

An evaluation of the information architecture of the UCT Library web site

Susan H Mvungi¹

Department of Information & Library Studies, University of Cape Town
 haikaeli@gmail.com

Karin de Jager²

Department of Information & Library Studies, University of Cape Town

Peter G Underwood³

Department of Information & Library Studies, University of Cape Town

Keywords: Information architecture; usability testing; card sorting.

Received: 23rd August 2008

Accepted: 27th October 2008

Web users are becoming more critical of the web sites they use. This paper evaluates the information architecture of the academic library web site at the University of Cape Town with more of a focus on the usability testing of the University web site. Two approaches to evaluation were completed to evaluate the library web site. Firstly, a formal usability test was conducted with five users to establish the required site structure and to identify any possible problems with the usability of the site. Secondly, a closed card sort analysis with ten participants was completed in order to establish the required site structure and terminology for the potential web site re-design.

It was found that the library had a generally usable web site. The site however exhibited a few problems with the terminology used; the navigation design; and issues relating to identifying specific information. This study presents recommendations to handle the aforementioned problems. The study also encourages continual web site evaluation.

1. Introduction

A library's web site provides international access and for this reason, a library may be judged on the resources it can provide to online users in this highly competitive digital information environment. King and Jannik (2005:235) have concluded that, since the library is an international gateway to the library's resources, essentially 'the library's website is the library'. Studies also show that web users are very impatient when searching for information on web pages, and that most users will spend up to five to ten seconds trying to find information they need and the site has to make an impression on them within this time frame, before users turn to another site to satisfy their information need(s) (Crawford, 2005). In Nielsen's well known book, *Designing web usability* (2000a:11), he indicates that with the vast number of web resources, web users are becoming more judgmental of web sites, with more users abandoning sites with complex structures that affect their usability.

The information architecture (IA) of a web site plays a significant and influential role in determining the ease of use of a web site. The purpose of the web page of a library is to satisfy a range of needs of users for guidance about services and access to information. Therefore, assessing impact and ease of use is more than a marketing exercise.

1.1 The aims of the study

The main aim of this study was to demonstrate the importance of a well organized information architecture of an academic library web site. The study examined the information architecture of the University of Cape Town (UCT) Library's web site. The study therefore aimed to provide answers to the following research questions:

- Is there a need to change and improve the current architecture of the university library web site, which could require a complete or partial re-design of the web site?
- If so, what are the necessary changes that should be implemented?

In the process of answering these questions, opportunities arose to identify methods and techniques to improve the UCT Library web site and therefore potentially increase the total number of users that access the site and use it for academic purposes.

1. Susan H Mvungi, a researcher and scholar in the field of Information Studies, completed this research whilst a student at UCT

2. Karin de Jager, Associate Professor in the Dept of Information & Library Studies, UCT: Karin.DeJager@uct.ac.za.

3. Peter G Underwood, Professor in the Dept of Information & Library Studies, UCT: Peter.Underwood@uct.ac.za.

1.2 Research strategy

The information architecture of the library web site was assessed using two techniques:

- Usability testing, to evaluate the usability of the web site.
- A card sort analysis technique, to evaluate the grouping of similar content objects on the web site.

Using these techniques to evaluate the site, it was possible to determine the overall organization, navigation, labelling, searching and usability of the web site, and in the process, the information architecture of the library web site became clear.

2. Literature review

The history of information architecture and how it has evolved over the years shows tremendous growth in this study area. The term 'information architect' was first used in the year 1976 by Richard Saul Wurman who chaired the National Conference of the American Institute of Architects (AIA) (Farlex, 2007).

An information architect:

- Clarifies the *mission* and *vision* for the site, balancing the needs of its sponsoring organization and the needs of its audiences,
- Determines what *content* and *functionality* the site will contain,
- Specifies how users will find information in the site by defining its *organization*, *navigation*, *labeling* and *searching systems*,
- Maps out how the site will accommodate *change* and *growth* over time. (Rosenfeld & Morville, 1998:11)

Wurman also gave the very first definition of information architecture and he defined the role of an information architect, this definition has been modified over the years but has formed a strong basis for development (Barker, 2005; Farlex, 2007). The growth of the Internet highlighted the need for the development of information architecture and it caused an increase in the number of information architect professionals (Farlex, 2007).

2.1 Information architecture

Information architecture is a newly recognized 20th century study area with numerous definitions. Among the many different definitions one can identify several similarities, and these include: the need for a well structured 'information environment' design; standardized ways of 'organizing and labelling web sites, intranets, and online communities'; and a means of bringing together these design methodologies into practice in the World Wide Web (Levine, 2006).

The Information Architecture Institute (IA Institute) has defined the practice of information architecture as:

- The structural design of shared information environments.
- The art and science of organizing and labeling web sites, intranets, online communities and software to support usability and findability.
- An emerging community of practice focused on bringing principles of design and architecture to the digital landscape. (IA Institute, 2007)

Information architecture is essentially used as a 'structural design of the information space to facilitate intuitive access to content' (Garrett, 2000). Information architecture or IA 'is commonly understood to be the art and science of structuring, organizing, and labelling information so that content owners can better manage it and users can find what they're looking for more effectively' (Tony, 2004). It finds a balance or overlap between the relationships of user needs, content needs, and context needs (Rosenfeld, 2006).

The main steps in developing and maintaining an information architecture were condensed from different writings by Brinck, Gergle and Wood (2002:130-131); Fervoy (2001); Holmes (2002:190-199); and UniSA (2006), and are listed below:

- To determine through research, the main goals of the web site, strategies of achieving those goals, and its objectives.
- Determine the main audience of the web site.
- Determine the overall web site structure and navigation.
- Determine the intended web site content and group this content.
- Document and evaluate each step and product of the information architecture process.
- Implement the information architecture on the web site and launch the web site.
- Maintain the web site through continual testing and re-evaluation.

As discussed below, overall web site information architecture is determined by navigation systems, labelling systems, and searching systems present on the site.

2.2 Navigation systems

Navigation systems are designed to answer three questions: 'where am I?; where have I been?; and where can I go?' (Holmes, 2002:267; Nielsen, 2000a:188).

In addition to answering the above questions, a web site should also answer the following questions:

- What site is this? (Site ID),
- What page am I on? (Page name),
- What are the major sections of this site? (Sections),
- What are my options at this level? (Local navigation),
- Where am I in the scheme of things? (“You are here” indicators),
- How can I search? (Krug, 2000:87)

Navigation has strong links to web site content, and, in turn, it also affects the overall site usability (Holmes, 2002:264; Spool and others, 1999:10,12).

2.3 Labelling systems

Labelling systems are established after the design of the structural organization and navigation systems of the web site (Rosenfeld & Morville, 1998:72). Labelling systems are used to make terminology, vocabulary, and the style of presenting information content consistent within a web site (Brinck, Gergle & Wood, 2002:164). Labels are placed to separate the vast sections of information on a site, and these labels are based on pre-defined standards (Brinck, Gergle & Wood, 2002:164; Rosenfeld & Morville, 1998:72).

2.4 Searching systems

Searching systems are very important features to have on a web site. This is because more than half of web users on accessing a web site are inclined to start using the search feature before attempting to do anything else (Nielsen, 2000a:224). Searching systems are normally included within sites that are large, and have content that is bound to change rapidly over a short period of time, in order to support the user finding the information they need quickly (Rosenfeld & Morville, 1998:100-101). Analyzing the search logs from a site lets one know what information users seek, but have difficulty in finding (Nielsen, 2000a:237).

2.5 Web usability

Usability generally refers to how easily users can adapt themselves through learning in order to utilize a ‘web site; software application; mobile technology; or any user-operated device’ and whether or not they are content with the results and the whole experience (United States Department of Health and Human Services, [2007]). Usability is ‘...the degree to which people (users) can perform a set of required tasks’ (Brinck, Gergle & Wood, 2002:2). Therefore usability ‘...measures the quality of a user’s experience when interacting with a product or system...’ (United States Department of Health and Human Services, [2007]). Usability of a web site depends largely on both what the user wishes to achieve when using the web site, and also on what the organization attempted to achieve when creating the web site, showing a strong relationship between the purpose of the site and its usability (Spool and others, 1999:3-4). When a site is easy to use, then its usability is good (Spool and others, 1999:4). Krug (2000:11) stated that his ‘first law of usability’ was to create a web site that does not require users to have to expend any energy on cognitive thinking in order to understand and use the site.

The International Organization for Standardization (ISO) has an ISO 9241-11 international standard for usability that gives advice on how to evaluate usability, and how to evaluate user satisfaction in this regard (UsabilityNet, 2006). The ISO standard also provides the following definition of usability: ‘the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use’ (UsabilityNet, 2006).

2.5.1 Usability testing

Krug (2000:141) concludes that in order to establish a ‘great’ web site, usability tests have to be performed on the site at the prototype level, implementation level and for maintenance purposes. Therefore, usability testing is a significant step in both ‘pre-launch methods’ and ‘post-launch methods’ (Holmes, 2002:424). ‘Usability testing is a technique for ensuring that the intended users of a system can carry out the intended tasks efficiently, effectively and satisfactorily’ (Gaffney, 1999).

Usability testing/user testing is a usability evaluation technique involving users having to interact with the web site and tackle an agreed upon set of tasks within a certain time frame (Brinck, Gergle & Wood, 2002:406; Krug, 2000:141). This type of testing has a number of advantages. It is a relatively inexpensive means of obtaining user perspectives on ‘a Web site, a prototype of a site, or some sketches of individual pages’; since it involves the user, more user-defined problems are identified (Brinck, Gergle & Wood, 2002:406; Krug, 2000:141). User testing is an iterative process, because once an identified problem is fixed, its usability has to be tested again (Krug, 2000:143). Each repetition leads to greater understanding of the dynamics of the user interaction so it is, in itself, a useful learning process.

Holmes (2002:425) identifies three steps needed to perform a usability test: 'Plan the test; Conduct the test; and Interpret and implement the results of the test'. Holmes (2002:427) has identified what he refers to as 'the five W's' needed to plan a usability test. These are the 'who, what, where, when, and why'. The 'who' aspect refers to the three groups of people involved in the testing process. These groups are the 'test participants'; the 'test facilitator'; the 'test observers' (Holmes, 2002:428). The test participants refer to the users, and the main requirement of users is that they represent the target audience of the site that is being tested (Holmes, 2002:428; Krug, 2000:142). A decision regarding the number of participants has to be made. Nielsen (2000b) developed a model that showed that the ideal number of users that could best identify the most usability problems is five. This leads to greater consensus and also allows for the "triangulation" of the results, as a further check on veracity. The test facilitator assists with conducting the test (Holmes, 2002:426-430). The test observers watch the user throughout the testing process and make notes based on their observations (Holmes, 2002:430). The observers may be 'team members, people from marketing and business development, and any other stakeholders' (Krug, 2000:151).

The 'what' aspect refers to what factors the usability test will test (Holmes, 2002:434-435). These factors will then determine the scope of the test and the task (Brinck, Gergle & Wood, 2002:423). The set of tasks should be determined beforehand and posed to the user as a structured set of questions (Brinck, Gergle & Wood, 2002:427).

The 'where' aspect refers to the location of the actual usability test. The location may be a room with a desk and a computer with a network connection at one extreme, to a usability lab at the other (Brinck, Gergle & Wood, 2002:432; Holmes, 2002:431; Krug, 2000:150). Usually the usability testing budget plays a role in determining the location for the test (Holmes, 2002:431).

Usability labs, according to Holmes, may be specially designed and provide the following amenities:

- A pleasant facility in which the test participants can be comfortable
- Computer equipment necessary for displaying the Web site for the user
- Computer equipment for the test facilitator or observers to record their findings
- Viewing windows, most typically mirrored windows, through which observers can silently watch the test being conducted
- Recording devices such as a video recorder or Web cam to capture the test participants' reactions and speech and a scan converter to record the computer screen

Additional equipment in high-end facilities can include microphones, audio mixers, video editing facilities with a video mixer to place the video of the participant and the monitor side by side, and display monitors and speakers for reviewing the final video. (Holmes, 2002:431-432)

The 'when' aspect refers to the time in the web site design life cycle that the tests should be conducted. Holmes (2002:434) identifies the most important phases as being the 'design and development phases'.

The 'why' aspect aims to assess the reasons for conducting the usability test: that is, essentially what specific questions does one want answered by the test (Holmes, 2002:434).

After planning the usability test, the test is then conducted. When the test is conducted, the aforementioned primary participants should know what their individual roles are (Holmes, 2002:435). All equipment and materials should be in place and in good working condition (Brinck, Gergle & Wood, 2002:436; Holmes, 2002:436). After the test, the users should be asked for feedback, either through asking them for their opinions about the site, or by issuing a questionnaire (Holmes, 2002:438).

The results of the usability test have to be analyzed and interpreted. Thereafter the necessary changes are identified and then implemented. The new design is then tested again (Brinck, Gergle & Wood, 2002:439; Holmes, 2002:438-439). The main deliverable is a usable web site that fulfills user requirements.

There are a number of books in the literature that provide descriptions of the usability testing procedures and methods. Nielsen's book *Designing Web Usability* (2000a), along with his web site known as *Useit.com: Usable Information Technology* (<http://www.useit.com>, 2002) provide numerous usability guidelines. More information on the actual methodology of a usability test is given by Hom on his web site known as *The usability methods toolbox*, (1998). The results of the usability testing of nine well-known web sites are given in the book by Spool and others (1999) titled *Web site usability: a designer's guide*. Instone's web site, *The Usable Web* is another useful web usability resource (2006). Usability testing materials are available for download from the United States Department of Health and Human Services - *Usability.gov* (2007) web site, and Gaffney's *Information and Design (ID)* (2001) web site. Web sites by DialogDesign (2005) and by the Society for Technical Communication Usability Special Interest Group (STCSIG) ([2007]) provide samples of their own usability test reports.

3. Research method

Two methods were undertaken in order to fulfil the desired aims which will be discussed below. Firstly, a formal usability test with five participants was used to evaluate the overall information architecture of the web site.

Secondly, a closed card sort technique with ten participants using OptimalSort software with virtual web-based cards was used to evaluate the terminology used on the web site. Card sorting is a technique that involves users having to sort cards into categories (Hom, 1998). It is a technique used by information professionals to determine the site structure (Maurer & Warfel, 2004). 'Card sorting generates an overall structure for your information, as well as suggestions for navigations, menus, and possible taxonomies' (Maurer & Warfel, 2004). There are two types of card sorting techniques, namely, open and closed card sorting. With an open card sort, users have to place cards into categories that they are required to define and name, and it is a technique used to establish categories when creating a new web site (Maurer & Warfel, 2004; OptimalSort, 2007). A closed card sort involves users having to place cards into categories that were predetermined by the testers, this is a technique used in the redesign of an already existing web site (Maurer & Warfel, 2004; OptimalSort, 2007). In this case virtual web-based cards were used instead of physical cards.

The anonymous participants had to place cards in the UCT Categories in the way that makes the most sense to them.

The Categories currently on the main navigation bar on the UCT Library web site are as follows:

- UCT Categories:
- Home
- Library Hours
- Catalogue (ALEPH)
- Electronic Resources
- Journals
- New Acquisitions
- About Us
- Help

The participants had to sort 24 virtual web-based cards (created for the purposes of the study, and were representative of the functions that participants would expect to be performed under the relevant UCT categories) that were located on the left hand side margin into fixed categories on the right hand side (the eight aforementioned UCT categories). A web-based card sorting tool known as OptimalSort designed by Optimal Usability was used to design the closed sort and to distribute the card sort to ten selected participants via electronic mail. The link for the survey was available at <http://susanmvungi.optimalsort.com/uct-project/> until the 31st of December 2007.

The main focus for this paper will be on the usability testing that was conducted on the web site.

3.1 Evaluating usability

In order to evaluate the usability of the library web site, a formal usability test was conducted with five users. The literature teaches that using such a small number of users is adequate, as most usability problems can be observed through testing the first five users and after that very little new may be learnt (Brinck, Gergle & Wood, 2002:140; Krug, 2000:146; Nielsen, 2000b). These results are observed provided the web site has one type of use and the user group shares similar characteristics in respect of that use (Nielsen, 2000b). Self (2007) agreed that usability testing '...can show you where there are questions, problems with the terminology' with regard to the web site, and that the periodic testing of 4 to 5 users is sufficient. The participants were randomly selected and they consisted of two postgraduate students and three undergraduate students, forming a user group with similar characteristics. The participants were informed that they would remain completely anonymous in all reporting of the results and hence their identities would remain confidential.

3.1.1 Test participants profiles

Table 1 Test participants profiles

Participant #	Type	Department	Level of site use in past month
1	Postgraduate Honours	Sociology	Once or twice a week
2	Undergraduate First Year	Science	On a daily basis
3	Undergraduate Third Year	Humanities	Hardly
4	Postgraduate Masters	Mechanical Engineering	Three times in the past month and only when needs a book(s)
5	Undergraduate Fourth Year	Molecular and Cell Biology	Does not use

3.1.2 Method

The usability test consisted of ten task questions, which the participants were asked to perform using the library web site. An examination of the literature discussing the number of tasks/questions posed in a usability study has shown that a usability test usually consists of between 10 and 15 tasks/questions, and these questions should be able to be completed within an hour of testing (Battleson, Booth & Weintrop, 2001:191; Tolliver and others, 2005; U.Va., 2003b; VandeCreek, 2005). The tasks/questions in a typical test should model the desired activities for which a user should use the library web site (Tolliver and others, 2005).

The tasks/questions were based on, and adapted from usability studies carried out at the following libraries:

- The University at Buffalo Libraries (Battleson, Booth & Weintrop, 2001).
- The University of the Pacific Library (UOP) (Krueger, Ray & Knight, 2004).
- The University of Washington Libraries (UW) (UW, 2004).
- The University of Virginia Library (U.Va., 2003a).

3.1.3 Format

In order to ensure consistency, every participant was given the same instructions before the test was conducted. The instructions were according to the testing script. The testing script was adapted from Gaffney's Information & Design (ID) web site (2001). The script provided details such as the reasons for conducting the usability test, the duration of the test, the testing procedure and expectations from the participant. The script emphasized the most important fact that the web site was being tested and not the participants' abilities. The script aimed to make the participants feel as comfortable as possible throughout the entire testing process.

On completing the usability test, each participant was then asked to complete a post-test questionnaire that would express their opinions of the library web site and the usability test as a whole. The questionnaire was used to rate the participants satisfaction with the web site. The questionnaire was designed using a Likert scale ranging from 1 to 7, in which 1 was regarded as unsatisfactory, 2 as very poor, 3 as poor, 4 as adequate, 5 as good, 6 as very good, and 7 as excellent. The questionnaire consisted of 16 questions. The questionnaire was adapted from Holmes (2002:445) and Spool and others (1999:151).

3.1.4 Data collection

The usability test was scheduled for approximately one hour. The tests were conducted in a room that was used as a usability lab located in the library's Knowledge Commons facility. As participants were given the tasks one-by-one, notes were taken down to make a record of their responses and the steps they took on trying to solve the tasks. General additional comments that they made were also recorded.

The participants were asked to use the 'think-aloud' protocol that involves them having to say out loud what they were thinking when performing the tasks. This protocol would give answers that would explain the participants thought processes and reasons for making the decisions that they made to complete the tasks. The comments of participants help the observer make better deductions about what the participants were thinking and hence the observer would make fewer 'false conclusions' (Raphael & Brower, 2001).

All tasks were timed. A task was noted as successful if the participant found the correct answer within a five-minute time frame. A task was noted as unsuccessful if either: a) Time ran out; b) The participant gave an incorrect answer; or c) The participant could not find the answer and abandoned the task.

The functions of the Scribe, Facilitator, and Observer were combined into one single role. The usability test not only determines the usability of the web site, but also demonstrates how easy it is to navigate the site and to perform searches when using the site. It also determines whether the terminology/labelling systems used on the site are what the users expect.

4. Results and analysis

Conducting a formal usability test with five participants was completed in order to evaluate the usability of the university library web site. These participants were representative of the targeted student population intended to use the library web site, forming a homogenous group for this purpose. All of the participants had attended a library orientation programme prior to the testing and were confident computer users, hence their digital literacy levels did not factor into determining the usability of the web site. The participants were given tasks to answer that modelled the normal activities that one would interact with the site to accomplish. There are numerous functions of a usability test. In addition to determining the usability of a site, the test may also be used to suggest a new site structure; better terminology; and new ways of improving the site.

4.1 Findings

All findings from the test have been labelled using the following codes in the discussion that follows:

DO NOT CHANGE (Solved task): Participants could complete the task easily and therefore there is no need to make any alterations.

LOW (Solved task with minor obstacles): Participants experienced minor problems when trying to solve the task.

MEDIUM (Solved task with major obstacles): Participants experienced major problems when trying to solve the task.

HIGH (Abandoned task, Incorrect answer): Participants were frustrated and confused when trying to solve the task resulting in them either abandoning the task or unable to give the desired response/results.

IMP (Improvements): Participants and/or the test observer identified a possible improvement for the web site.

The table below shows a summary of the usability test tasks with participants:

Table 2 Summary of task results

Task	Participant #1	Participant #2	Participant #3	Participant #4	Participant #5
1	Solved task	Solved task	Solved task	Solved task	Solved task
2	Solved task with minor obstacles	Incorrect answer	Solved task	Solved task	Incorrect answer
3	Solved task	Solved task	Solved task with minor obstacles	Solved task	Solved task
4	Solved task	Solved task	Solved task	Solved task	Solved task
5	Solved task	Abandoned task	Solved task	Abandoned task	Solved task
6	Solved task with major obstacles	Abandoned task	Abandoned task	Solved task with minor obstacles	Solved task
7	Solved task	Abandoned task	Solved task	Solved task	Abandoned task
8	Solved task	Abandoned task	Solved task	Solved task	Solved task with minor obstacles
9	Solved task	Solved task	Solved task	Solved task	Solved task
10	Abandoned task	Abandoned task	Incorrect answer	Solved task	Solved task

Key:

Task 1: Does any one of the university libraries own the book *The cold war*?

Task 2: Does the UCT Library subscribe to the journal *International journal of information management*?

Task 3: Where would you find the *Rapport* online newspaper via the library web site?

Task 4: How would you access the online database SwetsWise?

Task 5: How would you search the library online databases if you are accessing the web site out of the university campus?

Task 6: You need to find the book *The elements of user experience: user-centered design for the web* by Jesse James Garrett, but UCT Libraries does not own a copy. Does the University of Stellenbosch own a copy?

Task 7: What are the fines per day for late return for all books?

Task 8: Where in the library are printing and scanning facilities located?

Task 9: How would you find the description of the physical location of each one of the UCT Libraries?

Task 10: Does the libraries' web site provide help on using its online catalogue (ALEPH)?

Searching

Catalogue searching (Task one)

All participants were able to perform a catalogue search using the library web site online catalogue, ALEPH (ALEPH 500 version). Three out of five of the test participants did not go directly to the main navigation bar to select the menu titled "ALEPH" which would have been the most direct way to access the catalogue. Instead they went straight to the links located on the right hand side of the main page titled "SEARCH for BOOKS or JOURNALS", perhaps because this link used terms that were familiar to the user and suggested to the user what could be performed when accessing that page. The term "catalogue" is not easily understood by all.

Users did not also realise that their search results could be limited by setting the “Field to search” field in the basic search in the online catalogue. Four out of five participants left the “Field to search” field as the default “All fields” instead of limiting it to “Title” when performing a title search for a book.

DO NOT CHANGE: All participants could perform a title search for a book.

IMP: Provide roll-over text that explains what “Catalogue (ALEPH)” means when the mouse cursor is placed over the menu on the main navigation bar.

Journal searching (Task two)

Participants were confused over the difference between electronic journals and print journals. Participants expected to see a field titled “Journals” under the “Fields to search” options in the ALEPH basic search.

LOW: Participants had difficulties finding journal titles.

IMP: Provide a field titled “Journals” as one of the options under the “Field to search” for journal searches in ALEPH.

Recommendation: Make it clear in the ALEPH basic search that the “Field to search” field named “Title” refers to both book and journal title searches.

Online newspaper searching (Task three)

None of the participants had used the web site to perform an online newspaper search, but they were able to complete the task easily, with only one user experiencing minor setbacks. On accessing the online newspapers page, participants were frustrated when there was no search feature, such as an alphabetical list of the newspapers or a search box at the top of the page. Participants then had to scan the entire page looking for the named newspaper.

DO NOT CHANGE: All participants could perform an online newspaper search.

IMP: Provide an easier way to find available online newspapers, instead of having users scan the entire page for what they want.

Recommendation: Provide a search box at the top of the page for online newspaper and news sites searches.

Online database searching (Task four)

Participants were not familiar with the term “Databases by platform” and none of them used the link. Instead they settled with the link titled “Databases” to perform an online database search. Both links were available on the same drop down menu labelled “Electronic Resources”.

DO NOT CHANGE: All participants could perform an online database search.

Recommendation: Possible change of the phrase “Databases by platform” then do further usability testing to see if it improves this aspect of site use.

Off-campus access to resources (Task five)

UCT uses EZProxy as its protocol for off-campus use. One participant did not understand the meaning of “off-campus access”. This participant thought that the web site only provided these links when one accesses the web site off-campus. Two out of five participants abandoned the task.

LOW: One participant had difficulties understanding the meaning of off-campus access.

LOW: Some participants could not locate the EZProxy off-campus links.

Recommendation: Consider changing the link to something meaningful to users and that also explains what the link is for, then do further usability testing to see if it helps to improve the web site. Consider “Access from home” as a possible link title instead.

Location of SFX links to CALICO institutions (Task six)

UCT uses SFX as its protocol for access to other university library resources, with links that allow users to access and perform searches on their catalogues. Most participants had trouble finding these SFX links. Only one participant managed to use the links successfully without any problems.

HIGH: Participants could not locate SFX links to CALICO institutions.

IMP: One participant suggested that the main library page should have a readily available list of the other CALICO institutions links that provide access to the various institutional catalogues.

Recommendation: Provide instructional help on how to search other institutional resources, and possible renaming of SFX links to “CALICO institutions catalogue”. Also include a visible list of links to the CALICO institutions catalogues on the main library page.

Location of library fines (Task seven)

Two out of five participants abandoned the task even though they knew the answer. The site does not explicitly state the amount that the students will be fined, but the task was labelled as successful if the participants managed to reach the library "Penalties" area.

HIGH: Users were looking for the exact amount that the library charges per day for overdue books but they were unable to find it.

Recommendation: State the exact amount charged for overdue books.

Location of library equipment (Task eight)

Most participants (4/5) could locate the library equipment locations.

DO NOT CHANGE: Participants could easily locate the library equipment location through the links on the main navigation bar.

Location of branch libraries (Task nine)

All participants could easily locate the branch libraries and obtain information regarding their physical address location and other contact details.

DO NOT CHANGE: The links available on the main page to the other branch libraries is sufficient.

DO NOT CHANGE: The contact details and building location information of the branch libraries is adequate.

Location of the online catalogue (ALEPH) tutorial (Task ten)

Most participants could not locate the tutorial.

IMP: A participant clicked on the Help link on the ALEPH search page and suggested that this should provide all the help on using ALEPH. But the participant did not know that there was a tutorial that had more information regarding using ALEPH.

Recommendation: Provide access to the ALEPH tutorial in the Help link on the ALEPH main search page and not just on the main library home page. Also make the link more prominent.

The table below provides a summary of successful versus unsuccessful test tasks:

Table 3 Successful vs unsuccessful test tasks

Task	Successful tasks	Unsuccessful tasks
1 Catalogue searching	(5/5) 100%	(0/5) 0%
2 Journal searching	(3/5) 60%	(2/5) 40%
3 Online newspaper searching	(5/5) 100%	(0/5) 0%
4 Online database searching	(5/5) 100%	(0/5) 0%
5 Off-campus access to resources	(3/5) 60%	(2/5) 40%
6 Location of SFX links to CALICO institutions	(3/5) 60%	(2/5) 40%
7 Location of library fines	(3/5) 60%	(2/5) 40%
8 Location of library equipment	(4/5) 80%	(1/5) 20%
9 Location of branch libraries	(5/5) 100%	(0/5) 0%
10 Location of the online catalogue (ALEPH) tutorial	(2/5) 40%	(3/5) 60%

The usability testing revealed that the majority of the participants could easily solve tasks using the library web site. Tasks were completed quickly by participants.

4.2 Post-test questionnaire results

The post-test questionnaire asked participants to rate their satisfaction with the university library web site according to a seven-point satisfaction scale.

The questionnaire required participants to rate the web site using the following criteria:

- Ease of finding specific information.
- Ease of reading data.
- Ease of concentrating on the data search (distractions).
- Logic of navigation.

- Ease of search.
- Appearance of site.
- Quality of graphics.
- Relevance of graphics to site subject.
- Speed of data display.
- Timeliness of data (is it current?).
- Quality of language.
- Fun to use.
- Explanations of how to use site.
- Overall ease of use.
- Completeness with which the site's subject is treated.
- Your overall productivity with the site.

The post-test questionnaire results showed that the UCT Library web site received an overall mean satisfaction rating of 5.45 (Between good and very good), on a Likert scale of 1 to 7, with 1 regarded as unsatisfactory and 7 regarded as excellent.

The chart below depicts the mean questionnaire rating per question.

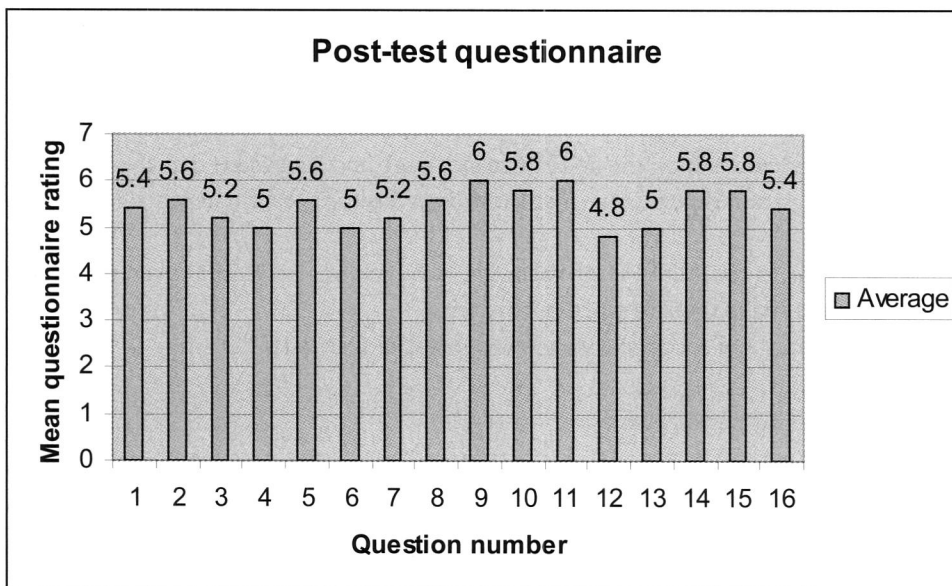


Figure 1 Post-test questionnaire results

As shown in the chart above, half the questionnaires questions 1, 3, 4, 6, 7, 12, 13 and 16 received a satisfaction rating less than the overall mean satisfaction rating of 5.45. These questions dealt with the satisfaction of participants with some of the most important aspects of the web site, such as the ease of finding specific information, the logic of navigation, and their overall productivity with the site.

Recommendation: In order to improve participant satisfaction with the web site the above mentioned issues with navigation and viewing of content should be rectified. This may be done by providing more visible help features on the site and at the same time making the user aware of their current position within the web site using more navigation elements.

Implementing ways in which to improve the aforementioned aspects of the web site is paramount. This may have a positive effect on user satisfaction with the UCT Library web site.

5. Conclusion

The most important recommendations from the study were:

From the formal usability test:

Provide roll-over text that explains what the categories used on the web site mean when the mouse cursor is placed over the menu on the main navigation bar.

To improve problems associated with journal searches, make it clear in the ALEPH basic search that the "Field to search" field named "Title" refers to both book and journal title searches.

Provide a search box to aid the searching of online newspapers from the online newspaper and news sites web page. Consider changing the phrase “Databases by platform” to simply “Online Databases” because users are unsure of its intended meaning. Further usability testing can be done to see if this eliminates the problem observed and improves the site or not.

Consider changing the “EZProxy” off-campus links to a term that is more meaningful to users and that also explains what the link is for, such as “Access from home”. Then do further usability testing to see if it helps to improve the web site.

Consider renaming of the SFX links to “CALICO institutions catalogue” and making the CALICO institutions catalogues accessible via links from the library web site home page.

Make the ALEPH tutorial readily accessible.

The post-test questionnaire outlined the areas of the web site that still require attention. The main recommendations from the questionnaire were to consider improving the visibility of the help features on the site and to also provide more navigational aids/elements.

From the Closed Card Sort Analysis:

The card sort restated the same terms as those identified in the formal usability test that needed renaming. This adjusting is necessary to suit the needs of the users. Most of the other terms were easily understood by users.

Provide roll-over text to aid users in deciding whether the web page is relevant to their information need before clicking on it.

The aforementioned adjustments have been suggested by this study to improve the information architecture of the site. Web librarians should be made more aware of the advantages of testing the information architecture. A culture of testing should be instilled in academic institutions. More academic institutions should make their evaluation results more readily available to all. Usability testing in South Africa is a new concept and more research in this area is needed.

References

- Barker, I. 2005. *What is information architecture?*. [Online]. Available: http://www.steptwo.com.au/papers/kmc_whatisinfoarch/index.html [2008, June 20].
- Battleson, B., Booth, A. & Weintrop, J. 2001. Usability testing of an academic library web site: a case study. *Journal of academic librarianship*, 27(3):188-198.
- Brinck, T., Gergle, D. & Wood, S.D. 2002. *Usability for the web: designing web sites that work*. San Francisco: Morgan Kaufmann.
- Crawford, W. 2005. Contemplation and content: getting under their skins. *EContent*. 28(3):43. [Electronic]. Available from EBSCOHost: Academic Search Premier at <http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=16541014&site=ehost-live> [2008, June 20].
- DialogDesign. 2005. *Usability test reports*. [Online]. Available: <http://www.dialogdesign.dk/utestreports.html> [2008, June 20].
- Farlex. 2007. *Information architecture*. [Online]. Available: <http://encyclopedia.thefreedictionary.com/information+architecture> [2008, June 20].
- Fervoy, P. 2001. *Information architecture planning processes*. [Online]. Available: <http://www.sdcn.org/webworks/ia/planning.htm> [2008, June 20].
- Gaffney, G. 1999. What is usability testing?. *Information & design*. [Online]. Available: <http://www.infodesign.com.au/ftp/UsabilityTesting.pdf> [2008, June 20].
- Gaffney, G. 2001. Usability testing materials. *Information & design*. [Online]. Available: <http://www.infodesign.com.au> [2008, June 20].
- Garrett, J.J. 2000. *The elements of user experience: user-centered design for the web*. [Online]. Available: <http://www.jjg.net/elements/pdf/elements.pdf> [2008, June 20].
- Holmes, M. 2002. *Web usability & navigation: a beginner's guide*. New York: McGraw-Hill/Osborne.
- Hom, J. 1998. *The usability methods toolbox*. [Online]. Available: <http://jthom.best.vwh.net/usability/> [2008, June 20].
- [IA Institute] Information Architecture Institute. 2007. *Defining information architecture*. [Online]. Available: http://ia institute.org/pg/about_us.php [2008, June 20].
- Instone, K. 2006. *Usable web*. [Online]. Available: <http://usableweb.com> [2008, June 20].
- King, H.J. & Jannik, C.M. 2005. Redesigning for usability: information architecture and usability testing for Georgia tech library's website. *OCLC systems and services*. 21(3): 235-243. [Online]. Available: <http://www.emeraldinsight.com> [2008, June 20].
- Krueger, J., Ray, R.L. & Knight, L. 2004. Applying web usability techniques to assess student awareness of library web resources. *Journal of academic librarianship*, 30(4):285-293.
- Krug, S. 2000. *Don't make me think!: a common sense approach to web usability*. Indianapolis, Indiana USA: New Riders.
- Levine, E. 2006. Information architecture: building our practice. *Information today*. 23(10). [Electronic]. Available from EBSCOHost: Academic Search Premier at <http://www.lib.uct.ac.za/datahosts.htm> [2008, June 20].
- Maurer, D. & Warfel, T. 2004. Card sorting: a definitive guide. *Boxes and arrows*. [Online]. Available: http://www.boxesandarrows.com/view/card_sorting_a_definitive_guide [2008, June 20].
- Nielsen, J. 2000a. *Designing web usability: the practice of simplicity*. Indianapolis, Indiana USA: New Riders.
- Nielsen, J. 2000b. *Why you only need to test with 5 users*. [Online]. Available: <http://www.useit.com/alertbox/20000319.html> [2008, June 20].
- OptimalSort. 2007. *What is it?: overview and a demo*. [Online]. Available: <http://www.optimalsort.com> [2008, June 20].

- Raphael, A. & Brower, G. 2001. Usability testing: think-aloud protocol – getting your users to talk while they work. *User-centered information design workbook*. [Online]. Available: <http://www.washington.edu/webguides/workbook/thinkaloud.doc> [2008, June 20].
- Rosenfeld, L. 2006. Introduction: IA in one slide. *Enterprise Information Architecture Seminar*. Fall 2006, Chicago, Illinois. Slide 5 of 266. [Online]. Available: <http://louisrosenfeld.com/presentations/0606-RosenfeldEIA.ppt> [2008, June 20].
- Rosenfeld, L. & Morville, P. 1998. *Information architecture for the World Wide Web*. Beijing: O'Reilly & Associates.
- Self, J.R. 2007. Usability testing. [Personal interview, 10 August]. Cape Town. (Unpublished).
- Spool, J.M. and others. 1999. *Web site usability: a designer's guide*. San Francisco, California: Morgan Kaufmann.
- [STCSIG] Society for Technical Communication Usability Special Interest Group. [2007]. *Usability toolkit*. [Online]. Available: <http://www.stcsig.org/usability/resources/toolkit/toolkit.html> [2008, June 20].
- Tolliver, R.L. and others. 2005. Website redesign and testing with a usability consultant: lessons learned. *OCLC systems & services*. 21(3):156-166. [Electronic]. Available from Emerald at <http://www.lib.uct.ac.za/datahosts.htm> [2008, June 20].
- Tony, B. 2004. Enterprise information architecture. *EContent*. 27(5). [Electronic]. Available from EBSCOHost: Academic Search Premier at <http://www.lib.uct.ac.za/datahosts.htm> [2008, June 20].
- [UniSA] University of South Australia. 2006. *Developing your site's information architecture*. [Online]. Available: <http://www.unisa.edu.au/wag/design/developia.asp> [2008, June 20].
- United States Department of Health and Human Services. [2007]. *Usability basics*. [Online]. Available: <http://www.usability.gov/basics/index.html> [2008, June 20].
- UsabilityNet. 2006. ISO 9241-11: guidance on usability (1998). [Online]. Available: http://www.usabilitynet.org/tools/r_international.htm#9241-11 [2008, June 20].
- [U.Va.] University of Virginia Library. 2003a. *Test questions for the library web site*. [Online]. Available: <http://www.lib.virginia.edu/usability/tests/lib.html> [2008, June 20].
- [U.Va.] University of Virginia Library. 2003b. *Usability test procedures for the U.Va. library*. [Online]. Available: http://www.lib.virginia.edu/usability/testing_procedures.htm [2008, June 20].
- [UW] University of Washington Libraries. 2004. *UW libraries usability testing report: new design fall 2004*. [Online]. Available: <http://www.lib.washington.edu/usability/newDesign04/Fall2004FinalReport.pdf> [2008, June 20].
- VandeCreek, L.M. 2005. Usability analysis of Northern Illinois university libraries' website: a case study. *OCLC systems & services*. 21(3):181-192. [Electronic]. Available from Emerald at <http://www.lib.uct.ac.za/datahosts.htm> [2008, June 20].