interface with more detailed information (such as a short introduction) of one book that participants chose. SRP 7 represented the library search interface of only one book that participants chose with its cover and features (author's name, publication date, book introduction), and showed the position of this book in a row of spines. SRP 8 represented the library search interface displayed books only with their covers. SRP 9 represented the library search interface displayed books only with their spines.

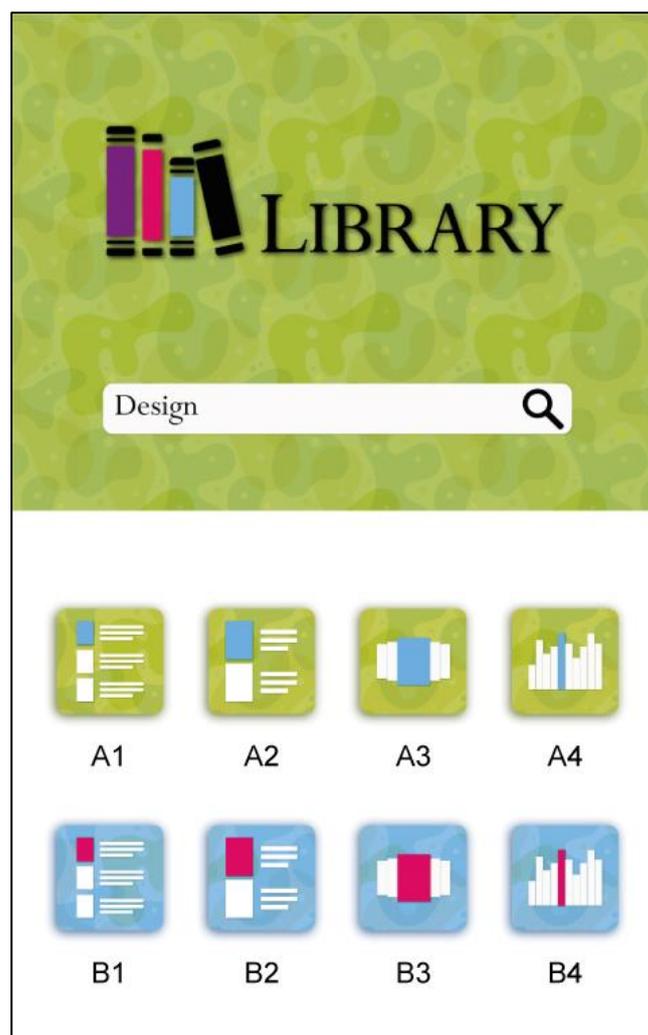


Figure 16. The navigation page for the text software

Figure 16 shows the navigation page for the text software that was used for this study. This page displayed when participants searching for books through the library search interface. This was a “dummy” search interface, which showed the participants that “Design” was the term being “searched” in each interface. This is the first screen of the interactive that the researcher developed, and was not a part of the test. This page provided a way to select an interface for the user to interact with as part of the experiment.

According to Figure 16, there were eight icons distributed on this page. The four green icons with blue emphasis in the top row represents four different electronic interactive examples: Navigation Flow A1 (small book covers), Navigation Flow A2 (bigger book covers), Navigation Flow A3 (book covers only), and Navigation Flow A4 (book spine only). The four blue icons with red emphasis in the second row represents another four different electronic interactive examples: Navigation Flow B1 (small book covers), Navigation Flow B2 (bigger book covers), Navigation Flow B3 (book covers only), and Navigation Flow B4 (book spine only). The differences between Navigation Flow A series and Navigation Flow B series would be explained in Section 4.2.3.

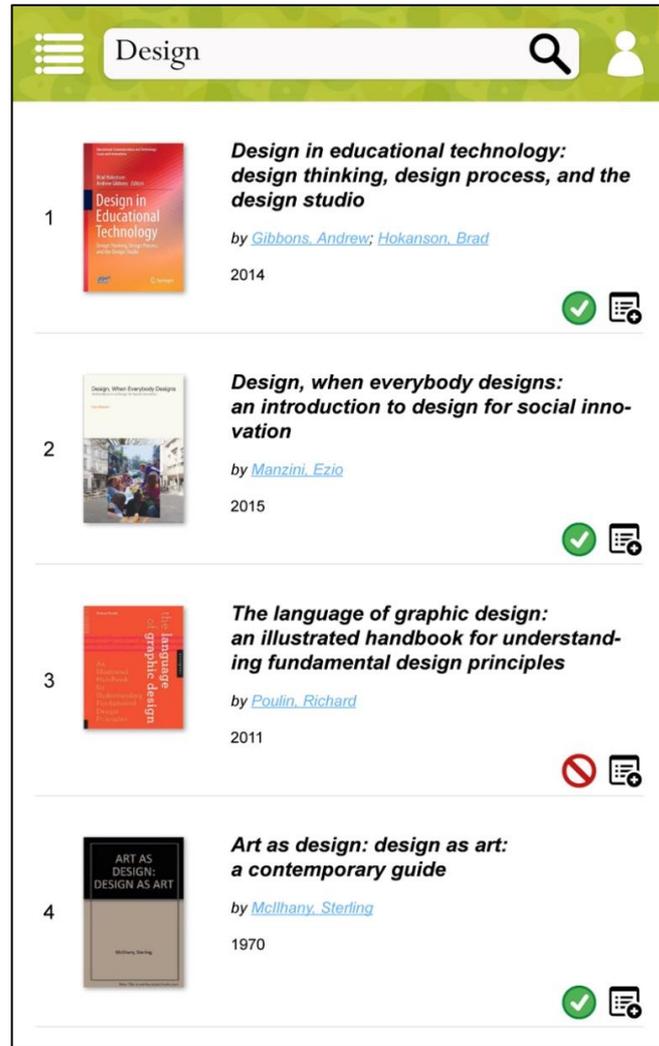


Figure 17. The SRP of small book covers

Figure 17 shows the library SRP of small book covers. This page was equivalent to SRP 1 mentioned in Section 4.2.1.1. In this figure, library search interface using a relatively small cover with some meta-data features of books. Participants could get several book details, including book title, author information, and publication date.



Figure 18. The SRP of bigger book covers

Figure 18 shows the library SRP of bigger book covers. This page was equivalent to SRP 2 mentioned in Section 4.2.1.1. In this figure, library search interface using a relatively big cover with more meta-data features of books comparing with Figure 17. The information that participants could get including book title, author information, publication date, a short introduction of the book, the series that the book belonging to, and the library ISBN number of the book, which would be easy for the participants to find the book.

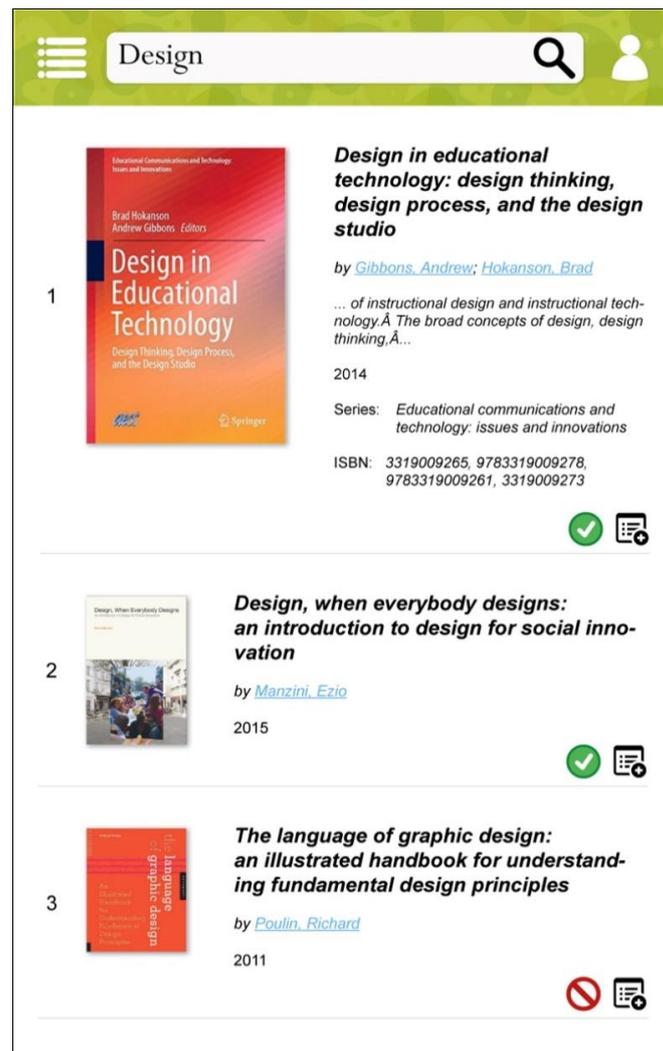


Figure 19. The SSRP of mixed book covers

Figure 19 shows the library SSRP of mixed book covers. This page was equivalent to SRP 3 mentioned in Section 4.2.1.1. In this figure, the first book was displayed with a bigger book cover, while other books on this page were shown with small covers. The book with bigger cover would show the participants the book title, author information, publication date, a short introduction of the book, the series that the book belonging to, and the library ISBN number of the book. The book with smaller cover just displayed the book title, author information, and publication date.



Figure 20. The SRP of only book covers

Figure 20 shows the library SRP of only book covers. This page was equivalent to SRP 8 mentioned in Section 4.2.1.1. In this figure, it showed the huge and prominent covers of different books in a row. Participants could get the book cover information clearly from this page. According to the research of McKay et al. (2012), the design of the book cover sometimes could affect people's choice of books.

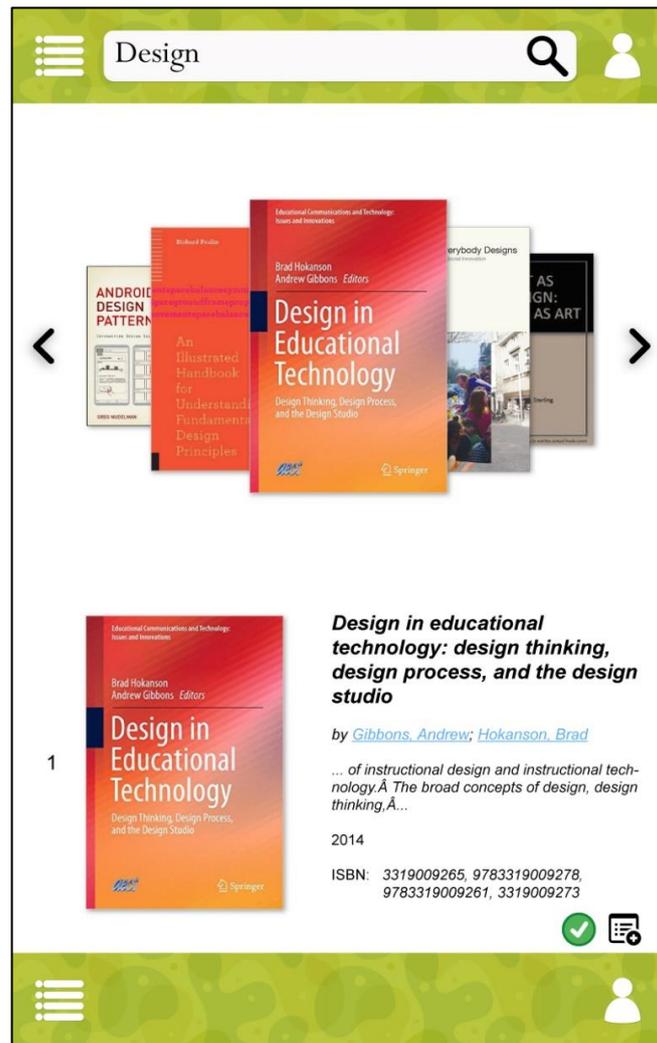


Figure 21. The SSRP of book covers with more information

Figure 21 shows the library SSRP of book covers, and with more information of one chosen specific book. This page was based on SRP 7 mentioned in Section 4.2.1.1, and changed the book spines into book covers. In this figure, it showed the different book covers in a row, with more meta-data features of one chosen specific book, including the book title, author information, publication date, a short introduction of the book, and the library ISBN number of the book. Participants could get the information of the chosen specific book clearly from this page.

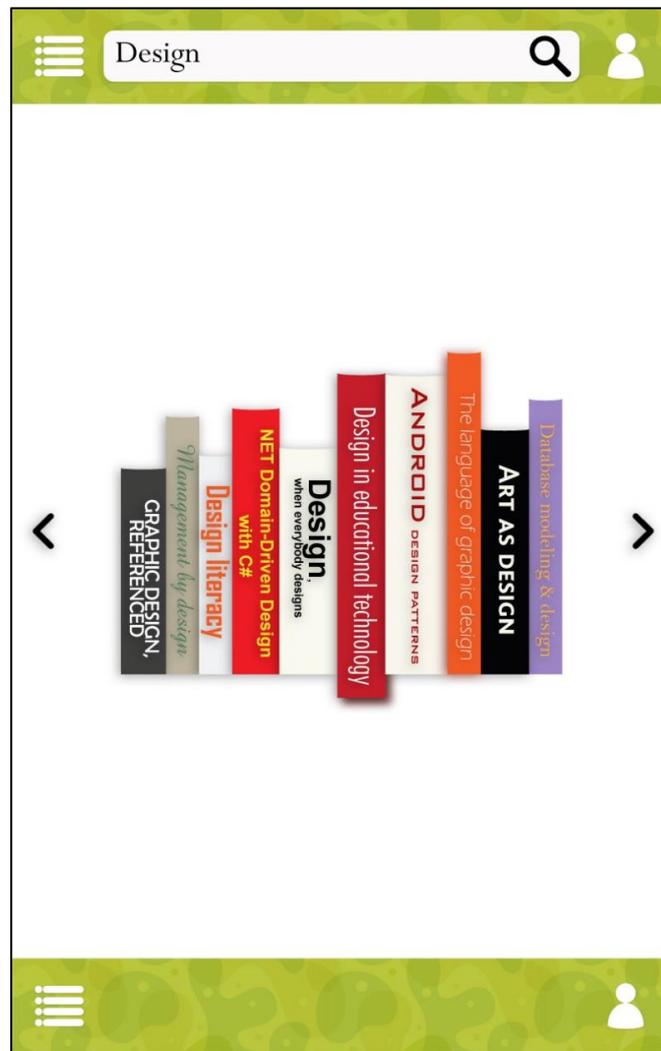


Figure 22. The SRP of only book spines

Figure 22 shows the library SRP of only book spines. This page was equivalent to SRP 9 mentioned in Section 4.2.1.1. According to this figure, it showed different book spines in a row. Participants could get the book title information only from this page. A row of book spines could make people feel like choosing books in the real library, and easy to find the position of the books.



Figure 23. The SSRP of book spines with more information

Figure 23 displays the library SSRP of book spines, and with more information of one chosen specific book. This page was based on SRP 7 mentioned in Section 4.2.1.1, and changed the location of the elements. According to this figure, it showed the different book spines in a row, and more meta-data features including the book title, author information, publication date, a short introduction of the book, and the library ISBN number of the book of one chosen specific book. Participants could know more information about the chosen specific book from this page.

The screenshot shows a library search result page. At the top, there is a green header with a search bar containing the word "Design", a magnifying glass icon, and a user profile icon. Below the header, the book cover is displayed on the left, featuring the title "Design in Educational Technology" and the editors' names "Brad Hokanson" and "Andrew Gibbons". To the right of the cover, the book title is repeated in a larger font: "Design in educational technology: design thinking, design process, and the design studio". Below the title, the authors are listed as "by Gibbons, Andrew; Hokanson, Brad". A snippet of the book's content is shown: "... of instructional design and instructional technology. The broad concepts of design, design thinking, the design process, and the design studio, are identified and they form the framework of the book. This book advocates the conscious adoption of a mindset of design thinking, such as that evident in a range of divergent professions including business, government, and medicine. At its core is a focus on 'planning, inventing, making, and doing.'" (Cross, 1982), all of which are of value to the field of educational technology. Additionally, the book endeavors to develop a deep understanding of the design process in the reader. It is a critical skill, often drawing from other traditional design fields. An examination of the design process as practiced, of new models for design, and of ways to connect theory to the development of educational products are all fully explored with the goal of providing guidance for emerging instructional designers and deepening the practice of more advanced practitioners. Finally, as a large number of leading schools of instructional design have adopted the studio form of education for their professional programs, we include this emerging topic in the book as a practical and focused guide for readers at all levels.

Publication details include: 2014, Series: Educational communications and technology: issues and innovations, and Publisher: Springer International.

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 LANGUAGE: English

Figure 24. The Book Result Page

Figure 24 shows the BRP of the library search interface. This page displayed when participants chose one book of each electronic interactive example, and was not a part of the test. According to this figure, the final search result of the library search interface included bigger book cover, the book title, author information, publication date, series, publisher, and a long detailed introduction. This page only replaced the final search result no matter what books that participants chose. It would always be navigated to this BRP regardless of how many steps of the navigation have.

4.2.3 Electronic interactive examples

According to the ten different NFs design mentioned in Section 4.2.1.2, the researcher designed eight different Navigation Flows (NFs) of the four SRPs, three SSRPs, one BRP, and one navigation page based on Section 4.2.2. These eight NFs could be divided into two types. The two main types of the eight different NFs were Direct Navigation Flow (DNF) and Supplementary Navigation Flow (SNF). DNF only had two steps, which started from a SRP, then directly navigated to the BRP when the participant selected one book. SNF had three steps. This type of NFs started from a SRP, then moved to a SSRP when participant chose one book, and then navigated to the BRP when they chose the book again. In this Section, the researcher designed four DNFs and four SNFs. All these eight NFs were navigated from the navigation page for the test software (Figure 16) as mentioned in Section 4.2.2. These eight NFs could also be seen as eight electronic interface examples.

The features of the four SRPs and three SSRPs based on Section 4.2.2 include the book title, author, publisher, publication date, book cover, short introduction and location information. In order to show the features of the four SRPs and three SSRPs in the eight NFs prominently, the researcher decided to use NF A, NF C, NF H, and NF I from the ten navigating ways of the library search interface models mentioned in Figure 14 and Figure 15 in Section 4.2.1. These four kinds of NFs were used as the basic model to design the eight electronic interface examples. The researcher designed four DNFs including A1, A2, A3, A4, and four SNFs including B1, B2, B3, B4.

NF A was chosen representing the NF of small book covers. The researcher designed NF A1 based on NF A through removing the feature of book spine and changing the navigation steps. NF C represented the NF of mixed book covers. The researcher removed the feature of book spine in the third BRP of

NF C, and designed NF B1 based on NF C. NF H represented the NF of bigger book covers. NF A2 was designed based on NF H, and the researcher removed the feature of book spine in the second BRP of NF H. NF B2 was similar with NF B1, which was also based on NF C. The researcher designed NF B2 through changing the small book cover into bigger book cover of the first BRP, and removing the feature of book spine in the third BRP of NF C. NF I represented the NF of book cover and book spine. NF A3 was designed based on NF I. In NF A3 the researcher changed the feature of book spine in the second BRP of NF I into book cover, and removed the third BRP. NF B3 was designed through adding SSRPs in the middle of NF A3. NF A4 was also designed based on NF I. The researcher removed the first BRP of NF I, and changed the order of the third BRP. NF B4 was designed through adding SSRPs in the middle of NF A4.

When labeling the figures in this chapter the researcher has identified clickable items with a blue lowercase letter. For example in Figure 25, a participant should click the under area of the SRP with small book covers (Figure 17) which in this figure is labeled 'a'. The NF A1 would result in the BRP (Figure 24) common to all of the tested electronic interface examples in this figure. The researcher has further detailed the flow of the interaction by labeling the arrows of each SRP to clearly show how an interaction has resulted in the NF. Therefore in Figure 25, when the participant clicked label 'a' the flow arrow is labeled 'a' and results in the BRP.

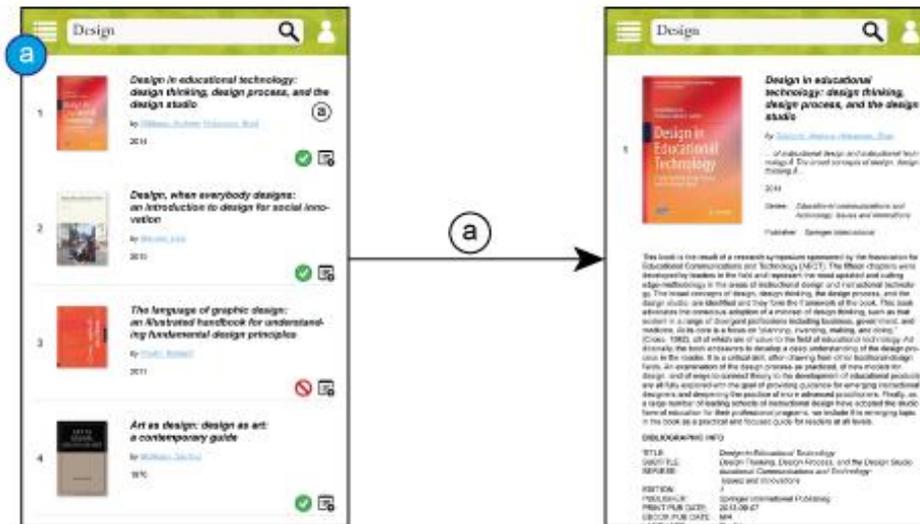


Figure 25. Navigation Flow A1

Figure 25 shows the navigating ways of the library SRP in NF A1. NF A1 showed one way to connect the library SRP. According to this figure, the interface started from the SRP of small book covers (Figure 17), and then connected to the BRP (Figure 24) when participants touched the area under label 'a' as shown by the flow arrow labeled 'a'. When using NF A1 to navigate the library SRPs, participants would get meta-data features, which included little book cover, book title, author information and publication date. When choosing one book, participants could navigate to the BRP and get more detailed information about the book.

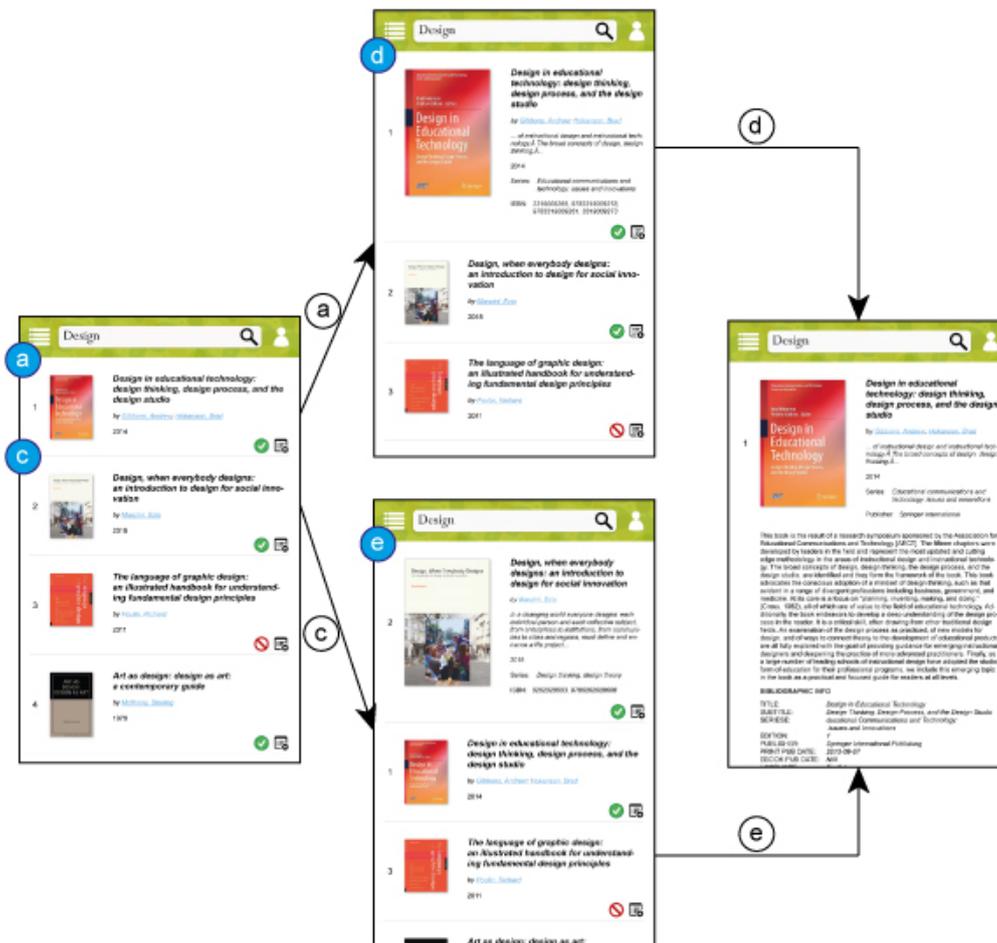


Figure 26. Navigation Flow B1

Figure 26 shows Navigation Flow B1. NF B1 showed another way to connect the library SRPs in Section 4.2.2. According to this figure, the interface started from the SRP of small book covers (Figure 17). On comparing with NF A1 in Figure 25, the difference in NF B1 is that it had one more middle connection of two different SSRP of mixed book covers (Figure 19). When participants touch the area under label 'a' in the SRP of small book covers (Figure 17), it represented that the book in this area was chosen, and navigated to the SSRP of mixed book covers with more details about the book. Participants would get features including book cover, book title, author information, publication date and short introduction in the SSRP of mixed book covers. It was the same with the area under label 'c'. When choosing one book by touching the area

under label 'd' and 'e' in the SSRP of mixed book covers, participants could navigate to the BRP and get more detailed information.



Figure 27. Navigation Flow A2

Figure 27 shows the Navigation Flow A2. According to Figure 27, the interface started from the SRP of bigger book covers (Figure 18). When participants touched the area under label 'a' as shown as the interaction flow arrow labeled 'a', NF A2 navigated to the BRP (Figure 24). Participants would get meta-data features included bigger book cover, book title, author information, publication date, short introduction, and the ISBN number. While touching one book, participants went to the BRP and obtained more detailed data about the book.

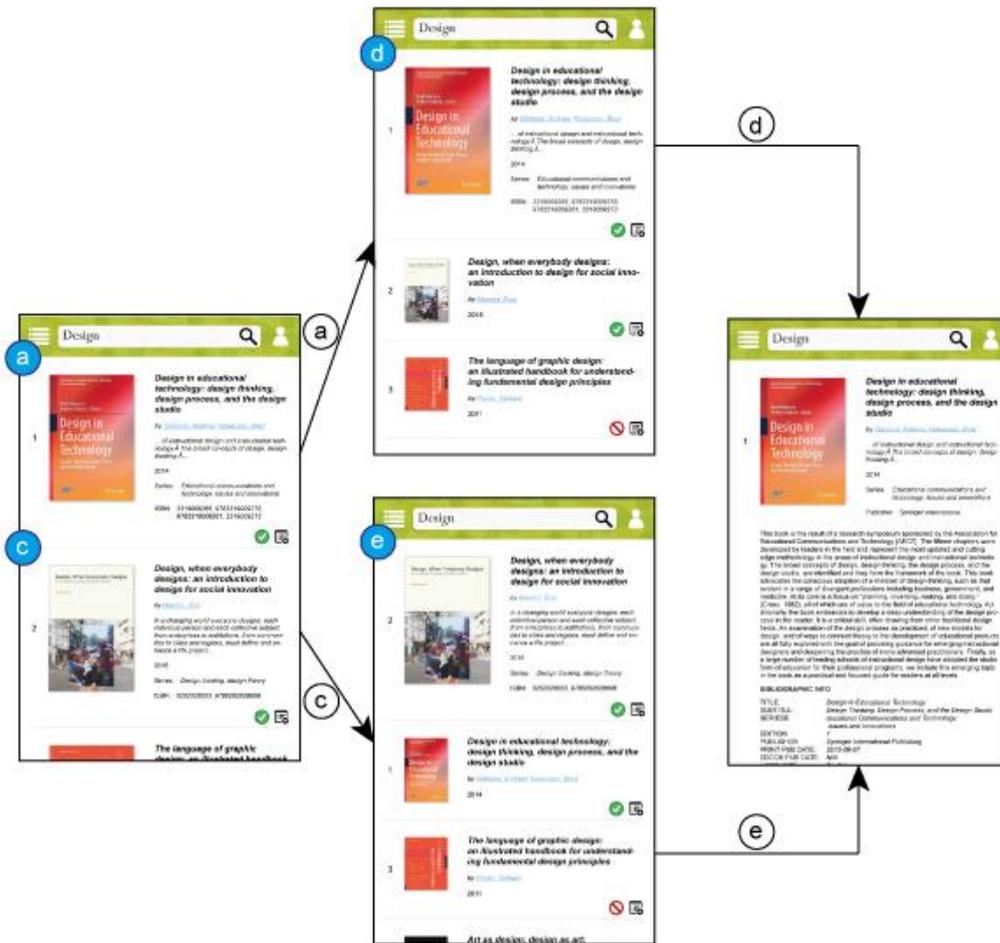


Figure 28. Navigation Flow B2

Figure 28 shows Navigation Flow B2. The interface in NF B2 started from the SRP of bigger book covers (Figure 18). The difference between NF A1 and NF B1 is that NF B1 had more middle navigation of two different SSRP of mixed book covers (Figure 19). When participants touched the area under label 'a' and 'c' in the SRP of bigger book covers (Figure 18), it navigated to the SSRP of mixed book covers with more details about the book including book cover, book title, author information, publication date and short introduction. It was similar when choosing one book by touching the area under label 'd' and 'e' in the SSRP of mixed book covers, participants could then explore to the BRP and get more point by point data about the book.

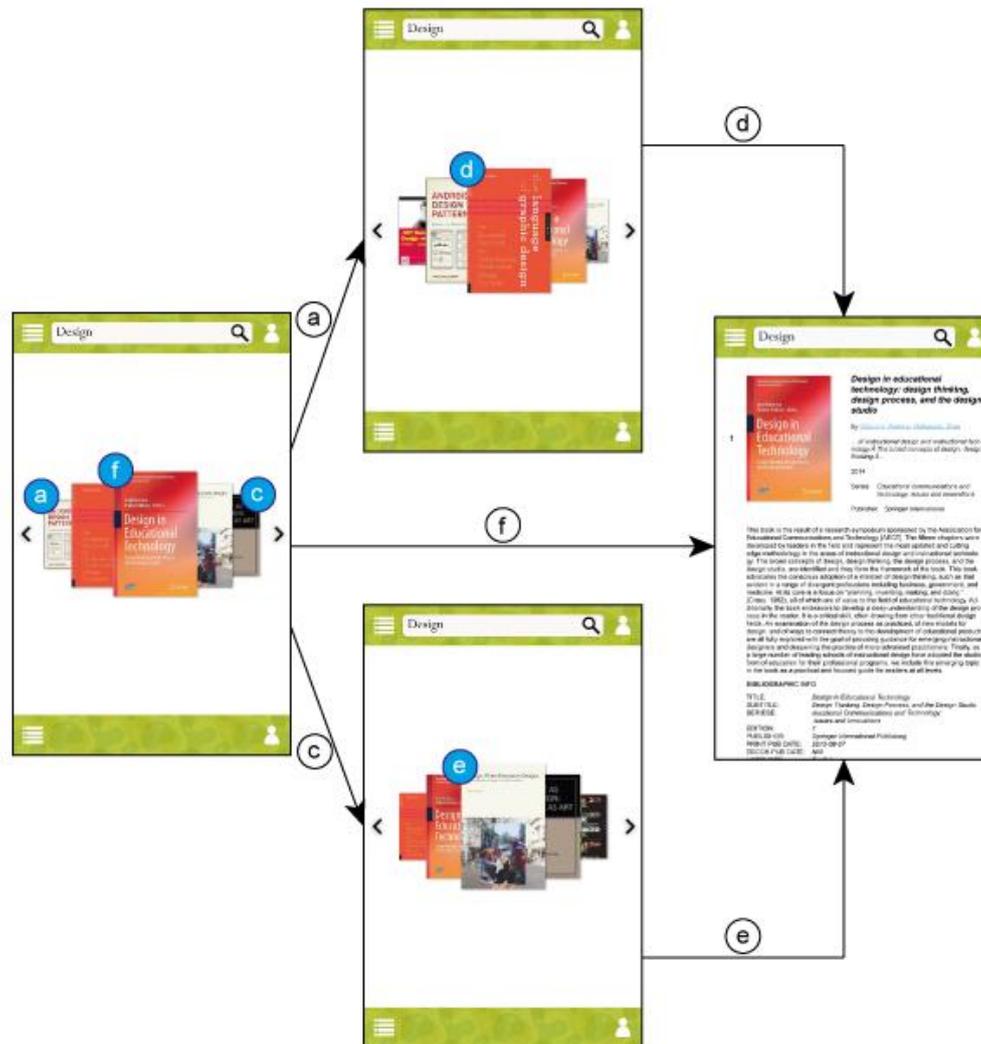


Figure 29. Navigation Flow A3

Figure 29 shows the navigating ways of the library SRP in NF A3. In Figure 29, the interface started from the SRP of only book covers (Figure 20), and then connected to the BRP (Figure 24) when participants touched the area under label 'f' as shown by the flow arrow labeled 'f'. Participants could navigate to other SSRPs when they touched the area under label 'a' and 'c', which represented the situation of choosing other neighbouring books. When using NF A3 to navigate the library SRPs, participants would only get the features of book covers. Participants could navigate to the BRP and get more detailed information about the book after choosing one book cover.

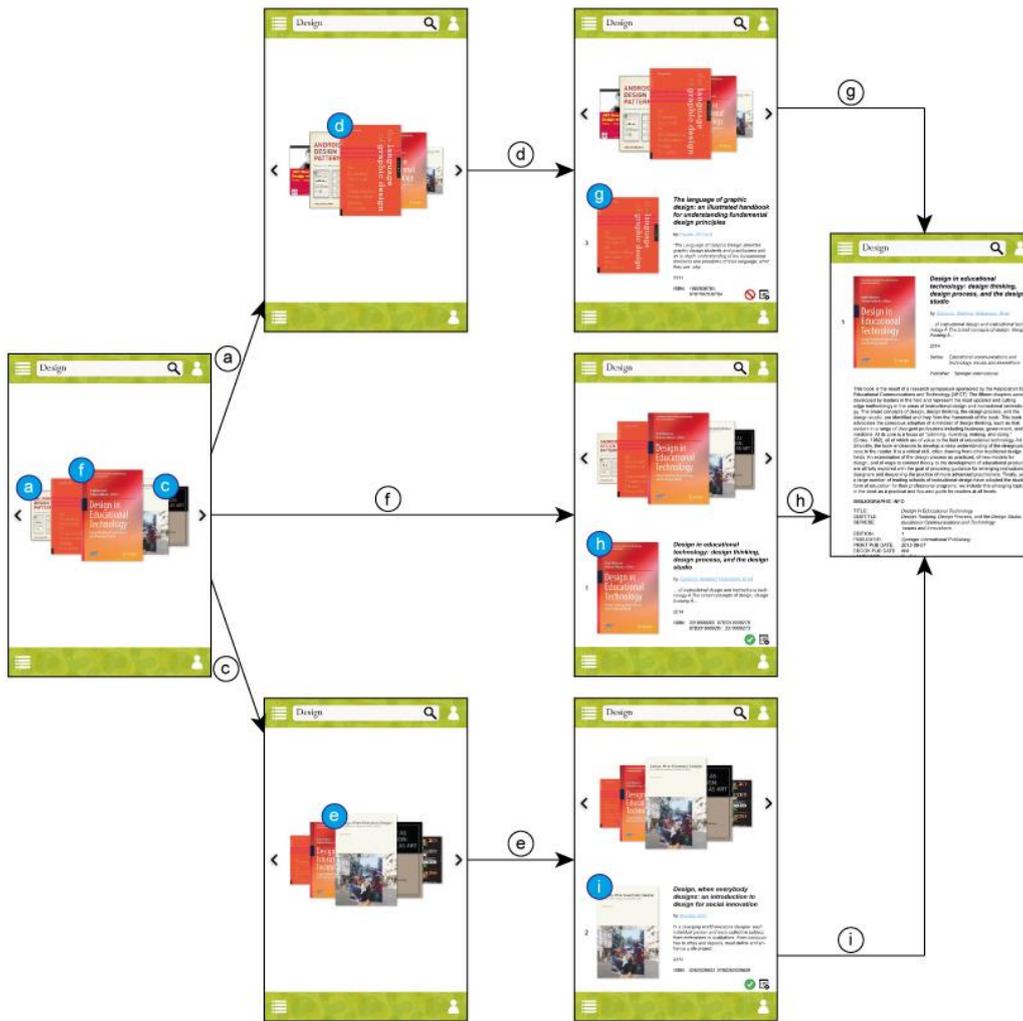


Figure 30. Navigation Flow B3

Figure 30 shows the navigating ways of Navigation Flow B3. NF B3 showed another way to connect the library SRPs of only book covers. According to this figure, the interface started from the SRP of only book covers (Figure 20). Participants could touch the area under label 'a' and 'c' and navigate to the neighboring books as shown by the flow arrow. On comparing with NF A3 in Figure 29, the difference in NF B3 was that it had one more middle connection of three different SSRPs of book covers with more information (Figure 21). When participants touched the area under label 'a' in the SRP of only book covers (Figure 20), it represented the book in this area was chosen and navigated to the SSRP of book covers with more information about the book.

Participants would get features including book cover, book title, author information, publication date and short introduction in the SSRPs. It was same with the area under label 'd' and 'e'. When choosing one book by touching the area under label 'g', 'h' and 'i' in the SSRPs of book covers with more information, participants could navigate to the BRP and get more detailed information.

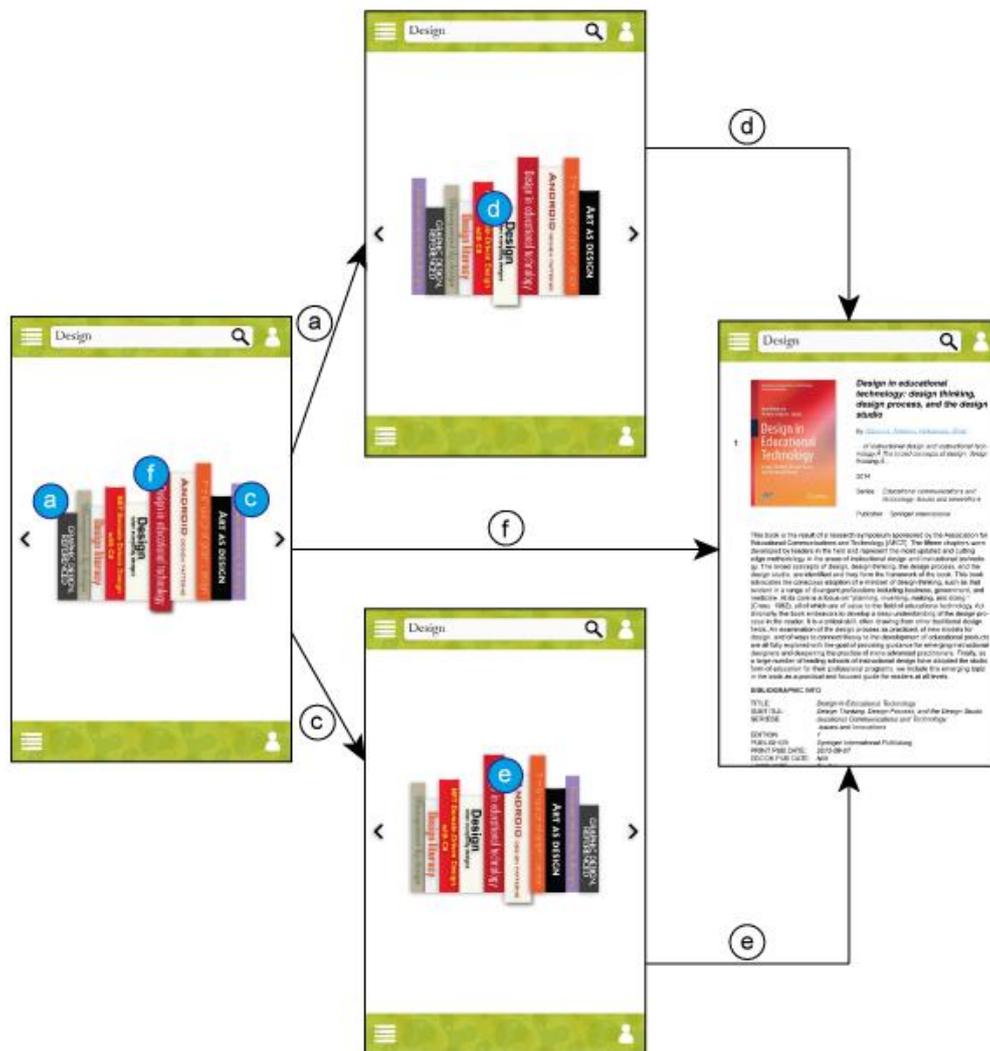


Figure 31. Navigation Flow A4

Figure 31 shows the Navigation Flow A4. According to Figure 31, the interface started from the SRP of only book spines (Figure 22), and then connected to the BRP (Figure 24) when participants touched the area under

label 'f' as shown by the flow arrow labeled 'f'. Participants could connect to other SSRPs when they touched the area under label 'a' and 'c' choosing other neighbouring books. Participants would only get the features of book spines when using NF A4 to navigate the library SRPs. Participants could navigate to the BRP and get more detailed information about the book after choosing and touching one book spine.

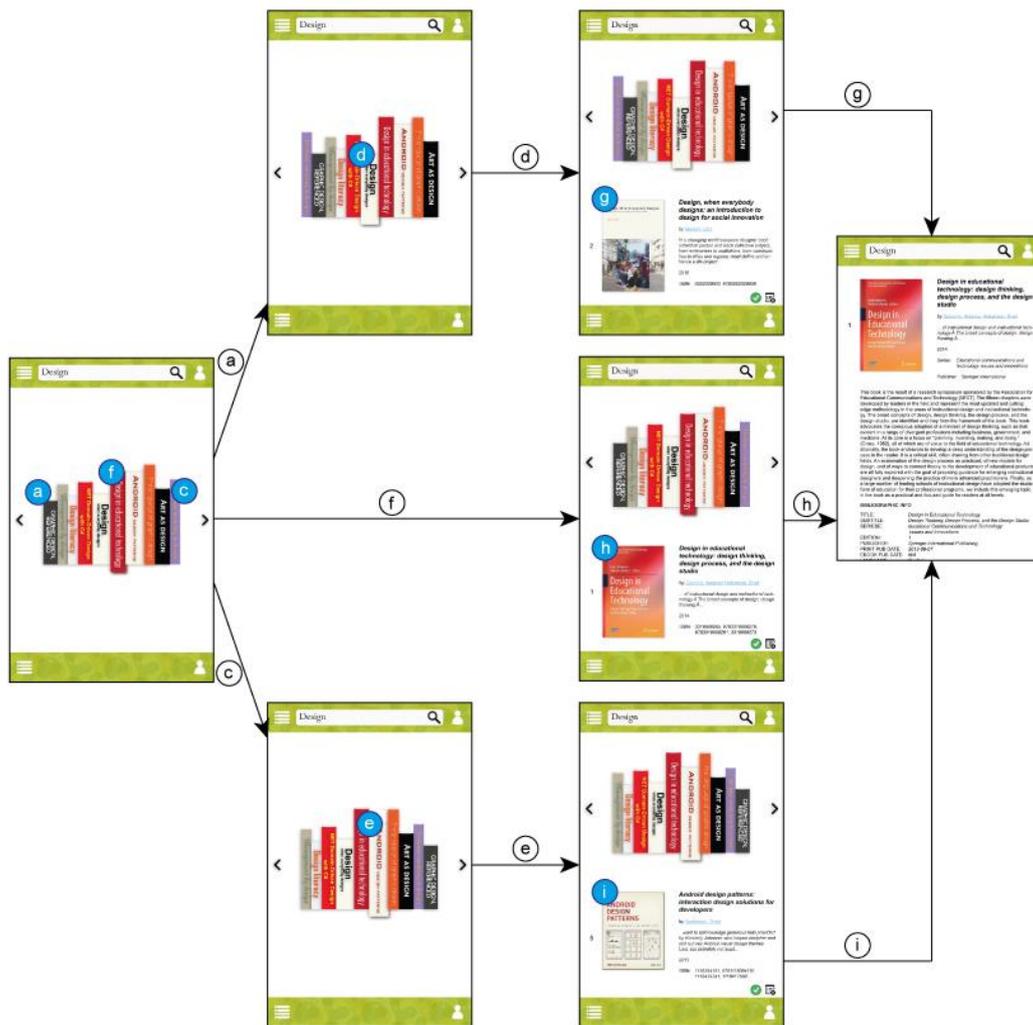


Figure 32. Navigation Flow B4

Figure 32 shows Navigation Flow B4. There was another way to connect the library SRPs of only book covers in NF B4. In Figure 32, the interface started from the SRP of only book spines (Figure 22). As shown by the flow arrow label 'a' and 'c', participants could touch the area under label 'a' and 'c' and

navigate to the neighbouring books. The difference in NF B3 was that it had one more middle connection of three different SSRPs of book spines with more information (Figure 23) compared with NF A4 in Figure 31. It represented the book in this area had been chosen and navigated to the SSRP of book spines with more information about the book when participants touched the area under label 'a' in the SRP of only book spines (Figure 22). Participants would get features including book cover, book title, author information, publication date and short introduction in the SSRPs. It was the same with the area under label 'd' and 'e'. When choosing one book by touching the area under label 'g', 'h' and 'i' in the SSRPs of book spines with more information, participants could navigate to the BRP and get more detailed information.

4.2.4 Interview Questions

In addition to the project title, gender, age, school and participant ID which were related to the participant's personal information, there were several interview questions that the researcher asked during a guided interview. Below is the Table for showing all the interview questions for the participants. According to this table, there are 19 interview questions.

Table 4. The interview questions

Q1	1. What is your degree / subject area?			
Q2	2. What language would you prefer to read in for your education?			
Q3	3. How often do you browse for books in a physical library?			
	A. Almost every day	B. Once a week	C. Once a month	D. Never
Q4	4. How often do you get books out of a physical library?			
	A. Almost every day	B. Once a week	C. Once a month	D. Never
Q5	5. Have you read material on a digital device for education before?			
	A. Yes		B. No	
Q6	6. Have you searched for reading material on a digital device before?			
	A. Yes		B. No	
Q7	7. What type of digital devices do you prefer (can choose more than one)?			
	A. IOS Tablet		B. Android Tablet	C. IOS Phone
	D. Android Phone		E. Computer	F. Others
Q8	8. How often do you read digital information for education?			
	A. Almost every day	B. Once a week	C. Once a month	D. Never
Q9	9. Which library searching interface do you prefer? Why?			
Q10	10. Is the book cover important to you in the library searching page? Why?			
Q11	11. Is the book description important to you in the library searching page? Why?			
Q12	12. Is the book spine important to you in the library searching page? Why?			
Q13	13. Are the related books important to you in the library searching page? Why?			
Q14	14. Would you like to have more details of the book (author's name, publication date, book blurb) in the library searching page? Why?			
Q15	15. Which example do you think is most useful to you for browsing for a book? Why?			
Q16	16. Which example do you think is most useful to you for searching for a specific book? Why?			
Q17	17. In which example did you find the level of information most useful for browsing? Why?			
Q18	18. In which example did you find the level of information most useful for making a decision? Why?			
Q19	19. In which example did you find the changes most intuitive when you clicked in the interface? Why?			

After showing eight electronic interactive examples of library search interface in a device to the participants, the researcher would let them click through these eight electronic interactive examples by themselves, and have a guided interview with each of them. The researcher asked the participant some related questions, and these question would help the researcher to collect useful information which supports the preference the participant made out.

The questions of the guided interview shown in Table 4 include two types, questions with options and questions that need to record the answer. During the guided interview, participants were asked to choose one of these options as displayed in Table 4, or need to answer the question and explain the reason for the answer. These questions could help understand the preferences and choices made by the participants.

When the guided interview is completed, the researcher finished recording all the answer and reasons, and recovered the questionnaire that filled out by the participant. The researcher summarized the data from these questionnaires, and entered them into an Excel sheet in the computer. After sorting and summarizing these tables of this Excel sheet, the researcher draw relevant charts to analyze the results.

4.3 Participants

Participants were gathered from the library at the University of Waikato (60), and from the Ocean University of China (15). Among the 60 participants from the University of Waikato, 30 of them were shown the eight electronic interactive examples in Order 1 (A1 to B1 to A2 to B2 to A3 to B3 to A4 to B4), another 30 of them were shown the eight examples in the Order 2 (A4 to B4 to A3 to B3 to A2 to B2 to A1 to B1). For the participants at the Chinese University, the meta-data was shown in the same English interfaces, and the texts of interview questions were shown in both Chinese and English. The

participants at the Chinese University could choose to do the guide interview according to their own favorite language.

Here the results collected regarding the information of participants.

4.3.1 Gender & University

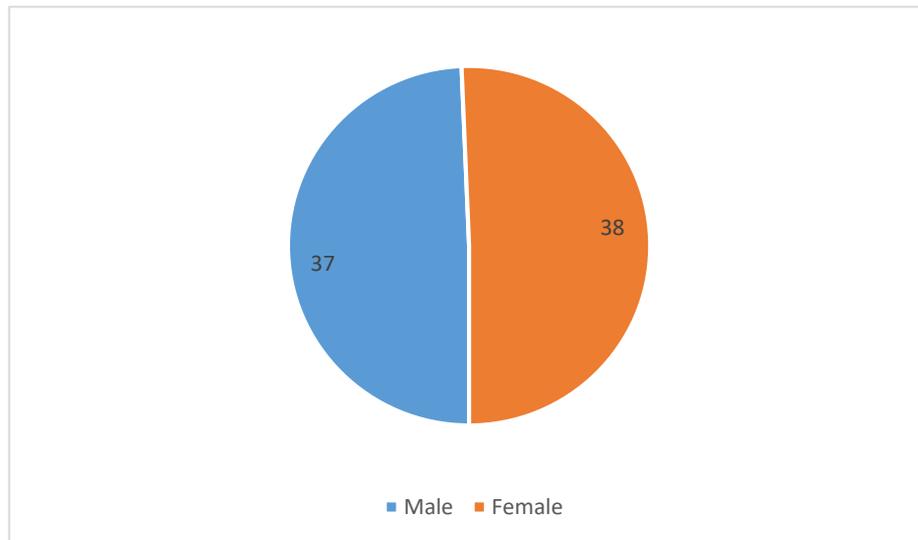


Figure 33. Gender distribution of participants (n=75)

Figure 33 shows the gender distribution of participants. Approximately half of the participants (37) were male, and 38 of them were female. The researcher aimed to get a balance of genders when recruiting participants for the study.

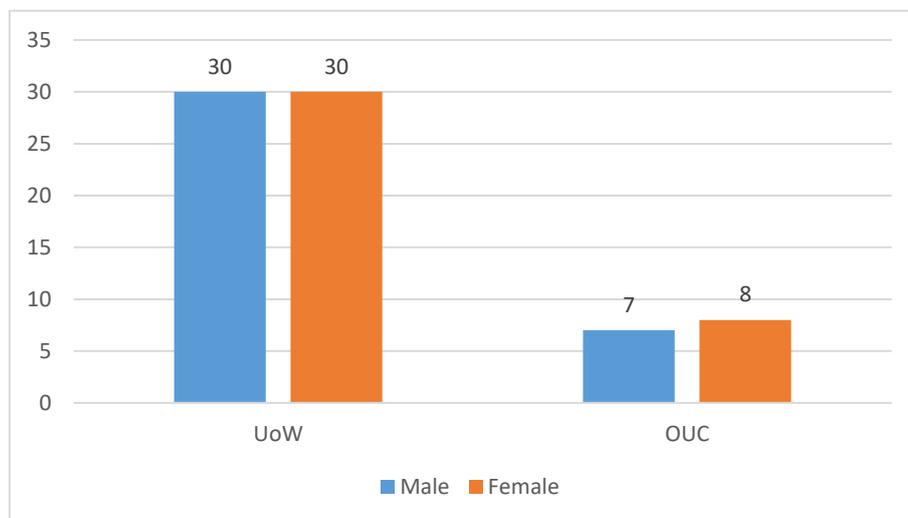


Figure 34. Gender distribution of participants in different schools (n=75)

Figure 34 shows the gender distribution of participants in the two different schools. There was a greater number of participants from the University of Waikato (UoW) than from Ocean University of China (OUC). There were 30 male and 30 female participants from UoW, which was far higher than that at OUC (seven of male and eight of female).

4.3.2 Degree / subject area

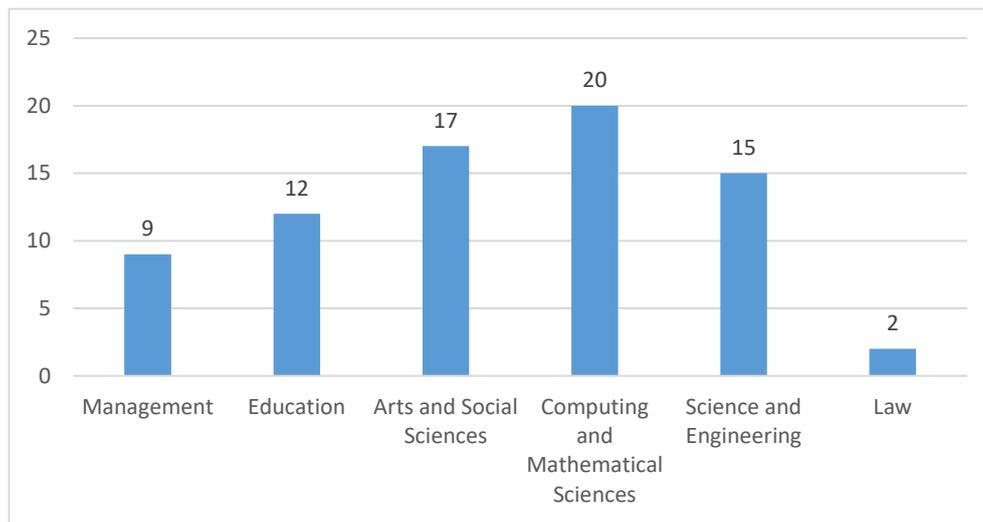


Figure 35. Degree and subject area of participants (n=75)

Participants were asked indicate their degree or area of study in Q1. Figure 35 shows the degree and subject area of participants. It is apparent from this chart that the most participants were from Computing and Mathematical Sciences (20). Following this, 17 of the participants were from Arts and Social Sciences, and 15 of the participants were from Science and Engineering. Only 12 of the participants were from Education, nine of them from Management, two of them were from Law.

4.3.3 Preferred language for education

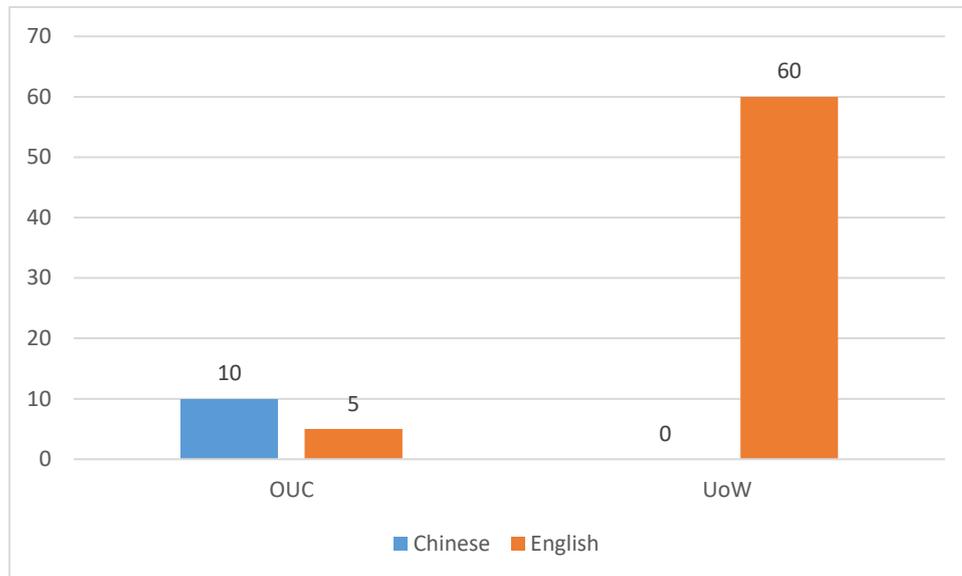


Figure 36. Language preference of participants (n=75)

Participants were asked what language they would prefer to read in for their education in Q2. Figure 36 shows the respondents' language reading preferences at the different schools. In this figure, more than half people (10) chose Chinese as their preferred language when reading for their education in OUC. However, there is still a considerable number of people (five) who chose English. All the participants (60) at UoW preferred to read educational material in English.

4.4 Results

Here the results collected regarding the preferences for library searching interface design on a device are discussed. The researcher report on the responses was given to the questions in Table 4.

4.4.1 Frequency of browsing books in a physical library

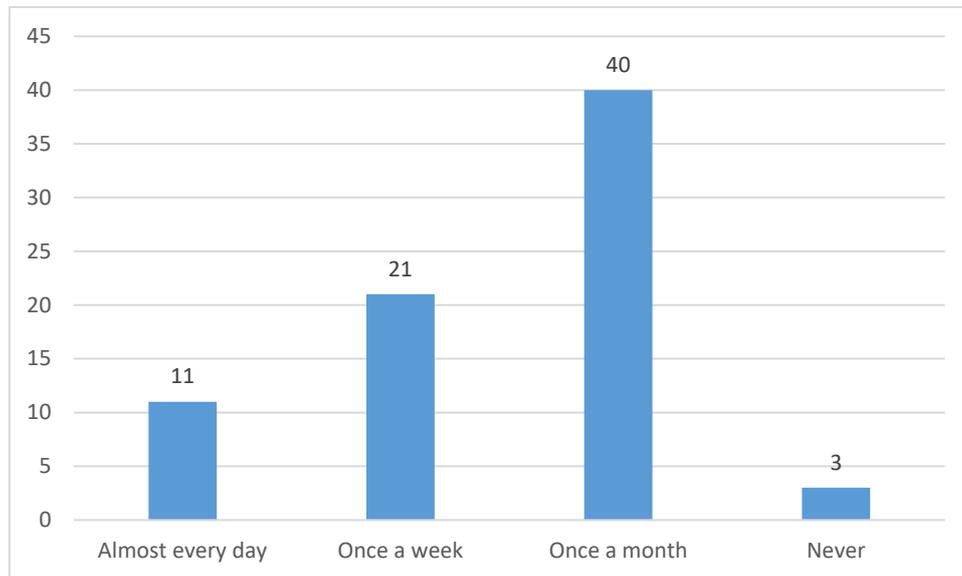


Figure 37. Frequency of browsing books in a physical library (n=75)

Participants were asked how often they browse for books in a physical library in Q3. Figure 37 shows how frequently participants said they browsed for books in a physical library. The most common frequency of browsing books in a physical library was once a month, with 40 participants giving this response. Following it, 21 participants browsed books in a physical library once a week. Only 11 of the participants did this almost every day, and only three participants had never done it before.

4.4.2 Frequency of borrowing books out of a physical library

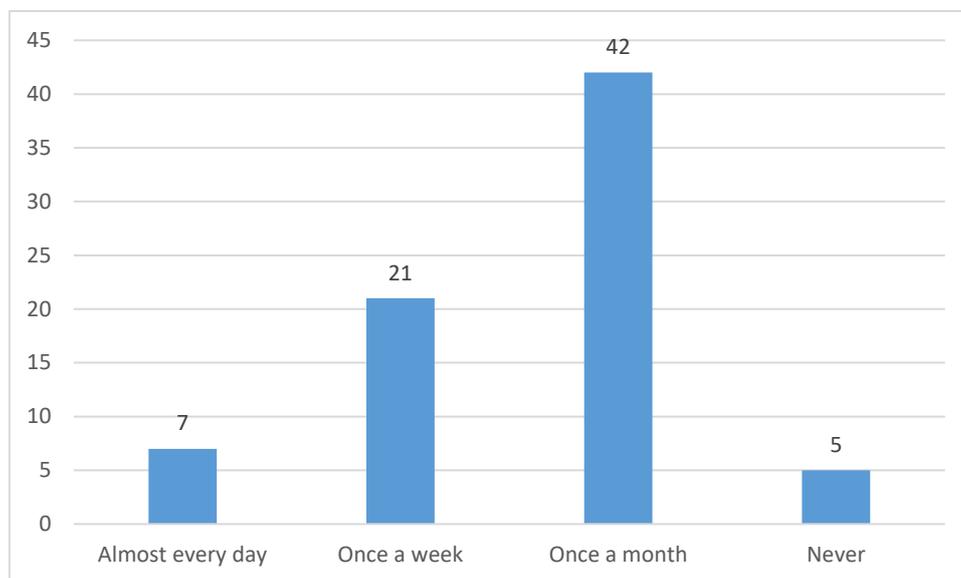


Figure 38. Frequency of borrowing books out of a physical library (n=75)

Participants were asked how often they get books out of a physical library in Q4. Figure 38 shows the frequency that participants said they would borrow books from a physical library. The highest frequency in borrowing books was once a month, with 42 participants. Followed by 21 participants who get books out of a physical library once a week. Only seven participants borrowed books almost every day, and only five participants have never done it before.

4.4.3 Read / Searched material on a digital device for education before

Participants were asked Q5: *have you read material on a digital device for education before*; and Q6: *have you searched material on a digital device for education before*? All of the participants (75) had read and searched for reading material on a digital device before. The research intentionally sought participants who were familiar with searching for educational material reading material on a

digital device. The questionnaire data was chosen depending on these two interview questions. They had to say yes to both questions to continue on. If one of the answers to these questions was no, then the researcher thanked the participant for their time, but did not continue with the rest of the study. The data of the person who did not read or search material on a digital device for education before, might not be helpful for the next question, and could not answer the next questions on library search interface. In this way, the resulting data would be more relevant and informative for people who use electronic devices.

4.4.4 Preference of digital devices

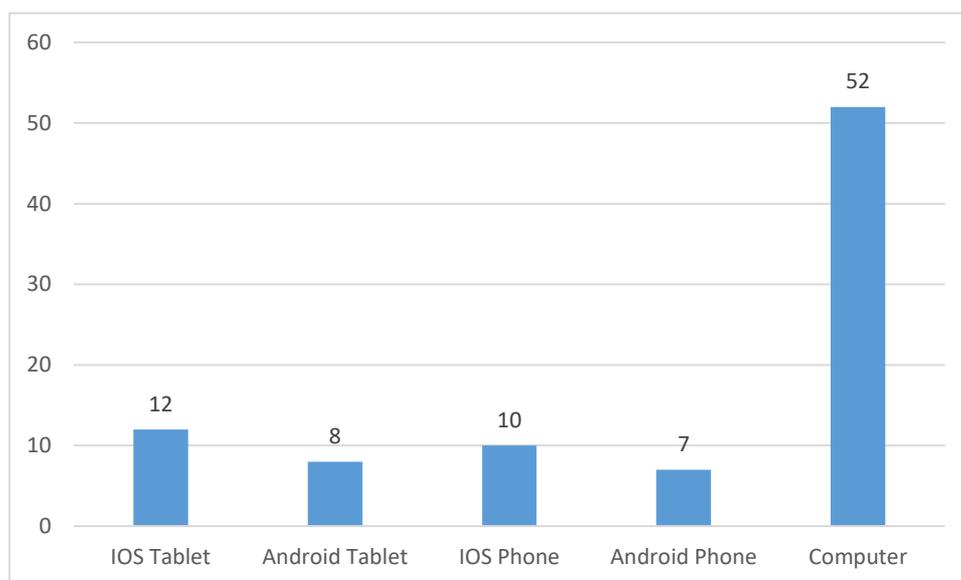


Figure 39. Participant preference of digital devices (n=75)

Participants were asked what type of digital devices they prefer in Q7, they could choose more than one device as their answer to this question. Figure 39 shows participants preferences for digital devices when reading educational materials. Participants were able to select more than one type of device, meaning the total number of responses exceeds the total number of participants.

In Figure 39, the most number of participants (52) said they would use a computer (desktop or laptop) as a digital reading device. Other participants chose different digital devices in similar numbers, with 12 choosing iOS tablets, ten choosing iOS phones, eight choosing Android tablets, and seven choosing Android phones.

4.4.5 Frequency of reading digital information for education

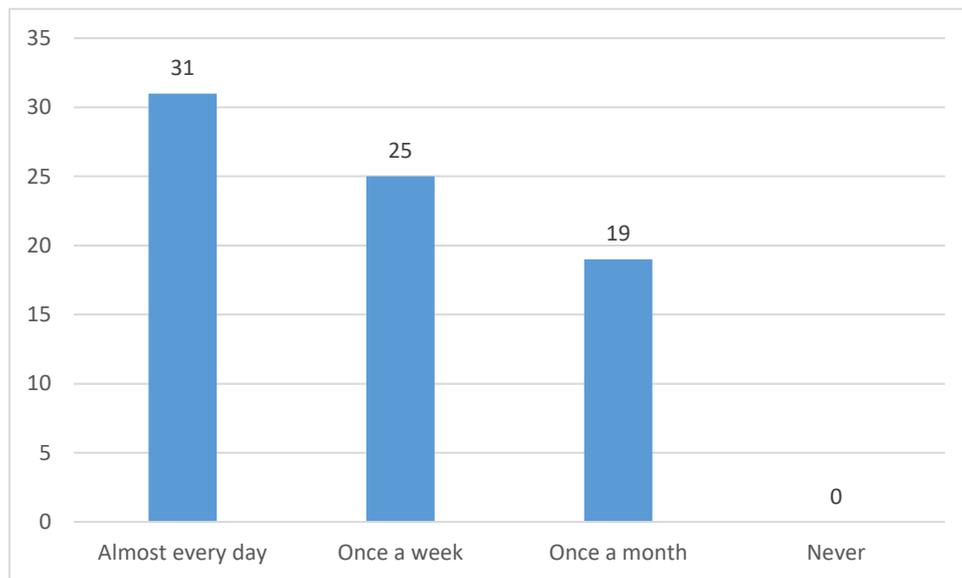


Figure 40. Frequency of reading digital information for education (n=75)

Participants were asked how often they read digital information for education in Q8. Figure 40 shows how frequently participants said they would read digital information for education. The highest frequency of reading digital information was almost every day, with 31 participants. Behind that was 25 participants choosing reading digital information once a week. Only 19 participants said they would read digital information once a month, and no participants have never done it before.

4.4.6 Preference of library search interface

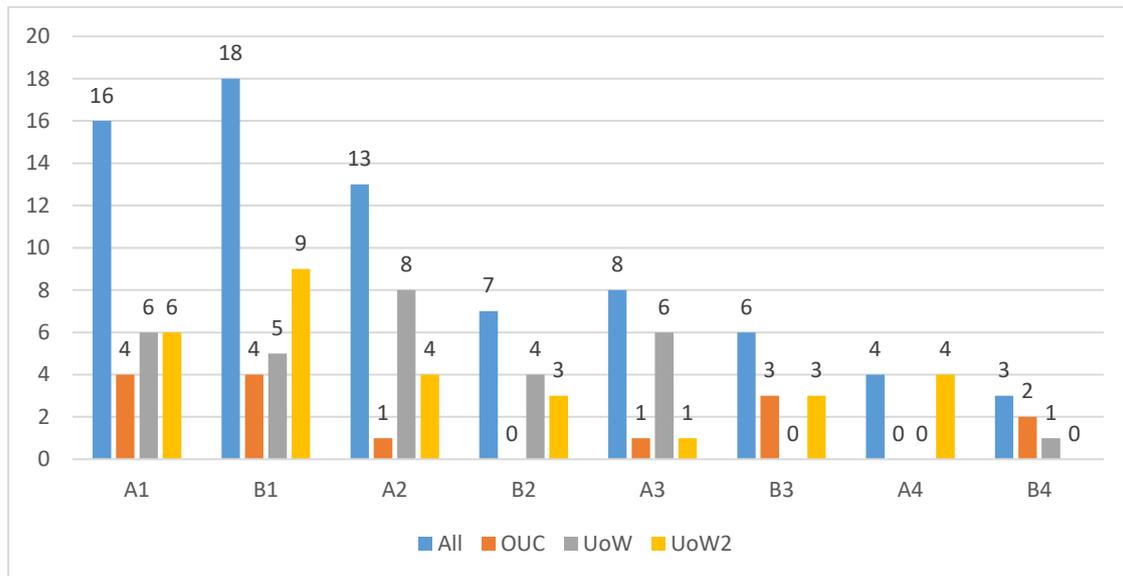


Figure 41. Participant preference of library search interface (n=75)

Participants were asked which library search interface they preferred, and why in Q9. Figure 41 shows the participants trends in choosing the eight different electronic interactive examples of library search interface for reading educational materials. In this figure, most of the participants (18 in all) said they would like to choose NF B1 as their first choice. Followed by NF A1 with 16 participants in all choosing it. Thirteen of the participants in all chose NF A2. Other participants chose different examples in similar values, with eight in all choosing NF A3, seven in all choosing example B2, six in all choosing NF B3, four in all choosing NF A4 and three in all choosing NF B4.

Among the participants choosing NF A1, four of the participants were from OUC, six of them were from UoW in Order 1, and another six of them were from UoW in Order 2. Among most of participants in choosing NF B1, nine of the participants were from UoW in Order 2, five of them were from UoW in Order 1, and the last four of them were from OUC. The participants who choose NF A2, only one of them were from OUC, eight of them were from

UoW in Order 1, and four of them were from UoW in Order 2.

The most often given reason for choosing the favorite library search interface was that the interface was considered easy for finding books (57%). For example, when selecting NF A1 as their preferred interface 16 participants described this interface as easy, while five participants describe NF B1 as easy. Eleven participants selected NF B1 and four participants selected NF A1 because the interface gave useful information.

4.4.7 Importance of book cover in the library search interface

Participants were asked *Q10: is the book cover important to you in the library searching page*; and were asked to explain why. Among all the participants, 72 of them thought the book cover was important in the library search interface. Only three of the participants thought it was not important.

Among these 72 participants who thought the book cover was important in the library search interface, 36 thought the book cover would make the book that they searched easy to find, 15 assumed that the book cover could help them to know what they want, 11 participants thought it could give them more information, and last ten participants believed the book cover makes the interface look more interesting. The three participants, who thought the book cover was not important in the library search interface, thought it was not helpful for their searching. This was described by participant P7 who said “the book cover is useless for me, what I value more is the book content rather than the book cover”.

4.4.8 Importance of book description in the library search interface

Participants were asked *Q11: is the book description important to you in the library searching page*; and were asked to explain why. According to participants, 71 of them thought the book description was important in the library search interface, four participants thought it was not important.

Among these 71 participants who thought the book description was important in the library search interface, 43 of them thought the book description could make the book easy to find, 13 expected that the book description would provide more related information, the last 15 people thought it could give them more clear information. Participant P11 explained that “through the book description I can know what this book is mainly talking about, and this would help me to find the right book”. The four participants who thought the book description was not important in the library search interface, thought it provided too much information that might disturb their searching. According to participant P4, “the book description gives me too much information, which could make me confused sometimes”. Participant P19 also said that “book description of similar books always tend to be the same, this makes it hard to choose”.

4.4.9 Importance of book spine in the library search interface

Participants were asked *Q12: is the book spine important to you in the library searching page*; and why. Among the participants, 43 thought the book spine was important in the library search interface. The other 32 participants thought it is not important.

Of the 43 participants who thought the book spine was important in the

library search interface, 37 thought the book spine would help them to find out what they want, and the other six participants thought it could give them clear information about the book. From the 32 participants who thought the book spine was not important in the library search interface, 30 of them thought it was not helpful for their searching, and two of them assumed the book spine was hard to realize what they want. Participant P15 described it as “showing too many choices, which does not help in searching for a book”.

4.4.10 Importance of related books in the library search interface

Participants were asked *Q13: are the related books important to you in the library searching page; and why*. Almost all of the participants (74) thought related books were important in the library search interface. Only one participant thought they were not important.

Among these 74 participants who thought the related books were important in the library search interface, 57 thought related books would help them to find out what they want, 13 people thought it could give them more information for their researching, and last four people believed related books let they have more choices. According to participant P11, “related books can remind me other useful choices”. The only one participant, who thought related books were not important in the library search interface, explained “it gives too much information, and is not helpful for definite searching”.

4.4.11 More details of the book in the library search interface

Participants were asked *Q14: would you like to have more details of the book (author's name, publication date, book blurb) in the library searching page; and were asked to explain why*. Sixty-three of the participants thought having more details about the book (author's name, publication date, book introduction) in

the library search interface was important. Only 12 of the participants thought it was not important.

Among these 63 participants who thought more details of the book were important in the library search interface, 47 of them thought more information would help them to find what they want and let them have more choices. The last 16 people thought it could give them more information for their researching. The 12 participants thought having more book details was not important in the library search interface, six of them thought it gave too much information, and another six assumed it was not helpful for them to search for a specific book. According to participant P16, “more details means more trouble if I already know what I want”. He explained that he did not want to waste time on more book details, “if I know the title and cover of the book I am looking for, I do not need additional information”.

4.4.12 Most useful example for browsing for a book

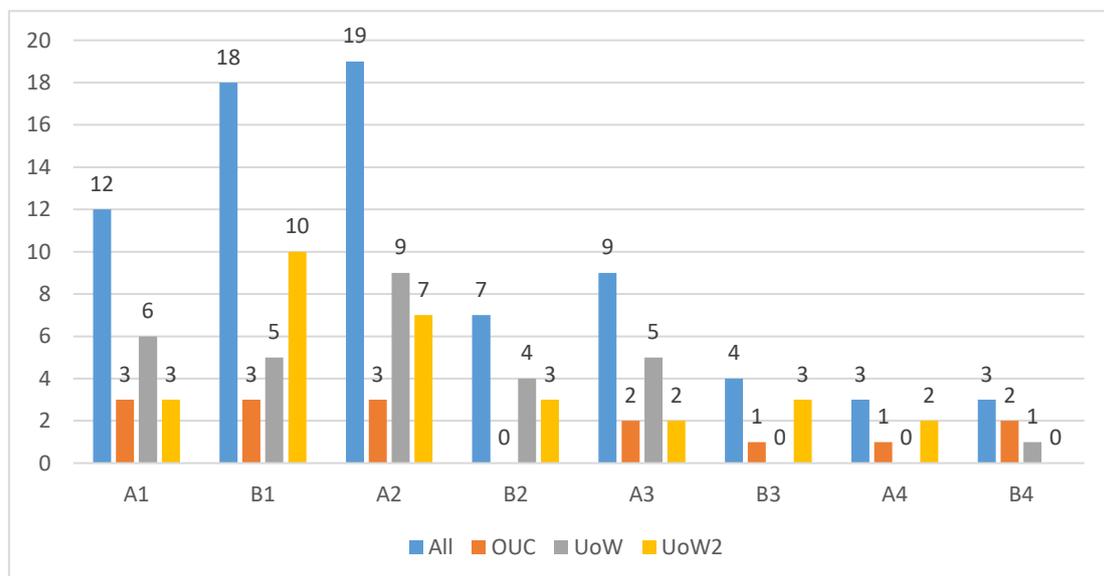


Figure 42. Participant preference of library search interface for browsing books
(n=75)

Participants were asked which library search interface examples they think is

most useful to them for browsing for a book in Q15, and why. Figure 42 shows the participants trends in choosing eight different examples of library search interface when browsing for a book. According to this chart, the greatest number of the participants (19) chose NF A2 as their preferred browsing interface. Following closely by 18 participants in all choosing NF B1. Twelve of the participants in all chose NF A1, nine of them chose NF A3. Other participants chose different NFs in a similar value, with seven in all chose NF B2, four in all chose NF B3, three chose NF A4, and the last three in all chose NF B4.

Among the participants choosing NF A1, three of them were from OUC, six of them were from UoW in Order 1, and another three of them were from UoW in Order 2. Three of the participants in choosing NF B1 were from OUC, five of them were from UoW in Order 1, and ten of them were from UoW in Order 2. Among the 19 participants who choose NF A2, three of the participants were from OUC, nine of them were from UoW in Order 1, and the seven of them were from UoW in Order 2. The participants who choose NF A3, two of them were from OUC, five of them were from UoW in Order 1, and another two of them were from UoW in Order 2.

The most common reason that participants gave was they thought it would give them clear information when they were browsing books (63%). Sixteen participants used this reason to explain why choosing NF A2, another ten explain why choosing NF B1. The reason followed it was having highly efficient for their work (23%). Eleven participants used this reason to explain why choosing NF B1, and three explain why choosing NF A2. According to participant P21, "NF A2 that includes the bigger book covers and short descriptions gives me clear information, and I can find the book I want quickly".

4.4.13 Most useful example for searching for a specific book

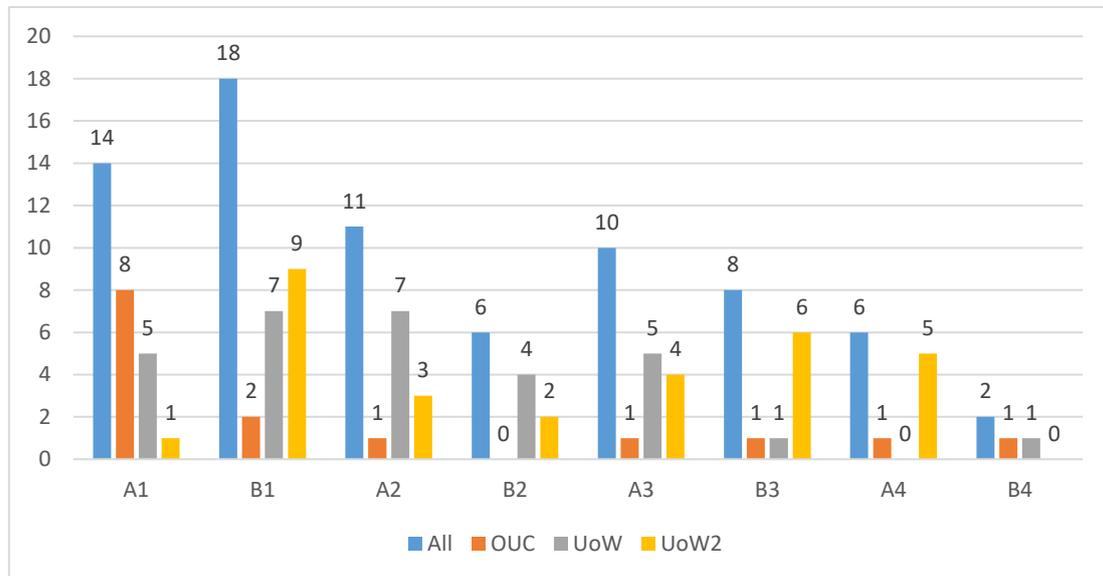


Figure 43. Participant preference of library search interface for searching for a specific book ($n=75$)

Participants were asked which example they think is most useful to them for searching for a specific book in Q16, and why. Figure 43 shows the participants preferences for the eight different examples of library search interface if they were searching for a specific book. From this figure we can see clearly that the most participants (18) would like to chose NF B1 as their first choice. Following it 14 participants in all chose NF A1. Eleven of the participants in all chose NF A2, ten of them chose NF A3. For other participants, eight of them chose NF B3, six of them chose NF B2 and another six chose NF A4. The last two in all chose NF B4.

According to the 18 participants who thought NF B1 is most useful to them for searching for a specific book, nine of them were from UoW in Order 2, seven of them were from UoW in Order 1, and the last two of them were from OUC. Among the participants choosing NF A1, eight of them were from OUC, five of them were from UoW in Order 1, and only one of them were from

UoW in Order 2. One of the participants in choosing NF A2 were from OUC, seven of them were from UoW in Order 1, and three of them were from UoW in Order 2.

The most common reason that participants gave was it gave them clear information (36%), and followed it was gave a better navigation page (27%). Among the reason that giving clear information, eight participants used this reason to explain why choosing NF B1, another seven explain why choosing NF A1. The reason giving a better navigation page, 13 participants used this reason to explain why choosing NF B1, and two explain why choosing NF B3. Participant P9 explained that “I like the second page of NF B1, it shows me accurate information when I clicked on one book, and this is very helpful”. On the other hand, another participant P23 described that “the information in NF A1 is clear and enough”.

4.4.14 Most useful example for information level of browsing books

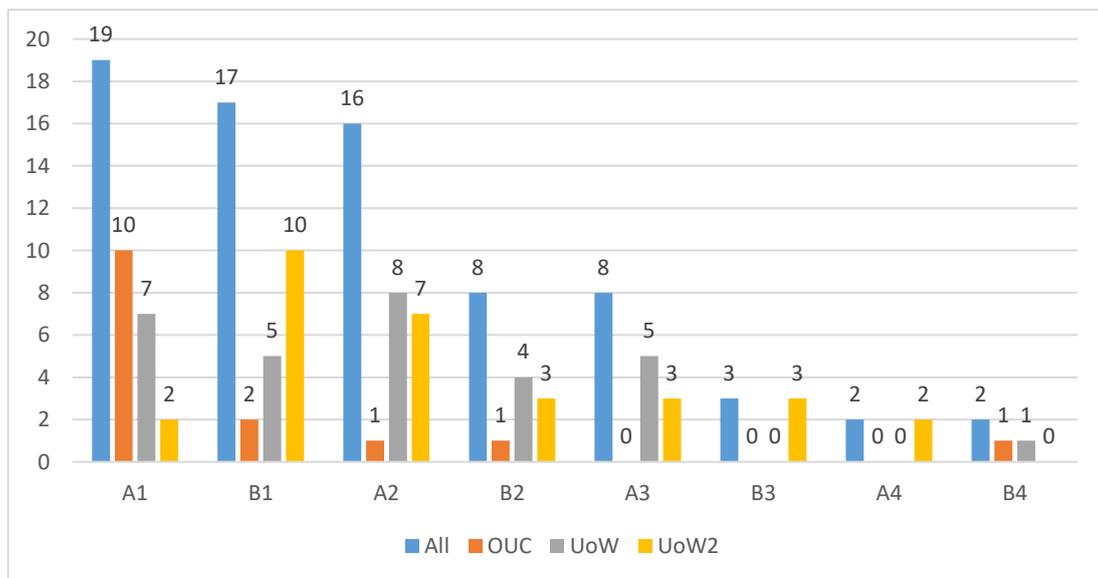


Figure 44. Participant preference of library search interface for information level of browsing books (n=75)

Participants were asked in which example they find the level of information most useful for browsing in Q17, and why. Figure 44 shows the participants preference for the eight different examples of library search interface for information level when browsing books. According to this chart, the most number of the participants (19) would chose NF A1 as their first choice, and followed by 17 participants in all choosing NF B1. Sixteen of the participants in all chose NF A2, eight of them chose NF B2, and another eight participants chose NF A3. The last participants chose different examples in a similar value, with three in all choosing NF B3, 2 in all choosing NF A4, and two in all choosing NF A4.

Among the 19 participants that choosing NF A1, just two of them were from UoW in the Order 2, seven of them were from UoW in Order 1, and ten of them were from OUC. Two of the participants in choosing NF B1 were from OUC, five of them were from UoW in Order 1, and ten of them were from UoW in Order 2. The participants who choose NF A2, only one of them were from OUC, eight of them were from UoW in Order 1, and seven of them were from UoW in Order 2.

The most common reason that participants gave was they thought it would give them clear information (54%). Sixteen participants used this reason to explain why choosing NF B1, another 12 explain why choosing NF A2. The reason followed it was participants believed this NF has high efficient (31%). Thirteen participants used this reason to explain why choosing NF B1, and seven explain why choosing NF A2. According to participant P37, "NF B1 gives me clear information, and it can help me find a book in a short time", while participant P41 thought that "the bigger book cover in NF A2 makes finding books more quickly".

4.4.15 Most useful example for information level of making a decision

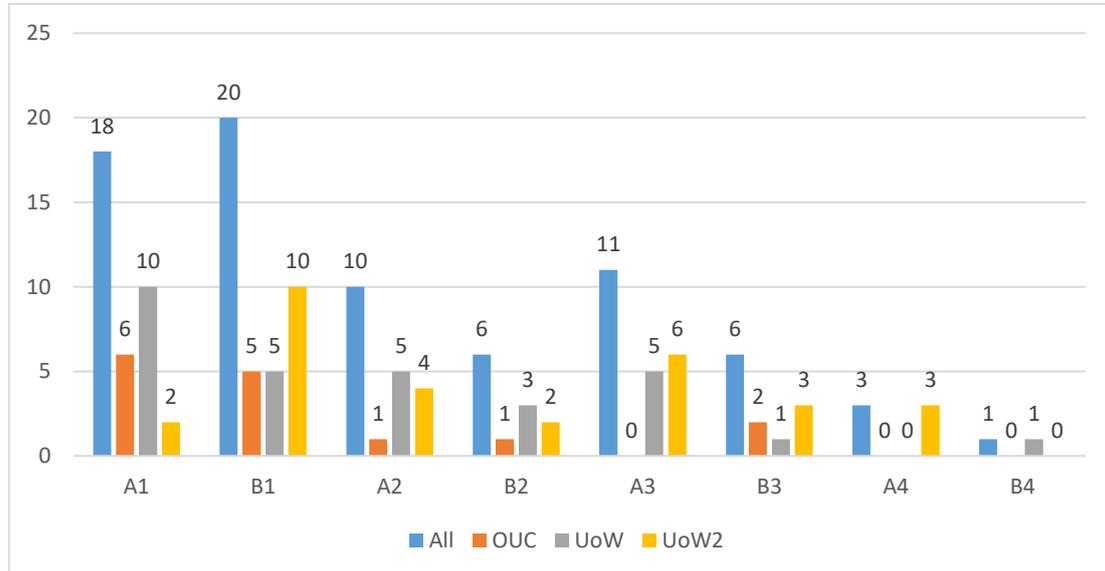


Figure 45. Participant preference of library search interface for information level of making a decision ($n=75$)

Participants were asked in which example they find the level of information most useful for making a decision in Q18, and why. Figure 45 shows the participants preference for the eight different examples of library search interface for information level when making a decision. It was clear that most of the participants (20) preferred NF B1 as their first choice, followed by 18 participants in all choosing NF A1. Eleven of the participants in all chose NF A3, ten of them chose NF A2, six of them chose NF B2, and another six participants chose NF B3. Three of the last participants chose NF A4, and just one participant chose NF B4.

Among the 20 participants who chose NF B1, five of them were from OUC, five of them were from UoW in Order 1, and ten of them were from UoW in Order 2. Six of the participants in choosing NF A1 were from OUC, ten of them were from UoW in Order 1, and two of them were from UoW in Order 2.

The participants who choose NF A3, none of them were from OUC, five of them were from UoW in Order 1, and six of them were from UoW in Order 2.

The most common reason that participants gave was they thought it would give them plenty information to make a decision (31%). Thirteen participants used this reason to explain why choosing NF B1, another eight explain why choosing NF A1. The reason followed it was participants believed this NF has high efficient to find out what they want (25%). Ten participants used this reason to explain why choosing NF A1, and seven explain why choosing NF A2. For participant P47 who chose NF A2, “bigger book covers in this NF let me make a decision quickly”.

4.4.16 Most intuitive changes example for clicking in the interface

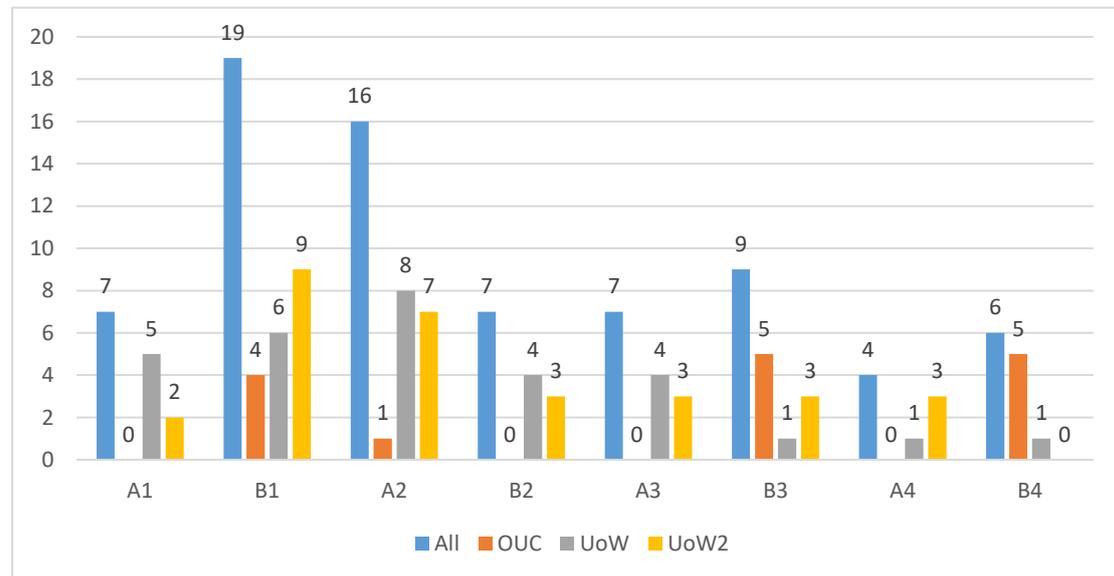


Figure 46. Participant preference of library search interface for intuitive navigation
($n=75$)

Participants were asked in which example they find the changes most intuitive when they clicked in the interface in Q19, and were asked to explain why. Figure 46 shows the participants trends in choosing 8 different examples

of library search interface for intuitive navigation. According to this chart, most of the participants (19) would like to choose NF B1 as their first choice. Following it, 16 participants in all chose NF A2. Nine of the participants in all chose NF B3, seven participants each chose NF A1, B2 and A3 respectively. Another six participants chose NF B4, and the last four chose NF A4.

Among the 19 participants that choosing NF B1, four of them were from OUC, six of them were from UoW in Order 1, and nine of them were from UoW in Order 2. One of the participants in choosing NF A2 were from OUC, eight of them were from UoW in Order 1, and seven of them were from UoW in Order 2. The participants who choose NF B3, five of them were from OUC, one of them were from UoW in Order 1, and three of them were from UoW in Order 2.

The most common reason that participants gave was they thought it gave a better navigation page when navigating to the last book page (57%). Sixteen participants used this reason to explain why choosing NF B1, another nine explain why choosing NF B3. The reason followed it was participants believed this NF has a clear connection (15%). Seven participants used this reason to explain why choosing NF A2, and three explain why choosing NF B3. According to participant P10, "I like the way of book cover page change in NF B3, and it is easy to get into the page with more details".

4.5 Discussion

This research is about evaluating people's preferences for library search interface design. As mentioned in Section 4.2, this study used an electronic display on a tablet supplied by the researcher on UoW and OUC sides. Participants were shown eight different electronic interactive examples of variations of a library search interface in the tablet.

The researcher collected information of several different library search interfaces in Chapter 3 (See Section 3.2). In Chapter 4 (See Section 4.2), several different library search interface examples were designed and tested in this study. The researcher designed three main types of the library Search Result Pages (SRPs), and combined these SRPs in eight different Navigation Flows (NFs), which could also be seen as eight electronic interface examples. The library search interfaces in these electronic interface examples included features that were useful for people to search for books, which were mentioned in Chapter 3 (See Section 3.2). In Chapter 4 (See Section 4.4), the researcher did a survey of these eight examples with 75 participants, and discussed the results. The participants presented various reasons to explain their tendency for these eight electronic interface examples. In this Section, the researcher analyzed their preferences for eight different electronic interface examples, and discussed the reasons for choosing these library search interfaces. The researcher was trying to find people's display preferences for a library search interface design.

4.5.1 Analysis of participants' preference for book searching

On comparing Figure 37 and Figure 38 (which shows the participants' frequency in browsing books and borrowing books out of a physical library) with Figure 40 (which shows the frequency of participants in reading digital information for education), it can be clearly seen that the participants tend to choose digital reading rather than a physical library in academic area. E-reading becomes an increased choice for readers in recent years (Wu & Mitchell, 2010). Most of the students have read E-books before. It is interesting that in Figure 37, there are three participants who chose 'Never' when asked how often they browse for books in a physical library before. Also in Figure 38, there are five participants who chose 'Never' when asked how often they

borrow a book out of a physical library. This may be because some of the participants were new students of the university, who had not yet come into contact with the university's library, and one of the participants explained that he did not want to go to the library to borrow books. The increasing number of electronic reading may have bigger influences on people's behavior of searching books from physical library than the researcher thought.

However, in Figure 39, it is seen that the participants preferred to use a computer (which included laptop and home computer) to read digital information. In addition according to Figure 40, all the 75 participants had read digital information for education before. The researcher also managed this dataset to make this study of people's display preferences for a library search interface design more meaningful. Participants who had never read digital information for education before did not have enough reference value for this study.

4.5.2 Analysis of participants' preference in different orders

For the materials used in this study, the participants from UoW completed this survey in Order 1 (A1 to B1 to A2 to B2 to A3 to B3 to A4 to B4). When the survey had been completed by half of the participants (30 questionnaires already finished), the researcher found out that the data was very consistent and aligned very clearly with the order of the examples. So during the survey, the researcher decided to change the order of the eight different electronic interactive examples, and include another 30 additional samples in Order 2 (A4 to B4 to A3 to B3 to A2 to B2 to A1 to B1). Through this approach, the researcher could see whether the survey results changed, and to see if choices depended on the order of the samples or not.

On comparing the data relating to the eight electronic interactive examples shown in Order 1 with the data of the examples in Order 2, it was seen that although the order changes do have some impact on the data, the overall trend is predominantly the same. From Figure 41, it can be seen that the data of UoW which was done in the Order 1 tends to focus on NF A1, NF A2, and NF A3. On the other hand, the data of UoW that done in Order 2 tends to focus on NF A1, NF B1, NF A2 and NF A4. Figure 42 showed the same trend details. In Figure 42, the data of UoW done in the Order 1 tends to focus on NF A1, NF B1, NF A2, and NF A3, while the data of UoW that done in Order 2 tends to focus on NF B1 and NF A2. In Figure 41 and Figure 42, it did not show significant difference between these two different orders. Participants tended to choose the same library search interface examples in different orders when asked Q9 and Q15. The interfaces and navigation flows they preferred in these two Interview Questions could have some similarities. Although shown in different orders, the library search interface with bigger book cover, book title, author information, publication date, and a short introduction of the book tends to be chosen by the participants. These factors in this library search interface may have motivated their choices.

However, it can be noted that in Figure 43, Figure 44, Figure 45, and Figure 46, participants' selection trends for library search interface examples were affected slightly by these two different orders. This effect was most clearly reflected in Figure 43. Figure 43 shows the participants' preferences for choosing the most useful electronic interactive example when searching for a specific book during their academic reading. In Figure 43, the data of UoW done in the Order 1 tends to focus on NF B1 and NF A2, while the data of UoW that done in Order 2 tends to focus on NF B1, NF B3 and NF A4. Participants tended to choose the library search interface examples that were shown in front of the order when asked Q16.

Although the order changes do have some impact on the data, the overall trend is predominantly the same. Participants tended to choose the same library search interface examples when they were shown the examples in two different orders. On the other hand, participants could also be affected slightly by these two different orders in some Interview Questions.

4.5.3 Analysis of participants' reasons for choosing library search interface

As mentioned in Section 4.4, Figure 41, Figure 42, Figure 43, Figure 44, Figure 45, and Figure 46 shows the participants preferences for the eight different library search interface examples according to different conditions. Figure 41 shows the participants trends in choosing library search interface for reading educational materials. Figure 42 shows the participants trends in choosing library search interface when browsing for a book. Figure 43 shows the participants preferences of library search interface if they were searching for a specific book. Figure 44 shows the participants preference of library search interface for information level when browsing books. Figure 45 shows the participants preference of library search interface for information level when making a decision. Figure 46 shows the participants trends in choosing library search interface for intuitive navigation. On comparing Figure 41, Figure 42, Figure 43, Figure 44, Figure 45, and Figure 46, it can be seen clearly that participants tended to choose NF A1, NF B1, NF A2 these three library search interface examples.

According to NF A1, the most often given reason by the participants for choosing this library search interface example across all the Interview Questions was giving clear and useful information (25% of all participants). Followed it the second most often-used reason for choosing NF A1 was that

the interface was considered easy for finding books (21% of all participants). The last often given reason for NF A1 was it could make the participants' work more efficiently (13% of all participants). In NF A1, participants would get meta-data features included little book cover, book title, author information and publication date. When choosing one book, participants could navigate to the result page directly by one click. These features and the direct connection of this library search interface example may let participants feel they could find books easily, and get clear and useful information.

According to NF B1, the most often given reason for participants choosing this library search interface example was that it gave useful information (77% of all participants). The second most often used reason for participants choosing NF B1 was it gave a better navigation page (38% of all participants). The third often given reason for NF B1 was it had high efficient for participants to find out what they want (32% of all participants). The last often given reason for NF B1 was easy for the participants to find books (7% of all participants). In NF B1, participants would get features including book cover, book title, author information, publication date, and short introduction. Participants could navigate to a Supplementary Search Result Page (SSRP) with more information details of the book they selected, and then connect to the result page. The SSRP of mixed book covers in this library search interface example may gave useful information better than other examples, and let participants feel it showing a better navigation page.

According to NF A2, the most often given reason by the participants was that the interface gave useful information (37% of all participants). The second most often used reason for participants to choose NF A2 was it made the participants' work more efficiently (22% of all participants). The last often given reason for NF A2 was it had a clear connection (9% of all participants). In NF A2, participants would get meta-data features included bigger book

cover, book title, author information, publication date, short introduction, and the ISBN number. While touching one book, participants went to the result page directly. These features in this library search interface example tended to give participants useful information, and the direct connection of this example may have made the participants' work more efficiently.

Other library search interface examples such as NF B3, the most often given reason for participants choosing was that it gave a better navigation page (15% of all participants), and followed it was that it had a clear connection (4% of all participants). Participants would get features including book cover, book title, author information, publication date, and short introduction in NF B3. Participants could choose one book by touching the book covers in this library search interface example, and get more detailed information about the selected book in a SSRP. When clicking the book cover again, participants could navigate to the result page. The SSRP and navigation in this example may let participants feel it gave a better navigation page than other examples, and had a clear connection.

NF A1, NF B1 and NF A2 were frequently chosen as being preferred for similar reasons: easy for finding books, giving clear and useful information, making the participants' work more efficiently, and giving a better navigation page and clear connection. The features in these three library search interface examples normally included book cover, book title, author information, publication date, and short introduction. According to the study of Vanderschantz et al. (2015), personal digital library users tended to choose the library search page with metadata, such as book title and book description, or use some way to implement a visual representation of a book, such as displaying a book cover (Vanderschantz et al., 2015). These common features were similar with the features in NF A1, NF B1 and NF A2, which may motivate participants' choices.

When participants were asked in Q18: *in which example did you find the level of information most useful for making a decision*; some library search interface examples such as NF B3, NF A4, and NF B4 were almost never chosen (Figure 45). While in other Interview Question such as Q19: *in which example did you find the changes most intuitive when you clicked in the interface*; these library search interface examples with book cover only or book spine only had an increasing selection compared with Q18 (Figure 46). This data provided a tendency for people who seem not want to change and try new things. Another possible reason to explain this preference was that the library search interface example has less changed comparing with the traditional library search interface in the Web. Traditional examples might be more helpful for searching or finding books.

4.5.4 Analysis of the importance of library search interface factors

According to the Interview Question Q10, Q11, Q12, Q13, and Q14, participants thought library search interface factors such as book cover, book description, book spine, related books, and more details of the book were playing an important role in their selection behavior of library search interface examples.

Almost all of the participants (99%) thought related books were important in the library search interface. Followed it 96% of the participants thought book cover were important, and 95% of the participants thought book description was important. Most of the participants (84%) thought more details of the book was important. More than half of the participants (57%) thought book spine was important.

The participants who thought related books were important pointed out that

this factor was helpful to find out what they want. The participants believed related books could give them more information for their researching, and let them have more choices. While the participants who thought book cover was an important factor, also preferred that book cover could make the book that they searched easy to find, and could give them more information. The participants who thought book description was important, explained as well that this factor could make the book easy to find, and would provide them more clear and related information. The participants who thought more book details of the was an important factor in the library search interface gave out similar reasons. They explained more details of books could help them find books, and let them have more choices. It would also give them more information that helps the researching. For the participants who thought book spine was important, gave out similar reason that book spine could help them to find out what they want, and give them clear information about the book.

While there were other participants who thought these library search interface factors were not important. The only one participant who thought related books were not important assumed that it gave too much information and was not helpful for definite searching. For the participants who thought the book cover was not important, they indicated it was not helpful for their searching. The participants who thought the book description was not important assumed it provided too much information that might disturb their searching. For the participants who thought more book details were not important, half of them thought it giving too much information, and half of the participants assumed it was not helpful to search for a specific book. The participants who thought the book spine was not important indicated that it was not helpful for their searching, and assumed the book spine was hard to realize the topics they want.

It can be seen that participants tended to give out the similar reasons to

explain why library search interface factors such as book cover, book description, book spine, related books, and more details of the book were important for them when selecting for books. The reasons mostly focused on easy and helpful to find book, and giving more clear and related information. While for the participants who thought these library search interface factors were not important, they pointed out different drawbacks of these factors.

4.6 Conclusion

In this chapter, the researcher designed models of nine typical library Search Result Pages (SRPs), which included the features that are commonly used in a digital library interface according in Chapter 3. Then the researcher combined these nine SRPs in ten proposed Navigation Flows (NFs). Three main types of the library SRPs and eight different NFs were designed based on these nine typical library SRPs and ten proposed NFs. This chapter analyzed a research of eight different library search interface examples that based on these library search interface models. These examples assessing people's display preferences for a library search interface design. A survey of these eight electronic interactive examples was done with 75 participants from Ocean University of China (OUC), and the University of Waikato (UoW).

4.6.1 Answering RQ3

This chapter began to address *RQ3: do people have a preference for how they search for books?*

Through discussing the results of this research, it can be seen that participants tended to choose digital reading rather than a physical library in academic area. The increasing number of electronic reading may have bigger influences on people's behavior of searching books from physical library. When discussing participants' trends in choosing digital devices when reading

educational materials in Section 4.5.1, it was seen clearly that the participants preferred to use a computer (which included laptop and home computer) to read digital information. Although the order changes of the digital library interface examples do have some impact on the data, the overall trend is predominantly the same. Participants tended to choose the same library search interface examples when they were shown the examples in two different orders. The library search interface with bigger book cover, book title, author information, publication date, and a short introduction of the book tends to be chosen by the participants. However, participants could also be affected slightly by these two different orders in some Interview Questions.

The data discussed in Section 4.5.3 also provided a tendency for people who seem not want to change and try new things. Traditional examples with the interface factors such as book cover, book title, author information, publication date, and a short introduction might be more helpful for searching or finding books.

4.6.2 Answering RQ4

This chapter also began to discuss *RQ4: what are the factors that affect people's preferences for library search interfaces?*

Participants tended to choose NF A1, NF B1, NF A2, NF B2 these four library search interface examples. The often given reasons by the participants for choosing library search interface example were similar: easy for finding books, giving clear and useful information, making the participants' work more efficiently, and giving a better navigation page and clear connection. The features in these three library search interface examples normally included book cover, book title, author information, publication date, and short introduction. According to the study of Vanderschantz et al. (2015), users

tended to choose the library search page with metadata, such as book title, book description, and book cover (Vanderschantz et al., 2015). These common features were similar with the features in the library search interface examples, which may motivate participants' choices.

Library search interface factors such as book cover, book description, book spine, related books, and more details of the book were playing an important role in their selection behavior of library search interface examples. These factors would affect people's preferences for library search interfaces on a mobile device. Participants tended to give out the similar reasons to explain why these library search interface factors were important for them when selecting for books. The reasons mostly focused on easy and helpful to find book, and giving more clear and related information. While there were some other participants pointed out different drawbacks of these factors when they were asked to explain why these factors were not important.

Chapter 5 - Conclusion

The purpose of this thesis was to study how the factors of library search interface design affect people's preferences. Through the research, participants' data was collected and analyzed regarding people's preferences for the display of books in a library search interface. The researcher concluded the important factors that influenced the preferences of the participants according to the results.

The thesis collected the background information about E-book and the development and use of digital libraries and E-book by users. A Case Study of several different library search interfaces was conducted. Followed by the design of prototype digital library interfaces on mobile devices which were investigated through a Usability Study with 75 participants from Ocean University of China (OUC), and the University of Waikato (UoW).

5.1 Summary

This research is about assessing people's display preferences for a library search interface design, and considers the influences that could help to improve library search interface design. Through the research, information was collected and analyzed regarding people's preferences for the display of books in a library search interface. The information gathered helping determine the level of detail required and user preferences for the presentation of E-books to ensure ease of selection in a library search interface.

In Chapter 2, the researcher discussed the literature on E-books and digital libraries. The definitions and concepts relevant to the investigation of E-book history, the differences between printed books and E-books, as well as the

development and use of digital libraries were expounded in this chapter. Here the researcher considered the steps of people's preference for choosing books, and summed up the reasons that people search for books. The research is undertaken into how to design and develop digital libraries for users. This chapter begins to address *RQ 1: how do people search for books;* and *RQ2: what is required in a digital library interface?* It was found that in the past two decades, the history of E-book has developed rapidly, the differences between printed book and E-book both have advantages and disadvantages, but it cannot be denied that E-book is gradually holding a dominant position in people's reading activities. People's preference for choosing books could be mainly divided into four steps: identify interesting books through the catalog, retrieve the books from the shelves, select available options, access and read the desired content of the book (Hinze et al., 2012). There are many reasons for determining how people choose books. The book searching reasons for students including length of the word, the size of the print, the length of the book, and other books related factors (Kragler, 2000). Children usually chose books based on the books' physical characteristics. Many things such as time limitation, check restriction, personal restriction and self-concept would affect children's book selection behavior (Reutzel & Gali, 1998). Digital libraries have several advantages comparing with traditional physical libraries. The global spread of platforms has improved the potential of digital library in the teaching and learning area. This is important when considering the improving growth of digital media and mobile devices, which could help students set their goals and manage educational content.

In Chapter 3, the researcher addressed the study of several different library search interfaces. The advantages and disadvantages of several different major categories of the library search interface were described in this chapter. Six university libraries, two city libraries, one E-book catalogue, and three

books sale websites have been chosen as the objects of study in this chapter. The researcher analyzed the features of each search interface, and identified features of interfaces that required investigation in the usability study of the subsequent chapters. This chapter continues to discuss *RQ2: what is required in a digital library interface?* In this chapter, the researcher discovered there are four major categories of the library Search Result Page (SRP) that the current library search page can be divided into: text title, title with cover, brief introduction and location information, and bigger book cover. For text title examples, people could only see the title list of book titles in the initial SRP. Compared to the text title only type, the examples of title with cover gave people more information about the books. Examples of brief introduction showed results with a brief introduction to each of the search results, while examples with bigger book cover was more focused on the design of the cover, which could be more attractive to capture the attention of consumers. There were nine features that are commonly used in a digital library interface on a mobile device, involved book title, author, publisher, publication date, little book cover, bigger book cover, introduction, location, and price. According to McKay (2011), there were five parts of the book that viewed most commonly by readers, included front matter, chapter headings, table of contents, the first page of content, and the introduction. This was similar with the features required in a digital library interface.

Chapter 4 addresses a research of several different library search interface examples. The researcher designed eight electronic interactive examples of variations of a library search interface on a device, and undertook a survey of these eight examples with 75 participants, and discussed the results. This chapter begins to address *RQ 3: do people have a preference for how they search for books;* and *RQ4: what are the factors that affect people's preferences for library search interfaces?* From the results, it can be seen that although the order changes of

the digital library interface examples do have some impact on the data, the overall trend is predominantly the same. Participants tended to choose the same library search interface examples when they were shown the examples in two different orders, and could also be affected slightly by these two different orders in some Interview Questions. The often given reasons by the participants for the most often chosen library search interfaces were: easy for finding books, giving clear and useful information, making the participants' work more efficiently, and giving a better navigation page and clear connection. Traditional examples might be more helpful for searching or finding books. Library search interface factors such as book cover, book description, book spine, related books, and more details of the book were playing an important role in their selection behavior of library search interface examples. These factors would affect people's preferences for library search interfaces on a mobile device. Participants tended to give out the similar reasons to explain why these library search interface factors were important for them when selecting for books. The reasons mostly focused on easy and helpful to find book, and giving more clear and related information.

5.2 Answers to research questions

Here gives a summary of the answers to the four research questions, RQ1 to RQ4.

5.2.1 How do people search for books? (RQ1)

This research question was talked in Chapter 2. Book selection plays an important role in book use process. According to Hinze et al. (2012), people's preference for choosing books could be mainly divided into four steps: identify the books they interest in through the catalog, search for the books from the shelves, select available options, access and read the required

content of the book. People choose books for many reasons. Students often search for books for reasons of the length of a word, the size of the print, the length of the book, and other books related factors (Kragler, 2000). Children usually chose books based on the books' physical characteristics, such as the time limitation, restriction of the observation, personal reasons and self-conscious (Reutzel & Gali, 1998). Different people showed a great deal of variety of preferences for choosing books. More research needs to be done for the reasons of how people search for books in the future. Research on the behavior of people's book selection in physical libraries could provide better suggestions for people to choose books in digital libraries.

5.2.2 What is required in a digital library interface? (RQ2)

According to Chapter 2, there are many elements that can help improve the library search interface design. According to Martin and Aitken (2012), digital literacy has influenced the cooperation and creation between designers and writers. Designers should change their roles from historical design to collaborators. The design of digital library interface should create understandable interfaces and display the search results effectively (Shneiderman, 2000). The content presentation of digital library would have a big impact on readers' search and reading behavior (McKay et al., 2012). Digital library users preferred to choose interfaces with metadata or visual representation of the book (Vanderschantz et al., 2015).

In Chapter 3, the researcher discussed and analyzed several factors through four major categories of the library search interfaces through describing the advantages and disadvantages of them. There were nine features commonly used in a digital library interface on a mobile device, which involved book title, author, publisher, publication date, little book cover, bigger book cover, introduction, location, and price.

5.2.3 Do people have a preference for how they search for books?

(RQ3)

Research question 3 was investigated in Chapter 4. In this chapter, the researcher set a research of several different digital library search interface examples, which assessed people's display preferences for how they search for books on a mobile device. The researcher developed different design ideas for digital library interface, and design eight different navigating ways of these library search interface pages. A survey of these eight electronic interactive examples was done with 75 participants. Through the results it can be seen that participants tended to choose digital reading rather than a physical library in academic area by a computer (which included laptop and home computer). Although the order changes of the digital library interface examples do have some impact on the data, the overall trend is predominantly the same. Participants tended to choose the same library search interface examples when they were shown the examples in two different orders. The library search interface with bigger book cover, book title, author information, publication date, and a short introduction of the book tends to be chosen by the participants. Traditional examples with the interface factors such as book cover, book title, author information, publication date, and a short introduction might be more helpful for searching or finding books.

5.2.4 What are the factors that affect people's preferences for library search interfaces? (RQ4)

Research Question 4 was also talked in Chapter 4. Chapter 4 analyzed a research of eight different library search interface examples that assessing

people's display preferences for a library search interface design. The often given reasons by the participants for choosing library search interface example were similar: easy for finding books, giving clear and useful information, making the participants' work more efficiently, and giving a better navigation page and clear connection. The features in these three library search interface examples normally included book cover, book title, author information, publication date, and short introduction. These features may motivate participants' choices. Library search interface factors such as book cover, book description, book spine, related books, and more details of the book were playing an important role in their selection behavior of library search interface examples. Participants tended to give out the similar reasons to explain why these library search interface factors were important for them when selecting for books. The reasons mostly focused on easy and helpful to find book, and giving more clear and related information.

5.3 Limitations & Future Work

While 75 participants were interviewed a significant number of the participants were students. In this way the results may be limited. Larger samples of non-student participants might prove interesting for future study.

Participants were asked if they have searched material or read material on a digital device for education before. All of the participants (75) had read and searched for reading material on a digital device before. The research intentionally sought participants who were familiar with searching for educational material reading material on a digital device. The questionnaire data was chosen depending on these two interview questions. If the answers of these questions were no, then this questionnaire data would not be used for the next step of this study. In this way, the resulting data would be more relevant and informative for people who use electronic devices. On the other

hand, the conclusion of this study may be narrow and limited. A selection of participants who are not regular digital information users could be included in future work in this area.

The researcher used a single tablet as the device in the research, which may make the survey results have limitations. Participants might show different tendency of choosing digital library interfaces based on the size and display of different devices. A wide range of devices should be investigated in the future study.

This study gave out the preferences of people for the library search page, but there were a lot of shortcomings and needed to be improved. The first thing was the one-sidedness of the data. Most of the participants were students, and larger samples could be collected in the future research. The second thing was people's traditional trend of the test examples. According to the findings, participants seemed to give similar reasons for choosing library search interface examples. Another possible reason to explain this was that the test examples had less optional choices. Future research could be improved in these areas with more detailed study of the digital library interfaces.

5.4 Conclusions

The main purpose of this thesis was to find out the factors of library search interface design that affect people's preferences. The researcher concluded the important factors that influenced the preferences of the participants according to the results.

People choose books for different reasons. Different people showed a great deal of variety of preferences for choosing books. Through the results of the survey of eight different library search interface examples, the library search interface with bigger book cover, book title, author information, publication

date, and a short introduction of the book tends to be chosen by the participants. These features may motivate participants' choices, and the participants tended to give out the similar reasons. The often given reasons by the participants were: easy for finding books, giving clear and useful information, making the participants' work more efficiently, and giving a better navigation page and clear connection. Library search interface factors such as book cover, book description, book spine, related books, and more details of the book were playing an important role in their selection behavior of library search interface examples. Participants tended to give out the similar reasons to explain why these factors were important: easy and helpful to find book, giving more clear and related information. Traditional examples with these interface factors might be more helpful for searching or finding books.

Reference List

- Attwell, A. (2010). *E-book*. Retrieved from https://www.britannica.com/technology/e-book_
- Bell, S. S. (2015). *Librarian's Guide to Online Searching: Cultivating Database Skills for Research and Instruction: Cultivating Database Skills for Research and Instruction*. ABC-CLIO.
- Borgman, C. L., Gilliland-Swetland, A. J., Leazer, G. H., & Mayer, R. (2000). Evaluating digital libraries for teaching and learning in undergraduate education: A case study of the Alexandria Digital Earth Prototype (ADEPT). *Library Trends*, 49(2), 228.
- Browne, G., & Coe, M. (2012). Ebook navigation: Browse, search and index. *The Australian Library Journal*, 61(4), 288-297.
- Cassidy, E. D., Martinez, M., & Shen, L. (2012). Not in love, or not in the know? Graduate student and faculty use (and non-use) of e-books. *The Journal of Academic Librarianship*, 38(6), 326-332.
- Christianson, M., & Aucoin, M. (2005). Electronic or print books: Which are used? *Library Collections, Acquisitions, and Technical Services*, 29(1), 71-81.
- Clark, T. (2013). *The 6 most popular eBook formats to know about*. Retrieved from <http://www.edudemic.com/most-popular-ebook-formats-2/>
- Cunningham, S. J., Alqurashi, H., Hinze, A., Vanderschantz, N., Timpany, C., & Heese, R. (2013). Browsing and book selection in the physical library shelves (Working paper). Retrieved from <http://researchcommons.waikato.ac.nz/handle/10289/7161>
- Dungworth, N., Grimshaw, S., McKnight, C., & Morris, A. (2004). Reading for

- pleasure? A summary of the findings from a survey of the reading habits of year 5 pupils. *New Review of Children's Literature and Librarianship*, 10(2), 169-188.
- Dushay, N. (2004). Visualizing metadata: A virtual book spine viewer. *D-Lib Magazine*, 10(10).
- Fox, E. A. (1999). The digital libraries initiative: Update and discussion: Guest editor's introduction to special section. *Bulletin of the American Society of Information Science*, 26(1), 7-11.
- Francisco-Revilla, L., Shipman, F., Furuta, R., Karadkar, U., & Arora, A. (2001). Managing change on the web. In *Proceedings of the 1st ACM/IEEE-CS joint conference on Digital libraries* (pp. 67-76). New York, NY: ACM.
- Gibson, C., & Gibb, F. (2011). An evaluation of second-generation ebook readers. *The Electronic Library*, 29(3), 303-319.
- Hamblen, M. (2011). *Amazon: E-books now outsell print books*. Retrieved from <http://www.computerworld.com/article/2508262/mobile-wireless/amazon--e-books-now-outsell-print-books.html>
- Hinze, A., McKay, D., Vanderschantz, N., Timpany, C., & Cunningham, S. J. (2012). Book selection behavior in the physical library: Implications for ebook collections. In *Proceedings of the 12th ACM/IEEE-CS joint conference on Digital Libraries* (pp. 305-314). New York, NY: ACM.
- Kragler, S. (2000). Choosing books for reading: An analysis of three types of readers. *Journal of Research in Childhood Education*, 14(2), 133-141.
- Liu P. (2015). *A brief introduction to the development of e-book*. Retrieved from <http://lms.tzuchi.com.tw/epaper/artical/index.php?id=file/34/digiinfo>

- Martin, C., & Aitken, J. (2012, June). Evolving definitions of authorship in ebook design. In *social shaping of digital publishing: Exploring the interplay between culture and technology: Proceedings of the 16th international conference on electronic publishing* (p. 43). Vancouver, Canada: IOS Press.
- McKay, D., Hinze, A., Heese, R., Vanderschantz, N., Timpany, C., & Cunningham, S. J. (2012). An exploration of ebook selection behavior in academic library collections. In *International Conference on Theory and Practice of Digital Libraries* (pp. 13-24). Springer, Berlin, Heidelberg.
- Rainie, L., Zickuhr, K., Purcell, K., Madden, M., & Brenner, J. (2012). *The rise of e-reading*. Retrieved from <http://files.eric.ed.gov/fulltext/ED531147.pdf>
- Reutzell, D. R., & Gali, K. (1998). The art of children's book selection: A labyrinth unexplored. *Reading Psychology: An International Quarterly*, 19(1), 3-50.
- Richardson Jr, J. V., & Mahmood, K. (2012). eBook readers: User satisfaction and usability issues. *Library Hi Tech*, 30(1), 170-185.
- Rinehart, S. D., Gerlach, J. M., Wisell, D. L., & Welker, W. A. (1998). Would I like to read this book? Eighth graders' use of book cover clues to help choose recreational reading. *Literacy Research and Instruction*, 37(4), 263-280.
- Roesnita, I., & Zainab, A. N. (2013). The pattern of e-book use amongst undergraduates in Malaysia: A case of to know is to use. *Malaysian Journal of Library & Information Science*, 10(2), 1-23.
- Ross, C. S. (2000). Making choices: What readers say about choosing books to read for pleasure. *The Acquisitions Librarian*, 13(25), 5-21.
- Shneiderman, B., Feldman, D., Rose, A., & Grau, X. F. (2000). Visualizing digital library search results with categorical and hierarchical axes. In

- Proceedings of the fifth ACM conference on Digital libraries* (pp. 57-66). New York, NY: ACM.
- Trachtengerts, M., Erkimbaev, A., Zitserman, V., & Kobzev, G. (2015). Using a digital library instead of a traditional database: ABCD-based infrastructure for nanotechnology. *The Electronic Library*, 33(5), 916-927.
- Vanderschantz, N., Timpany, C., & Hinze, A. (2015). Design exploration of ebook interfaces for personal digital libraries on tablet devices. In *Proceedings of the 15th New Zealand Conference on Human-Computer Interaction* (pp. 21-30). New York, NY: ACM.
- Wang, L. (2012). *Exploring the performance of the neat appearance in web design*. Retrieved from <http://www.gwyoo.com/lunwen/shejilunwen/wzhshjlw/201103/422665.html>
- Wiederhold, G. (1995). Digital libraries, value, and productivity. *Communications of the ACM*, 38(4), 85-96.
- Witten, I., Bainbridge, D., & Nichols, D. (2009). *How to build a digital library*. Burlington, MA: Morgan Kaufmann.
- Wu, A., & Mitchell, A. M. (2010). Mass management of e-book catalog records: Approaches, challenges, and solutions. *Library Resources & Technical Services*, 54(3), 164.

Appendix

Material for Usability Study

This appendix contains all the relevant material for the Usability Study of the users reported in this paper.

- Ethical Approval Letter from the Human Research Ethics Committee of the Faculty of Computing and Mathematical Sciences at the University of Waikato, dated 29 November 2016;
- Participant Information Sheet and Consent Form (both in English and Chinese), which overview the learning objective and procedure, and the rights of participants;
- Research Interview Form (both in English and Chinese), which includes all the interview questions for participants;

Faculty of Computing and
Mathematical Sciences
Korohiko me ngā Pūtaiao Pāngarau
The University of Waikato
Private Bag 3105
Hamilton
New Zealand

Phone +64 7 838 4322
www.cms.waikato.ac.nz



29 November 2016

Chun Feng
C/- Department of Computer Science
THE UNIVERSITY OF WAIKATO

Dear Chun

Application for approval under the Ethical Conduct in Human Research and Related Activities Regulations

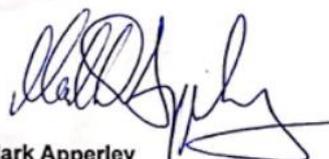
I have considered your application to conduct a research project involving human participants entitled "People's preferences for library searching interface design on a device" to be conducted on campus grounds at Universities of Waikato (Hamilton) and Shandong and Ocean (China).

The procedures described in your request are acceptable. I note that you state participants involved in the study will not be identified in any resulting publications. At the conclusion of the project the data will be submitted to the FCMS Data Archive repository for five years.

The Participant Information Sheet, Consent Form and Questionnaire comply with the requirements of the University's Human Research Ethics policies and procedures.

I therefore approve your application to perform the research project.

Yours sincerely



Mark Apperley
Human Research Ethics Committee
Faculty of Computing and Mathematical Sciences

Figure 47. Ethical Approval Letter

Participant Information Sheet



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

Ethics Committee, Faculty of Computing and Mathematical Sciences

Project Title
People's preferences for library searching interface design on a device

Purpose
This research is conducted as partial requirement for CGRD593. This research is about assessing people's display preferences for a library searching interface design on a device via a guided interview with an electronic display, a questionnaire paper, and a set array of questions.

What is this research project about?
This research is to investigate people's display preferences for a library searching interface design on a device. Through this research, information will be collected and analysed about people's preferred details of a book and how the books should be displayed in a library searching interface. The book's details may include the book's cover, spine, and descriptions as well as other parameters.

What will you have to do and how long will it take?
The study will be performed as a guided interview and an observed task using an electronic display on researcher's iPad / Tablet, and a questionnaire paper (that is, using an electronic display and an array of questions to guide the participants through the interview) on the University of Waikato (UoW), Shandong University, and Ocean University of China (OUC) grounds. This should take no longer than 20 minutes. Observations will be made of you using the electronic display. Information will be gathered from the interactions that you have with the electronic display and responses to the questionnaire. You will be shown six electronic interactive examples of variations of a library searching interface in a device. These interfaces will include variation in the level of detail and aspects of the book shown. You will be asked to rank these examples in order of preference regarding the level of detail displayed. The interviewer will then ask you questions in a guided interview to understand you and your choices.

What will happen to the information collected?
By signing the consent form you will be agreeing for us to use the analyzed data. The researchers plan to publish the results in working papers, academic conferences and journals. The results will be presented at talks at these conferences or during visits to other universities. The results of the research will be made available in summarized form to the University CGRD593 paper co-ordinator and a written report of the results will be handed in. All publication and presentation of the results will be done in anonymised form. If you wish to see the results, an email address will be requested.

Declaration to participants
If you take part in the study, you have the right to:

- Refuse to answer any particular question, and to withdraw from the study before analysis has commenced on the data.
- Ask any further questions about the study that occurs to you during your participation.
- Be given access to a summary of findings from the study when it is concluded.

Who's responsible?
If you have any questions or concerns about the project, either now or in the future, please feel free to contact either:

<p>Researchers: Chun Feng Email: 630933305@qq.com</p>	<p>Supervisors: Claire Timpany Phone: 838 4309 Email: ctimpany@waikato.ac.nz</p>
<p>Nicholas Vanderschantz Phone: 838 4656 Email: vtwoz@waikato.ac.nz</p>	

Figure 48. Participant Information Sheet (English)

参与者信息表



伦理委员会，计算机与数学科学学院

项目名称：
人们对图书馆搜索界面设计在设备上的偏好

项目目标：
本研究作为 CGRD593 课题的一部分要求进行。这项研究是通过使用电子设备展示和一组指向性问题的导向性交谈来评估人们对设备上的图书馆搜索界面设计的显示偏好。

研究内容：
这项研究是调查人们对设备上的图书馆搜索界面设计的显示偏好。通过这项研究，将收集和分析人们选择书时对书的相关详细信息的偏好以及书应如何在图书馆检索界面中显示的信息。书的详细信息可能包括书的封面，书脊和描述以及其他参数。

调查人员工作和所需时间：
该研究将使用导向性交谈和对使用电子设备在调查人员的 iPad/Tablet 上展示的示例的观察（即，使用电子设备展示和一组指向性问题的导向性交谈来引导参与者完成调查）在山东大学，怀卡托大学（UoW），中国海洋大学（OUC）的校园内进行。调查时间不会超过 20 分钟。观察将在参与者使用电子设备展示的示例时进行。信息将从参与者对电子设备展示的示例和对问卷的回答的交互中收集。参与者们将被展示六个电子设备上的图书馆搜索界面设计的显示交互示例。这些示例将包括书籍的细节信息和展示方式的变化。参与者将被要求按照关于所显示的细节水平的偏好顺序对这些示例进行排序。之后调查人员将在导向性交谈中询问参与者问题，以了解参与者做出的偏好和选择。

数据信息：
通过签署同意书，参与者将同意我们使用分析的数据。研究人员计划在工作文件，学术会议和期刊上发表结果。调查结果将在这些会议上的讲座上或在访问其他大学期间提到。研究结果将以摘要形式提供给 CGRD593 这门课程的合作人员，并将提交书面结果报告。所有出版和展示的结果将以匿名形式进行。如果参与者希望看到结果，可以留下电子邮件地址。

对参与者声明：
如果您参与了这项研究，您有权：

- 拒绝回答任何特定问题，并在数据分析开始之前退出研究。
- 询问您在参与期间发生的关于研究的任何的进一步的问题。
- 在研究结束后，可以获得研究结果的摘要。

负责人：
如果您对该项目有任何问题或疑问，请随时联系：

调查人员：

Chun Feng
Email: 630933305@qq.com

指导人员：

Claire Timpany Phone: 838 4309 Email: ctimpany@waikato.ac.nz	Nicholas Vanderschantz Phone: 838 4656 Email: vtwoz@waikato.ac.nz
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Figure 49. Participant Information Sheet (Chinese)

Research Consent Form

 THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

Ethics Committee, Faculty of Computing and Mathematical Sciences

People's preferences for library searching interface design on a device

Consent Form for Participants

I have read the **Participant Information Sheet** for this study and have had the details of the study explained to me. My questions about the study have been answered to my satisfaction, and I understand that I may ask further questions at any time. By signing the consent form I agree for my responses to be used in the dissemination analyzed data.

I also understand that I am free to withdraw from the study at any time, or to decline to answer any particular questions in the study. I understand I can withdraw any information I have provided up until the researcher has commenced analysis on my data. I agree to provide information to the researchers under the conditions of confidentiality set out on the **Participant Information Sheet**.

I agree to participate in this study under the conditions set out in the **Participant Information Sheet**.

Signed: _____

Name: _____

Date: _____

Email: (if you would like a copy of the results) _____

Researcher's Name and contact information:

Chun Feng
Email: 630933305@qq.com

Supervisor's Name and contact information:

Claire Timpany
Phone: 838 4309
Email: ctimpany@waikato.ac.nz

Nicholas Vanderschantz
Phone: 838 4656
Email: vtwoz@waikato.ac.nz

Figure 50. Participant Consent Form (English)



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waiāto

参与者同意书

伦理委员会，计算机与数学科学学院

人们对图书馆搜索界面设计在设备上的偏好

参与者同意书

我已经阅读了本研究的参与者信息表，并且调查人员对我解释清楚了研究的相关细节。我对这项研究的问题已得到了满意的回答，我了解我可以随时提出进一步的问题。通过签署同意书，我同意我的回答可以用来分析数据和传播。

我也明白我可以随时退出研究，或拒绝回答研究中的任何特定问题。我明白我可以在研究者开始分析我的数据之前撤回我提供的任何信息。我同意在**参与者信息表**中提供的保密条件下向研究人员提供信息。

我同意按照**参与者信息表**中列出的条件参与本研究。

签字: _____

姓名: _____

日期: _____

Email: (如果你希望得到一份结果副本) _____

调查人员联系信息:

Chun Feng
Email: 630933305@qq.com

指导人员联系信息:

Claire Timpany
Phone: 838 4309
Email: ctimpany@waikato.ac.nz

Nicholas Vanderschantz
Phone: 838 4656
Email: vtwoz@waikato.ac.nz

Figure 51. Participant Consent Form (Chinese)

11. Is the book description important to you in the library searching page? Why?

12. Is the book spine important to you in the library searching page? Why?

13. Are the related books important to you in the library searching page? Why?

14. Would you like to have more details of the book (author's name, publication date, book blurb) in the library searching page? Why?

15. Which example do you think is most useful to you for browsing for a book? Why?

16. Which example do you think is most useful to you for searching for a specific book? Why?

17. In which example did you find the level of information most useful for browsing? Why?

18. In which example did you find the level of information most useful for making a decision? Why?

19. In which example did you find the changes most intuitive when you clicked in the interface? Why?

Thank you for your patience and support!

Figure 53. Research Interview Form (English). Page 2



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

研究人员访谈问卷

伦理委员会，计算机与数学科学学院

项目名称:
人们对图书馆搜索界面设计在设备上的偏好

性别男/女 年龄

参与 ID: 学校

在调查中，我会问你一些相关的问题。
这些问题将帮助我们收集支持你将做出的偏好的有用的信息。

1. 你的学位/学科领域是什么？
2. 你更喜欢读什么语言的和你学科领域相关的文献资料？
3. 你在现实图书馆中浏览书籍的频率如何？

A. 几乎每天	B. 一周一次
C. 一个月一次	D. 从不
4. 你在现实图书馆中借出书籍的频率如何？

A. 几乎每天	B. 一周一次
C. 一个月一次	D. 从不
5. 你在数字设备上阅读过和你学科领域相关的文献资料吗？

A. 是	B. 否
------	------
6. 你在数字设备上搜索过和你学科领域相关的文献资料吗？

A. 是	B. 否
------	------
7. 你更倾向于选择哪种类型的电子阅读设备（可选择多项）？

A. IOS 平板电脑	B. 安卓平板电脑
C. IOS 手机	D. 安卓手机
E. 电脑	F. 其他: _____

Figure 54. Research Interview Form (Chinese). Page 1

