‘An Analysis of the Information Architecture of New Zealand Tertiary Library Websites’

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Abstract

Library websites are becoming more and more important as so much of a library's content is accessed through its website. It is important that this is usable for the site's users and that the information contained in the site is findable. In order for this to happen the site must have a good information architecture.

This study was done firstly as a literature analysis to determine what is currently considered to be best practice in information architecture for library websites. This was then formed into a checklist of best practice criteria and was used to analyse a sample of New Zealand's tertiary library websites to determine what areas that these sites were doing well with their information architecture and what areas may need improvement. The study found that in many areas the sites matched well with the criteria such as having effective site navigation systems and using clear label terms. There were also areas that needed improvement such as the prominence of the library branding and search tools needing to be more user-friendly.

This study provides a good picture of the current state of New Zealand tertiary library sites information architecture that could be used when updating these sites and it also provides a good checklist that can be used in the analysis of other library sites. Future research could extend this project by analysing sites more thoroughly and it could also do a more specific analysis by looking at what a certain library's users want and need in the information architecture of their library site.

Keywords: Information architecture, tertiary library websites, website usability, website analysis.

Introduction

In our world today there are huge volumes of information being accessed online and it is essential for any organisation to have a good online presence for its users. This is especially important for libraries because their websites are the portals through which more and more of their information is being accessed. This information comes in the form of the library catalogue, online resources, and information about the library. If users have a bad experience on a library's website it can be just as harmful as a bad experience inside the physical library, except that the library may never know about it and will not be able to improve their services. Because there is usually no one to respond to the disgruntled online user it is important that research is done to allow libraries to see where they could improve the user experience of their websites. There are several elements that make up a website, the look and feel, the content and the information architecture. It is important that each of these elements provides the user with a positive experience. This will be good for the user as it will mean that their visit granted them some level of success, and it will also give them a favourable impression of the library which will encourage them to continue using the library's services.

The goal of this research is to look at the element of information architecture (IA) and determine what "good" IA for library websites looks like. "Good" IA is defined by what is considered to be best practice according to the recommendations compiled from current research and literature. This was applied to the tertiary library websites in New Zealand in order to analyse how their IAs compared with this best practice criteria, what they have done well according to the criteria and any areas for improvement.

Literature review

Importance of usable websites

In a world of information overload coupled with fast paced technological change it is important for organisations to put effort into keeping technology, such as their website, as useful to users as they can, or they will risk being bypassed for something more usable. Information on the internet is getting more complicated and when websites are managed poorly they frustrate users with difficult to use sites and information that is hard to find (Haller, 2011). The story is no different for library websites. More and more library services are being offered online but they face strong competition with search engines like Google (Ding, & Lin, 2010, p. 55). From a 2010 survey on user perceptions of libraries, it seems the library may not be winning the competition, with search engines seen as faster, easier to use and more convenient than libraries (OCLC, 2010). Constant change has become

common in web design (Burford, 2011) and those who cannot keep up will be left behind. Libraries need to make keeping their websites current a priority, ensuring that their websites remain usable and useful for their users.

Usability

The term usability is a popular term used today to infer the quality of something. In the words of Eric Reiss, "usability deals with an individual's ability to accomplish specific tasks or achieve broader goals while 'using' whatever it is you are investigating, improving, or designing" (2012, p. xviii). Usability can refer to how effectively a person can use almost anything but it is certainly being used as a way of measuring the quality of website design. In the past if someone complained that a website was difficult to use, the designer's reaction would often be that the user needed to learn how the website worked; this is no longer considered a good response. Today, if the same complaint was made, the experts would say "don't blame the user for the website's problems" (Riley-Huff, 2012, p. 30). It is now all about the user. Researchers in this area recommend that websites should be organised according to user tasks (Born, 2007, p. 9), and designed from the user's perspective (Fitchett, 2006, p. 16). An important part of determining the quality of a website is the perception of the user (Born, 2007). According to research, websites from the user's perspective should be simple (Howie, 2013), accessible (Le, 2006), convenient (Born, 2007), and intuitive (Gullikson et al., 1999). This is what users want and expect of modern websites. There are many things that can help to make a website useable, an attractive look and feel, or well written content. One other very important usability element is related to the websites structure, this is its information architecture (IA).

History of IA

The term IA, though becoming more acknowledged today than when it first appeared, has been around for some time. It is believed to be coined, in its use in designing information, by Richard Saul Wurman. Wurman believed that there was a "tsunami of data" coming towards the world that would be disastrous if not managed well (1997, p. 15); however, if information structures were built well then it would be possible for people to actually understand this mass of data, he called this structure IA. Another important contribution to the growth of IA has come from Peter Morville and Louis Rosenfeld with their book, *Information Architecture for the World Wide Web*, which was first published in 1998 and is now in its 3rd edition published in 2007. Their approach is one that is widely acknowledged in many areas as pioneering the structured approach to IA (Burford, 2011). Another influential writer in this area is Steve Krug, though he writes more generally about usability, much of what he says falls into the IA website element. In 2000 Krug published a book called, *Don't Make Me Think: A common sense approach to web usability*. The main point he

makes in his book is that designers need to make things clear to users on a website, instead of causing them to ask a lot of question to find what they need. More recent writings in this field include Reiss (2012), Resmini & Rosati (2011), and Ding & Lin (2010) who have carried on discussing the ideas of IA in a modern context. Surprisingly these ideas have changed very little. Technology has become faster, and more complex but users still want simple, convenient, accessible and intuitively designed sites, and these are essentially the same expectation they had over a decade ago.

Why focus on the user?

It could be argued that there is too much emphasis being placed on the user and that it is not worth the effort it requires to keep a website's IA relevant to the user. However it is important to understand that most websites, whether they are e-commerce sites, library sites, or another kind of site, are not for the use of the organisation or the designers, they are for the users. If organisations want their users to keep using their services they will give them a good experience on their website. If users are satisfied with their experience this will encourage them to return (Born, 2007; Gullikson et al., 1999), which is of course good for the organisation. IA is specifically important to an organisation's site because if a site is structured logically it will give the user more confidence in their ability to use and get information from the site (Born, 2007).

Trust is another important issue that can be affected by IA. If the organisation appears to have the same values as the user, such as a tertiary website communicating its priority to help students with their studies, the user is more likely to trust the organisation (Born, 2007). Alternatively, if the site uses jargon that the user cannot understand, this communicates that the values of the organisation are focused internally and not on the user. This will not induce trust in the organisation but will only frustrate the user (Fitchett, 2006). For an organisation to keep the loyalty of their online users by giving them a good experience, the user must be the focus of the IA design.

Sites not designed for users

Though we can see that ideally IA should be designed according to how the user can best retrieve the information they need from an organisation, this is not always how sites are designed. Websites are often designed with the organisation's staff in mind or sometimes even on the opinions of the staff members with the most influence (Burford, 2011, p. 30). Websites can, and naturally should, to some extent, be affected by the website content (Burford, 2011) but this can also be influenced by the personalities inside the organisation. Websites can also be affected, often negatively, by the amount of resources allocated to their development (Connell, 2008). These things negatively contribute to IA design and unfortunately mean that there are many websites that need much improvement to their IA.

Good IA is important for library websites

Libraries are organisations with a lot of information to offer. It would be hoped that, with information experts managing them, library websites would have exemplary IA, unfortunately this is not always the case. There have been some case studies done that examine library websites' IA. They have found that the users became lost in the structure of the site (Gullikson et al., 1999) and, if given the option, users would have used different terms than those the library used (Hulseberg & Monson, 2011). These sorts of responses indicate that some library websites are not being created for users.

As a result of the lack of usability, users may become frustrated because the site uses terms that do not mean anything to them or the information is not organised in a way that helps them to find what they want. This would cause them to develop a negative view of the library site as well as the library itself. A good IA will encourage use of the library website, showing users they are important by using the terms they would use and organising pages in a way that makes sense to them, giving them a positive experience of the library. As more and more information that libraries have becomes electronic, and more and more users access the library and its resources through the Library's website, it becomes more essential for each library website to have a good IA. If they do not, the usefulness of the whole library is thrown into question.

Past research

In New Zealand there has been very little research done on library websites. Most of what has been done has looked at tertiary library websites but none of this research has specifically examined IA. In 2013 a broad study of New Zealand tertiary library websites homepage design focused on the look and feel of these pages (Howie, 2013). This is an important element of websites, especially for usability; however this study did not investigate any elements of IA. A 2007 study, looking at some elements of website design, touched on areas of IA and found these basic elements to be satisfactory (Born, 2007), however no in depth investigation was carried out on them as part of this study. In 2006, a study was done of New Zealand tertiary library websites to look broadly at how their usability had changed over a period of seven years (Le, 2006). The study found that one area that still needed improvement was features of the navigation, this is an area of IA, so these results are helpful but again they do not go into sufficient depth. A study was done on New Zealand university libraries in 2006 on the terms users used for library concepts (Fitchett 2006). The study found that there were still many terms the libraries used that were not well understood by the users. Terminology is an important part of IA but it is not the only one. These studies have looked at broader and narrower issues of IA as well as touching on some IA elements but none of them have specifically and thoroughly evaluated New

Zealand tertiary libraries' website's IA. It is also important to note that most of these studies are several years old and many of the library sites are likely to have changed since the studies were conducted.

The gap

These studies leave a gap in our understanding of the state of tertiary library websites in New Zealand. For such an important area of website usability it is vital to have a good understanding of the quality of the IA for these websites. These sites should be evaluated against current best practice for IA to see how they compare and discover any areas that could be improved. This current study hopes to begin to fill this gap in our knowledge and show where these websites currently are in terms of their IA. This will help the sites, and thus the libraries themselves, to be more useful and relevant to their users.

The definition of IA

In order to study IA it is important to have a clear definition of what exactly IA is. There are several definitions that have been given for IA. Wurman defines IA as taking complex information and making it as simple as possible for people (1997, p. 7). He believed that IA could be applied to many things, both digital and physical. The Information Architecture Institute (2013) shares a definition given by Morville and Rosenfeld, which defines IA more in terms of the digital world:

> 1. The structural design of shared information environments. 2. The art and science of organizing and labelling web sites, intranets, online communities and software to support usability and findability. 3. An emerging community of practice focused on bringing principles of design and architecture to the digital landscape (2007, p. 4).

The last part of this definition gives a bigger picture of IA as an emerging design principle. The first part looks at what IA does, provides structure to information environments, and these are both fairly straight forward. The second part describes how IA operates more specifically. IA involves the organizing and labelling aspects of digital spaces and it is about doing these two things in such a way as to support usability and findability.

These terms usability and findability need definitions on their own as part of this investigation. We have previously discussed usability but it is useful to have a clear definition and Gullikson et al. provides a useful one; she states that usability is a measure of how effectively various pieces can be used (1999, p. 294). Usability is a term that can be

used to measure many different website elements and this includes IA. The other term, findability, is defined as a measure of how easy something is to locate or navigate (Shieh, 2012, p. 708).

One of the most important aspects of IA that has been included in other definitions (Ding, & Lin, 2010, p. 1) but is not included in Morville and Rosenfeld definition is the importance of the user. The goal of IA is that it works for the user. So it is important to have a definition of IA that includes this aspect. The following definition combines the discussed definitions into one that is useful for the current context and will be the one that is used for this research: IA is about organising and labelling information in a website into structures that make it easy for the user to navigate the site and to locate what they need.

Objective and main research question

Objective

The objective of this study is to compare the IA of tertiary library websites in New Zealand to current best practice in IA according to current research and literature, and identify what areas they are doing well in and what areas, if any, there are for improvement.

Research questions

1. What are the current criteria for best practice in tertiary library websites' information architecture based on current research and literature?

2. How do New Zealand tertiary library website's information architectures compare to these criteria for current best practice?

3. What are areas that these websites are doing well and what, if any, areas can they improve?

Research design

This study was done as a quantitative research study using cross-sectional research design in the form of content analysis. The content that was analysed was the IA of a purposive sample of New Zealand tertiary library websites. The analysis was based on best practice that was compiled from current research and literature. Determining the quality of New

Zealand tertiary library's IA could have been done with a variety of research designs including user testing, which is common in this area of research. However, the objective of this study was not to develop a best practice, as a user testing design would have enabled by showing each organisation how they can specifically meet the needs of their users, it was simply to compare what is viewed as current best practice to New Zealand tertiary library websites. Though user testing and the development of best practice would have yielded more useful results, undertaking such a study would have required time and resources beyond that of the current study. This study was done with the aim to produce results that have a level of external validity that will allow them to be useful for similar sites in New Zealand.

Methodology

Population

This study examines a sample of New Zealand's tertiary library websites. New Zealand has many libraries and to evaluate their IA adequately would have required a large scale study to get an appropriate sample. In this case it was more useful to look at a sample of a smaller, more specific, population. As New Zealand tertiary library websites have had some research done on them already it is beneficial to continue to build this picture. So a purposive sample of the population of New Zealand tertiary library websites was chosen for analysis in the current study.

Purposive sampling is a sampling procedure where the sample is selected based on certain criteria and the purpose of the study (Daniel, 2012). In this case, the purposive sampling is based on variability so that a full range of institutions are represented that fulfil each of the criteria (Daniel, 2012). The criteria were selected because of the importance of their variation in the sample. The criteria used are institution types (i.e. university, polytechnic or wananga), sizes based on equivalent full time students in 2012 and locations within New Zealand. Having a representative sample of institution types, sizes and locations ensures that a full range of institutions have been represented.

Out of New Zealand's public tertiary institutions a sample of 10 websites were examined. There are a total of 29 such institutions in New Zealand so this is a sample of approximately one third of the total population. Based on the number of each of these types of institutions in New Zealand, three universities, six polytechnics, and one wananga were included to make up a purposive sample. A complete list of institutions can be seen in Appendix A. As the sample has only one wananga the results for this institution type, though helpful to see, should not be generalised to other wananga. This sample is large enough for the university and polytechnic result to be generalised to a certain extent, however, every

website is developed independently from the others. Though sites can influence the standard of the others indirectly through the competition between the wider institutions to provide the most desirable learning environment for current and potential students, they are individual sites and thus the ability of the results to be generalised will always be limited.

Part 1: Data collection

To answer the first research question and create a current IA best practice criteria, case studies and other relevant literature were examined. An effort was made to use studies and literature that are both currently recognised as best practice, having not been superseded by more recent research, and are contextually relevant to libraries. Any recommendations or evidence of best practice in IA that were found in the literature were noted down as a list of bullet points.

Part 1: Data analysis

This data was then grouped according to the most prominent and most common themes. If there was no clear majority consensus or no reasonable way of objectively measuring the criteria they were removed. The remaining criteria were then deduplicated, clearly defined and compiled into a best practice criteria checklist. This was used in part 2 to provide a means of examining the New Zealand tertiary library website's IAs as objectively as possible.

Part 2: Data collection

Data collection to answer the second question required the checklist created in part 1 to be used to analyse the sample of New Zealand tertiary library websites. This analysis was intended to be undertaken over a few days so the data would be a valid representation of these sites at a particular point in time. However, this was not a feasible time frame for the analysis, as had been expected, and so this was extended over five weeks. This was not an ideal timeframe as some of the sites did change over this time. However, based on the information that had already been gathered from the sites, these changes did not appear to affect the information architecture, so there is no reason to believe this extended data collection time affected the results.

Analysis was done criterion by criterion instead of site by site so this did ensure that each criterion was measured against all sites within a short time frame. This was also important because it put the focus on getting an accurate picture of how all the sites did on each criterion instead of how each site did against the others.

Each criterion took different amounts of time to evaluate on each site depending on the criterion and on the site. Some required a quick glance at the home page to determine things like the presence of a library logo or a website search box. Other criterion took longer such as finding the existence of contact information or a site map which required some exploration of the site in a few cases. In other cases they may have taken time because of the nature of the question, such as checking if all the menu links worked which required checking each link in the menu on the home page on every site.

The data was collected on a spread sheet. Criteria were given a 1 if the site fulfilled the criterion and a 0 if the site did not. If there was a partial fulfilment of a criterion it was given a 0.5. This was, for instances, where a required feature was present but unclear or where some of the features on the site met the criterion while others did not.

Some criterion were analysed on a per page or per label basis instead of a per site basis. In these cases the page or label results were compiled into a percentage that fulfilled the criterion, with 1 indicating that the criterion was fulfilled on all of the pages. This individual page and label analysis was done on criteria 2-4 and 7-9 in the Navigation section as well as all the criteria in the Label and Specific label terms sections.

The individual pages and labels that were examined were ones that were on or could be reached directly by the global library menu and/or the home page menu where they existed on the library sites. This totalled 373 individual pages and labels. Not all criteria were applicable to the pages and labels; these were removed from the results in some instances. However, the final result was always calculated as a percentage of what was applicable for analysis.

Part 2: Data analysis

The data collected for part 2 was then analysed individually and collectively, looking for themes and patterns. These were analysed using descriptive statistics like Pearson r. The results have been presented graphically and textually as appropriate. This analysis included both an acknowledgement of what areas the websites match well with the criteria and recommendations for improvement in the areas these sites IAs were the most different from the best practice criteria.

Ethical considerations

Though this study did not require interaction with people and did not need approval from an ethics committee, care has been taken in respect to the organisations as they are named.

This study is not intended to rank organisations according to which of them has the best IA, but instead to get a better picture of where these sites stand against the best practice criteria in order to show what they are doing well and to make any recommendations for areas where these sites can be adjusted to be closer to the best practice criteria.

Results

Literature analysis

Part one of the data analysis was done as a literature analysis. Twenty-eight articles and books were found to have relevant information that could be used to create a best practice checklist, including material by Born (2007), Detlor & Lewis (2006), Hulseberg & Monson (2011), Krug (2000), and Lehman & Nikkel (2008). All of the materials were analysed for criteria that could be added to the checklist. These were then sorted into categories and refined down to remove duplicates, items that were unable to be measured and any items where there was disagreement in the literature. These criteria were then developed into a list of questions that could be used in an analysis of library websites.

Further refining occurred in the testing of the checklist and a few more items were removed due to their lack of objectivity or their difficulty to measure. The final list contained 50 items to be measured. These were organised into six categories: Site features, Searching, Information grouping, Navigation, Labels, and Specific label terms. Each of these categories has 5-11 items in each section. These cover information such as the presence of features like help and contact information, the kinds and location of searching options, the logic and clarity of the grouping of information, functionality and usefulness of the navigation and the quality of the labels. A complete list of criteria used, including references can be found in Appendix B.

Abbreviations

In order to create a more concise report, the institutions that were analysed in this study will be abbreviated when they are mentioned as follows:

- University of Auckland: UofA
- University of Canterbury: UofCan
- Victoria University of Wellington: VUW
- Nelson Marlborough Institute of Technology: NMIT
- Otago Polytechnic: OtPoly
- Unitec New Zealand: Unitec
- Wellington Institute of Technology: WelTec
- Western Institute of Technology Taranaki: WITT

- Waikato Institute of Technology: Wintec
- Te Wananga O Raukawa: WanORau

Results format

The results are presented by section. Each section includes a brief description of what area of the websites it is analysing. The questions that comprise each section of the checklist are listed with a summary of the result and this includes specific notes from the analysis.

For each site a score of 1 indicates that the site completely fulfilled the criterion. Where scores are mentioned in the summary of each criterion they are a summary of the scores of all of the sites and so they are the sum of the sites' scores on each criterion. A score showing that all 10 sites perfectly met the criterion would be a score of 10 and a score of 0 would indicate that none of the sites matched the criterion.

Site features

This section of six questions analyses the websites in terms of some basic features of information architecture that are important for users to navigate and locate information on the library site. The literature viewed these as standard features that should be present on all library sites.

1. Is the library's parent organisation clearly indicated on the home page?

Score: 9.5. The tertiary organisation of each library site was clearly indicated on its home page. This mostly came in the form of the institution name and logo. This was often located in the top left corner in page header.

2. a. Is the library logo present on the home page? b. Is it located at the top of the home page?

Score: a: 5.5, b: 6. None of the institutions, except for OtPoly, had an actual library logo. Most simply had the word "Library" in the top right of the page in the header. The UofA site had the library indicated in a subtitle to the university logo. If these were present they were considered to be logos for the purpose of this analysis. The only indication that the site was a library site on a few home pages was in the page title, a part of the page that is lower and less prominent; these were not considered to be logos in this analysis. Where a sort of logo beyond a plain text page title was present, the logo was at the top of the home page.

3. Is the navigation clearly distinguishable from other features on the site on the home page?

Score: 8. Navigation seemed to come in a few different forms on the library sites. For some, the navigation at the top of the home page was for the library's tertiary organisation. If it was not made clear to whom the navigation belonged, the library site or the institution site, it was only given 0.5 instead of 1. Other navigation types included lists of links on the home page sectioned off by headings, library global navigations, located at the top left of the page or as blocks in the middle, and various combinations of these.

4. a. Is there a help feature on the site? b. Is it easily accessible?

Score: a: 8, b: 8. Many of the sites had some sort of help feature, whether it was a section entitled "help" with options below, a help option on the menu, an ask a librarian link or a live chat link on the home page. Where help was present it was mostly easily accessible. VUW and NMIT did not have help sections accessible from their home pages. WanORau did not have a help option.

5. a. Is there contact information on the site? b. Is it easily accessible?

Score: a: 9, b: 7.5. All sites except for WanORau had information to contact library staff. Some sites had "contact" as a menu item, some had lists of contacts, some just had a library phone and email on the right side of the home page and some had no information or else it was very small or not in a place where it was very noticeable. This was mostly easily accessible.

6. Does the site have a site map?

Score: 2. Most sites did not have a site map. The link to the site map was in the site footer where present.

Searching

This series of nine criteria analyse different aspects of searching as a form of navigation within these library sites. The information contained in the library site is often quite large and having a way to access it, other than following the path through the menu hierarchy, is often very important for the users to use the site efficiently.

1. Unless site is very small, a site search box is present?

Score: 5.5. None of the sites had a site search exclusively for that library site. A few had the institution's site search in the top menu; these had their top menu bar as a navigation for the institution. The rest had no site search. WanORau, being only four pages, fit into the category of very small, in this instance a site search was not required to meet the criterion.

2. Is the site search easily accessible?

Score: 4.5. The site search was easily accessible on all the sites where it was present. The exception to this was the WITT site search; this was a drop down menu that required some effort to use.

3. Is there a library search box for federated searching?

Score: 5. Half of the libraries had federated library search boxes. Another three only had catalogue searches and the last two had no searches available on the home page. One of these had a catalogue search on a secondary page. The other could only be searched within the databases themselves and there was no search box for library material on this site.

4. Is the library search box in a prominent place on the home screen?

Score: 7. For most of the sites that had a library search of some sort, it was located centrally on the home page. Among the others there was a site with no search at all, one with the search on a secondary page, and two with a small search box on the side of the home page.

5. Are the search boxes clearly labelled as to what they are searching?

Score: 7. Where they were present, the library searches were well labelled. None of the site searches were labelled.

6. Are resources able to be searched by subject?

Score: 9. Subject searching mostly came in the form of subject guides which almost all the libraries had. For the most part these were easily accessible. A few of the libraries also allowed their catalogues to be searched by subject.

7. Are resources able to be searched by format?

Score: 9. All sites, except WanORau, allowed searching by format, though it was not always easy to locate. In many cases this came in the form of an advanced search limiting option.

8. Are resources able to be searched by course?

Score: 7. Most libraries allowed searching by course in the form of a course reserve search.

9. Are there browsing options for searching?

Score: 9. The browsing options were usually for databases and journals which often included A-Z buttons and subject browsing.

10. For long lists of information, is a search box provided?

Score: 5.5. In some cases the pages for browsing databases or journals included a search box. This was the most prominent use of long lists in the sites.

Information grouping

In order for users to be able to locate what they need, the information must be grouped in a way that is manageable for the user and in a way that makes sense to them. It is important that the grouping fosters a high level of usability and findability. These nine criteria were designed to investigate this.

1. Are hierarchies used instead of flat lists?

Score: 8.5. For the most part, the sites had a more hierarchical than flat structures, with lists of links broken up into categories. These came in the form of accordion menus, headings with lists of links underneath or headings that could be selected to get to links.

2. Is the navigation hierarchy broad and shallow?

Score: 9. Though the number of links under each item varied from 1-10, there were no overly lengthy list that could have been categorised as deep. The hierarchies were all mostly broad and shallow.

3. Is it clear what the major groupings of the site are?

Score: 10. Each of the sites had clear category headings to group the links in the site.

4. Are the sections clearly distinguishable from one another (i.e. do not have overlapping content)?

Score: 7.5 Most of the menus had distinguishable sections. Most did not have content that needed to be repeated in other sections. Two had subsections repeated on another menu and this was either to provide a quick reference for content or to categorise the information differently. WITT had menu items with sections and subsections repeating.

5. Do menu items appear to have a logical method of being grouped?

Score: 9. Most items appeared to be grouped logically. It was reasonable for them to be grouped under the headings as they were and they fit well as a group. An exception to this was Wintec's site which had only three headings but some of the items didn't seem to fit under any of them.

6. Is information grouped by subject?

Score: 9. Subject grouping came in the form of subject guides which almost all the libraries had. For the most part these were easily accessible. However on Weltec's site they were difficult to locate.

7. Is information grouped by user?

Score: 8.5. Most libraries had some information that was grouped by user. This included the users types postgraduate, undergraduate, staff, academic staff, and distance students. These groupings were done with pages for specific users, or sometimes with sections of the

menu being specified for a type of user. UofA was the only site without any content grouped by user from the home page.

8. Are pages grouped by category and subcategory?

Score: 9. All institutions had categories and subcategories except for WanORau, but this site was too small for grouping to be useful.

9. Are key resources and services no more than three clicks away?

Score: 10. This criterion required further clarification as to what defined a key resource so that the sites could be analysed against this criterion. Therefore, for the sake of this criterion, key resources and services were defined with the help of result from research conducted by Duncan and Holliday (2008, July), as: databases, journals, the catalogue, subject guides, opening hours, and contact information. None of the sites had key information more than three clicks deep.

Navigation

For users to navigate a site it is important that the site's navigation works effectively for them. These nine questions examine the usability of the sites' navigation, determining if the user is able to access what they need from the site.

1. It is clear what site the navigation is for (i.e. no confusion between institution and library navigation)?

Score: 8.5. The navigation was clearly distinguishable on most sites. Often it was only the library navigation that was present and it was clear that this navigation was for the library site. When there was also an institutional navigation, the site the navigation was more difficult to distinguish. It was helpful when the institution logo and the library name or logo clearly distinguished the sections. Where this was not the case, such as UofCan, it was not instinctive as to what the top navigation was for. Wintec was a site that was able to clearly distinguish the library and institution's navigation by keeping all the library content below the header.

2. Do all menu buttons and links work when clicked?

Score: 9.9. The vast majority of links worked when clicked. A couple of links that were exceptions were a link on the Wintec site which consistently timed out without going anywhere and a link on the VUW site which highlighted an incorrect tab, making it appear that the user was somewhere different in the site.

3. Is there a home link on every page?

Score: 9. Most pages had home links except for pages that went away from the library site. This may have been to go to a Wiki, a search platform, a pdf or in the case of OtPoly there were links that took the user to the Otago University site with no home link back to the OtPoly library site.

4. Is the link to go back to the home page is obvious?

Score: 6.6. Many home links were obvious but there were several pages that only had small breadcrumbs to link back to the home page which were not very obvious.

5. Is the Global navigation clear? b. And is it consistent throughout the site?

Score: a: 9, b: 7. For the most part, the global navigation was consistent. On some sites the global navigation changed completely when in pages that were off the main site, such as going into a search portal or a lib guide. For Otpoly, the number of items in the global navigation menu changed slightly on different pages. For WITT it sometimes disappeared completely and was replaced by a page navigation.

6. Can the user navigate around the site starting from any page?

Score: 10. Overall the user could navigate all the sites from any page.

7. Does each page give the user an indication of where they are in the site?

Score: 6.8. Some sites were good at indicating the users' location including UofCan and VUW who did this well with menus that were opened to highlight the section of the site that a page was located. A few sites used breadcrumbs to show a page's location in the site. These were mostly used well though a few had some pages lacking breadcrumbs. There were a

few sites that did not do this well, with most pages in Wintec and OtPoly's sites giving no indication of their location.

8. Is it clear on each page what the page is about and what it can do for the user?

Score: 9.6. This was mostly done very well with the majority of pages clearly indicating what they were about. There were a few exceptions with the worst being WelTec's Spydus page which had several different links going to the same general search page.

9. Do pages suggest connections?

Score: 8. Most sites had a few pages that lacked connections, however not all pages are the sort where it is important for there to be connections. UofCan showed the link to connections with the implementation of a "see also" box on the top right of most pages. OtPoly did not have connections between pages.

Labels

These next five criteria examine menu labels effectiveness overall. It is important for labels to be used in a way that facilitates usability and findability, if a label attracts or detracts a user unnecessarily it can lead to needless frustration on the part of the user. So it is important that labels communicate effectively to users.

1. Do labels represent the content beneath them?

Score: 8.6. For the most part labels represented the content beneath them. When this wasn't the case it was often because the link went to a very general page such as the links to Spydus on WelTec's site. Also, on the OtPoly site, some labels took the user to relevant content but it was located on the Otago University site. The label did not acknowledge the change to a different site nor was OtPoly acknowledged on the page in anyway, making it appear that they link was incorrect; this was also seen as being misrepresentative.

2. Are labels used consistently throughout the site?

Score: 7.1. For this criterion the labels were compared to the page titles in order to check for consistency. Many pages had consistent labelling. There were some pages that had different page titles than the label; this was seen as an inconsistency in labelling.

3. Are labels concise?

Score: 7.6. Most labels were concise. Wintec had some concise labels especially under the "Resources" section of its menu. It listed the types of resources, "Databases", "Ebooks", etc. However, there were some labels that were wordy and this was found on a few sites. An example of this can be seen on the VUW site under the heading "Using the Library" other items under this heading named a people group such as "Distance students", however one label said, "Information for teaching staff", if this label had done the same as the others and said "Teaching Staff" it would have made it more concise.

4. Are labels precise?

Score: 8.7. Overall labels were precise. Under the heading "About the Library" on the OtPoly site the items were clear, using labels such as "Hours" and "Staff", making it specifically clear what the page would take the user to. There were exceptions to this, where labels that were not clear, like the "Linking & Copyright" label on the UofCan site. This label does not specifically say what linking means or what kind of linking it is refereeing to, making it quite a broad and not very precise term.

5. Are labels simple?

Score: 9. Labels were mostly simple. The VUW site has a few good examples of simple labels under its "Using the Library" heading, with labels like "Pay Fines" and "Submit Your Thesis" which uses plain and simple language. The exception to this was when labels seemed to use terms that were not clear. An example of label that is not simple can be found on the UofCan site. The label "Pedagogy Resources" uses the complex term "pedagogy" instead of a simpler one.

Specific label terms

This section of criteria analysed the specific terms used in labels to see if they made any of the common errors identified in the literature. These common errors describe types of terms that would be confusing or difficult for users to understand.

Labels are not:

1. Cute. Score: 9.9.

2. Marketing focused. Score: 10.

3. Brand names. Score: 9.7.

4. Abbreviations. Score: 9.9

5. Technical names. Score: 10.

6. Ambiguous. Score: 9.8.

7. Library terminology. Score: 8.2.

For most of these criteria there were no, or virtually no, labels that fell into these problem categories. There were several labels that did include library terminology.

Discussion

The results reveal a wide range of strengths and weakness of the analysed sites against the checklist which are either positively or negatively affecting the websites' usability and their content's findability. Each of these sections of criteria will be examine here in more depth, followed by further pattern analysis.

Site features

Figure 1 summarises the results from the Site features section. It shows the criteria in order, from the highest scoring to the lowest scoring.

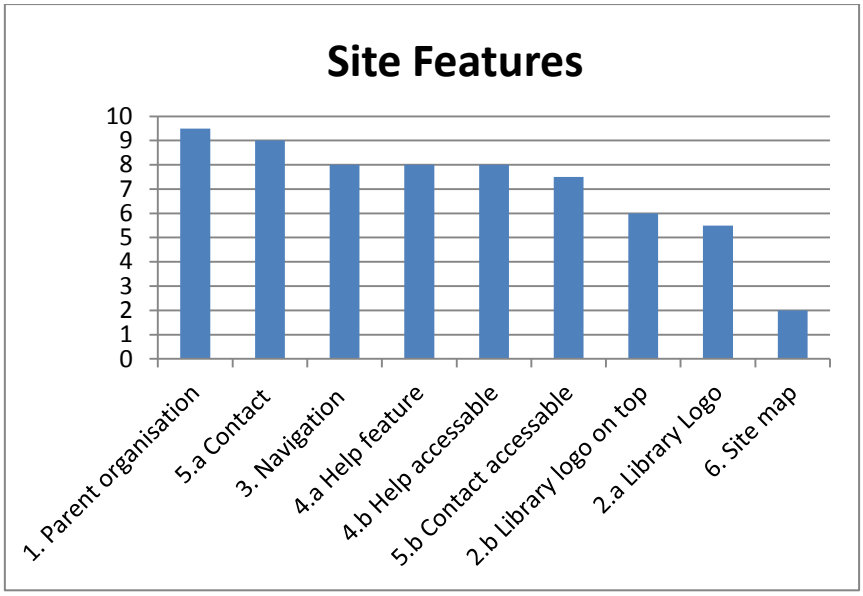

Figure 1: Site features score summary

The institutions did well to clearly identify themselves as the parent organisation on the library home page. In many cases an institution's library site may look different from its institutional site, so prominent institutional branding can help users to keep from getting disorientated and gives them a point of familiarity (Hulseberg, & Monson, 2011; Crowley, Leffel, Ramirez, Hart & Armstrong, 2002). A good example of this can be seen in Wintec Library's site in Figure 2.

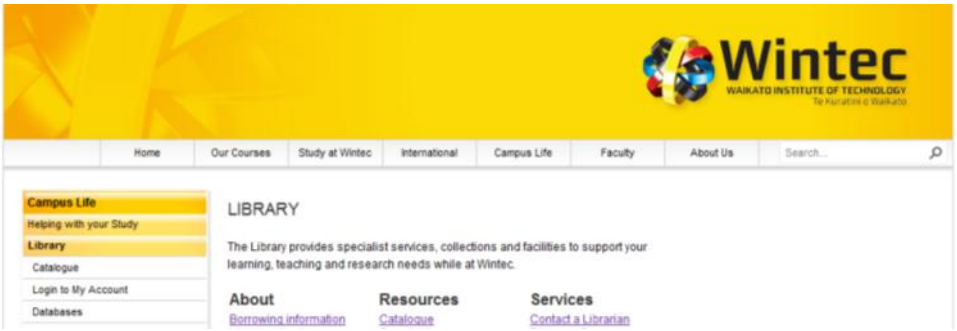

Figure 2: Wintec library's home page

Contact and help information were also mostly present and easily accessible. When a user is having a difficult time finding what they want, the presence of these features gives the user a place to go if they get stuck (Hulseberg, & Monson, 2011). It allows the users a certain amount of self sufficiency to find what they need on their own, while still allowing them to get help when they want it (Duncan, & Holliday, 2008, July). The library sites did well incorporating these features to allow the user to feel a level of confidence in location and where they can go. This confidence can help give them a positive view of the library.

However, there were some site features that were not always presented well. Though the institutional branding was clear, the library branding was surprisingly not clear. An indication that the site was a library site did exist on all the site's home pages but on many pages it was not very obvious. This information, like the institutional information, is important for the users to allow them to know where they are and makes the sites more user-friendly (Born, 2007). Unitec was one of the sites that did this well as can be seen in Figure 3, making it clear to the user that they were on the Library site.

Figure 3: Unitec library's home page

The lack of prominence in the library branding on some sites may show the lack of priority that these institutions place on the library as most institutions that did not score well in this area also did not score well overall. The site feature that received the lowest score in this section was the site map. Only two institutions had a library site map on their page though a couple of others had site maps for the institution in the footer. The site map is a way for the site to support the navigation (Detlor, & Lewis, 2006) and, like the contact and help information, this feature also gives users a place to go when they get stuck. This was listed in several studies as a feature that makes a site more usable (Le, 2006; Tedesco, Schade, Pernice, & Nielsen, 2008; Born, 2007). It is an alternative to using the site search box to find information on the site, giving the users a browsing option that is a visual representation of what the site contains. This is important and can help to meet the needs of different users who will have a variety of searching preferences.

So while many sites did include features that are important to users and that help make them feel more confident in their ability to use the library sites, this could be improved by making the library branding clear and giving users the option of using a site map to find what they are looking for on the site. Though there is work that some sites could do to improve their site features for their users, overall the sites contained much of the information that is essential for a good user experience.

Searching

Figure 4 summarises the results from the Searching section of criteria. It shows the criteria in order from highest to the lowest.

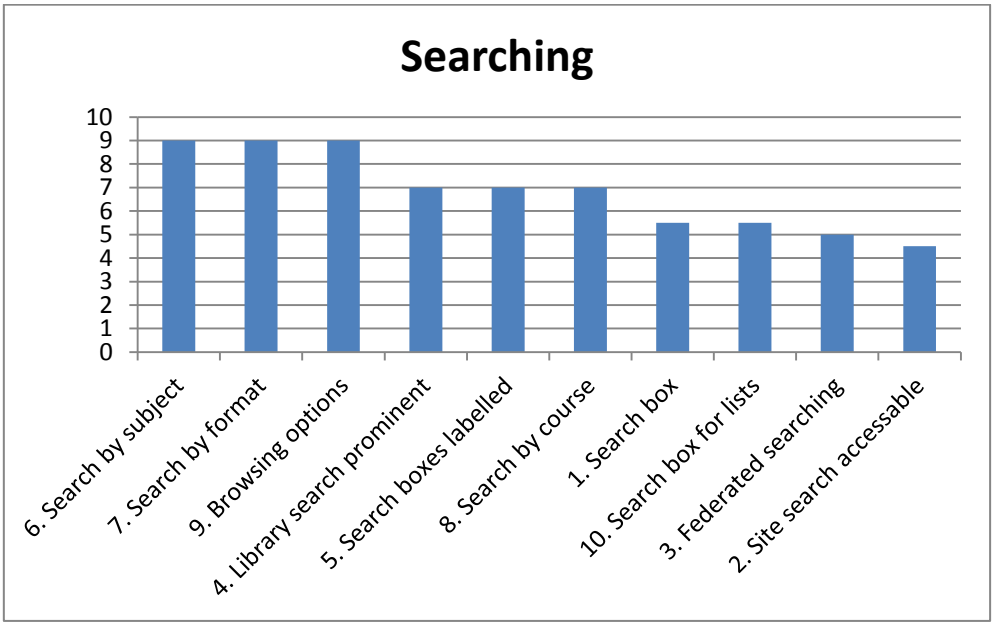

Figure 4: Searching scores summary

The strongest areas for these sites in terms of searching were the variety of types of searching that the sites catered for. Most sites allowed their resources to be browsed as well as searched by subject and format, and many also allowed searching by course. These searching options are ones that users want because they allow the user the best chance of finding the information they need (Hulseberg, & Monson, 2011). This may also come back to the user's desire to be self-sufficient as much as possible and a variety of searching options acknowledges the variety of library users and their different needs. It shows the Library's priority to be user focused and their desire to meet the needs of different users (Morville, & Sullenger, 2010; Resmini, & Rosati, 2011).

While the variety of searching options was often provided for library resources, there was no provision for library site searching on any of the sites that were analysed. Some sites did have institutional site search boxes but this is not as helpful to a user as a search box that targets the library site when they are looking for information they expect to be on the library site. This may indicate a strong connectedness and a lack of independence of the libraries within their institutions. Many of the libraries also did not have federated searching capabilities, this is a newer library searching tool but it is one that is very useful for users (Detlor, & Lewis, 2006). This may be connected to student numbers and funding, as the sites that did have federated searching were mostly the ones with the highest number of EFTS.

This makes sense in some ways, as having more students using a library site can provide justification for acquiring more sophisticated searching tools.

The sites did well to show their user focus in the variety of searching options they made available, however they fell short of the criteria in some important areas. Federated searching is the libraries' Google equivalent to the library's resources. Google type searches are normal for many users and are the preferred way of searching large amounts of content (OCLC, 2010). For libraries to have usable sites it is important that this kind of searching is an option, especially for novice researchers. Having a targeted site search is also another way that sites can show they care about user's desire for efficiency (Crowley et al., 2002), and do not want them to have to waste their time, either searching through the site's various pages or sifting though irrelevant search results to find what they need (Mvungi, De Jager & Underwood, 2008). Providing all of these options helps to communicate a library's user focus.

Information grouping

The summary of the results from the Information grouping section, presented in order from highest to lowest scoring, can be seen in Figure 5.

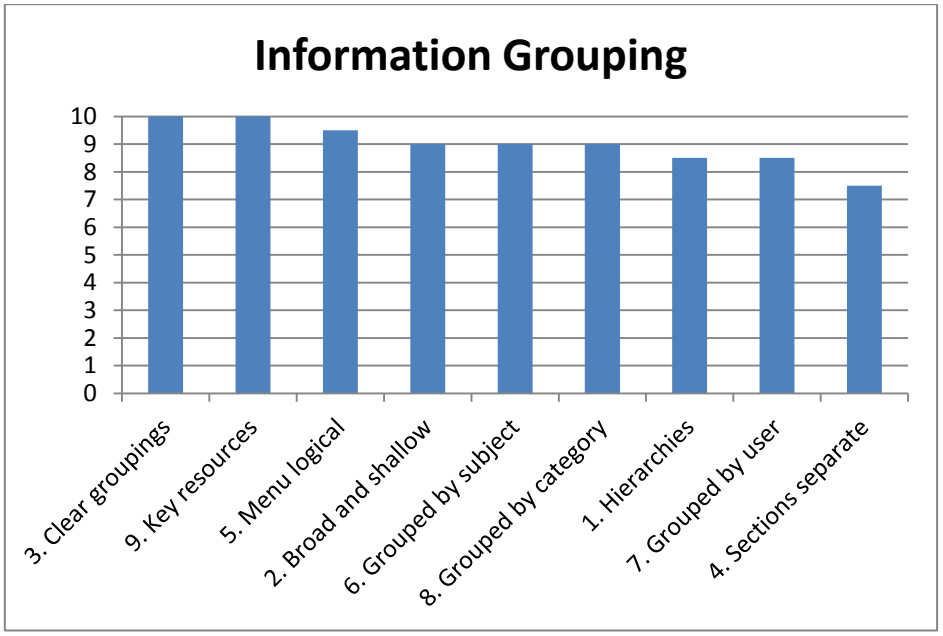

Figure 5: Information grouping scores summary

This section was one of the highest scoring sections in the checklist with most criteria being met by all the sites. The sites grouped information in ways that were clear and logical. This makes it immediately apparent to users where information is so they do not have to spend time asking questions and experimenting with the menus, which can be frustrating for them

(Krug, 2000), but can quickly and easily find what they want. It also communicate to them that the library is there to help them and not confuse them. Simplicity is a priority for users (Howie, 2013) and the sites examined were able to organise information in broad, shallow hierarchies and use categories and subcategories to break up information. These sites were able to keep important information shallow enough for users to access quickly.

The only criterion in this section that didn't match as well with the sites was that the groupings were done in a way that required some menu items to be duplicated in different categories. It is important that the categories chosen for organising information on a website are different enough that it is clear where an item will be located (Lehman, & Nikkel, 2008). If this is not clear users may be forced to spend time scanning through large lists of links or to go into pages instead of being able to see the heading they want and immediately finding a link to the information they need underneath. This was not a criterion that was hugely lacking in the sites but it is an area where some minor changes could be made to bring the sites more in line with the criterion.

A website should group its information so that, in a quick glance, most users have a good idea of what the site has to offer and what they will find as they explore deeper (Brown, 2010). These sites were able to group information in a way that was manageable for users which is an important function of good IA (Resmin,i & Rosati, 2011). Though some work could still be done to create categories that are clear and distinctive from one another, for the most part, the site information was grouped in a way that made sense to users so they could find what they needed without getting overly frustrated.

Navigation

Figure 6 shows a summary of the results from Navigation section. The criteria are again displayed in order from the highest scoring to the lowest scoring.

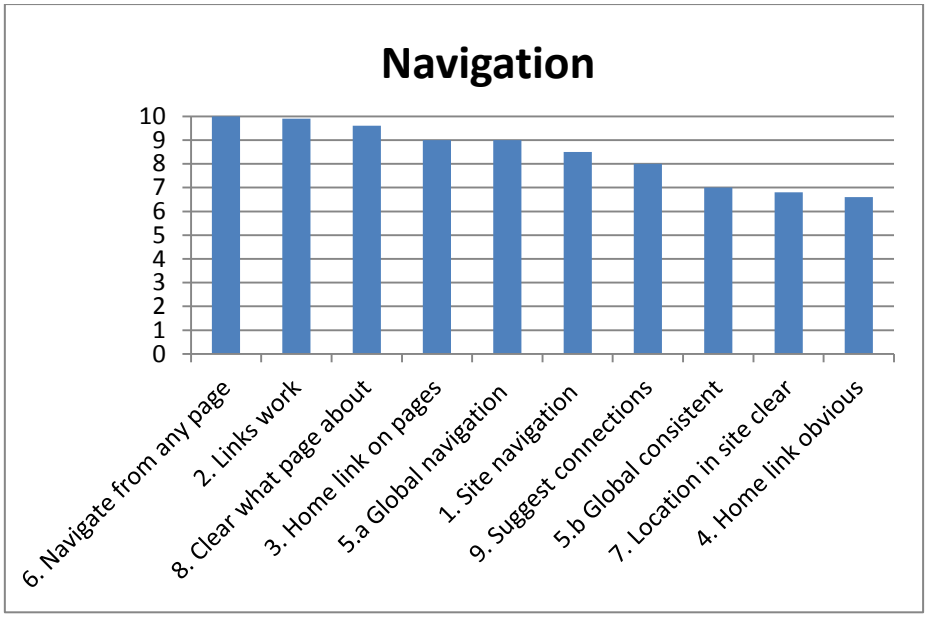

Figure 6: Navigation scores summary

Many of the navigation essentials were met well by the sites. 99% of links worked which, though it should always be 100%, is still a very good number. Home links were available from most pages and it was possible for users to navigate the sites from almost all of the pages that were analysed, these are all very basic principles that are an essential foundation for good IA usability (Krug, 2000; Brown, 2010). It is also important for users to be able to quickly tell what a page is about and what they can do on it (Becker, & Yannotta, 2013, March). The sites did well, with the use of straightforward page titles especially, making it clear for the user what the function was of each page. This is important because it means that even if the user has to enter a page to discover its usefulness, they do not have to spend much time scanning it before they decide to either leave or remain on the page. This increases the usability of a page (Becker, & Yannotta, 2013, March).

One thing that did not match the criteria well on all of the sites was the clarity of a page's location within the site. This is often done using breadcrumbs as can be seen on the Unitec site in Figure 7.

Figure 7: Unitec library's *Borrowing and Renewals Help* page

It was also done using accordion menus as can be seen on the VUW site in Figure 8.

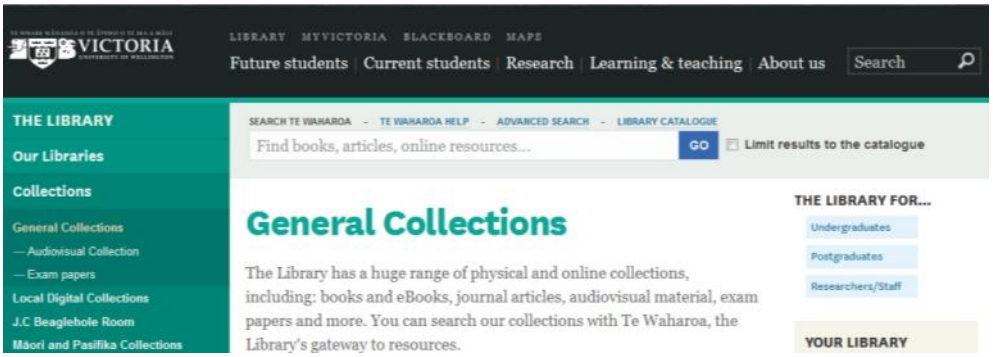

Figure 8: VUW library's *General Collections* page

Though these sites did do this well, there were some sites that gave virtually no indication of their pages locations. Without this indication it makes it difficult for the user to find a page again, to move around from the current location to different pages in the site or to know what category the current page falls under. There were also many pages where the link back to the home page was not obvious, though it did often exist, and the existence of this link is important for ease of use (Born, 2007). If a user gets lost and needs to start again, it is not good for the site to cause the user even more frustration by making starting again difficult.

It is not only important that information exist on a site but users also need to be able to find it; this is greatly influence by the way it is presented (Detlor, & Lewis, 2006). It is essential that users are able to get to the information on a site, if the links are not there or they do not work then the access is not good, however this should be the bare minimum requirement for navigation, that it actually allows the user to navigate the site. Good navigation requires this to be taken a step further and puts the user at the centre of the design (Surla, 2007, August/September). It has a navigation system that makes it easy for users to access information and facilitates quick recognition that the information is what they want. This was done well in some areas such as using simple page titles and having clear access back to the home page but it was not done so well in other areas, such as pages that did not make it clear to the user where they were located in the site's hierarchy. Having all of the navigation features clear and easy to use is ideal for excellent findability and usability.

Labels

In Figure 9, the results from the Labels section are summarised with criteria scores being shown in order from highest to lowest.

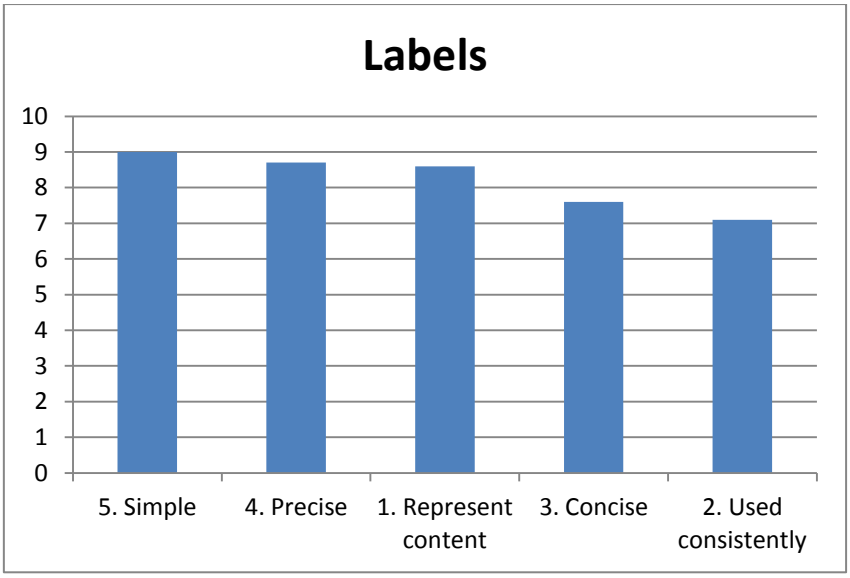

Figure 9: Labels scores summary

The page labels mostly scored well against each of the criterion. As has been mentioned before, simplicity in a site is very important for users and this includes the language used in the site (Becker, & Yannotta, 2013, March). Most labels used language that was simple. The labels overall were also very precise and did not give the user the indication that the pages contained more than they actually did. It follows on from this that the pages also scored well in having labels that represented the content beneath them, allowing the users to accurately anticipate the content of the page simply from the label that was used (Brown, 2010). These areas are important for sites to do well in because these are things that help the labels be used efficiently. They communicate clarity and honesty to the user, saying what they are and being what they say. They play a huge part in making content findable. If a label is too complicated, broad or simply misrepresentative, it distracts the user instead of helping them find what they are after. On the other hand, if a label is simple it can draw the user to the information they need.

One criterion that many of the sites could work to improve is the consistency of the labels used. In this criterion the labels were only compared to the page titles in order to check for consistency and not broadly throughout the content in the site, but they were still found to lack consistency. Consistency is important for being clear to the user, especially when labelling pages. There is no need to be creative and use different terms for the same thing as this will only cause confusion (Reiss, 2012). Having consistent labelling was actually done well on the majority of pages; however, there were pages where the page label and page title were different. This is a small thing to point out as something to correct but it is also a small thing to correct to keep consistency in the pages. Having this consistency may go a long way to making information clear to users and therefore making the whole site more usable.

Requiring labels to be representative, consistent, concise, precise and simple puts a huge responsibility on a very small number of words (Morville, & Sullenger, 2010) and it is an immense challenge of language, to find the right words to communicate to users. The criteria here have been designed to describe types of labels that can communicate the sites' content to users in the best way possible (Morville, & Rosenfeld, 2007). This is an area where many library sites struggle (Duncan, & Holliday, 2008, July), and these sites have done well comparatively in this area. Surprisingly, the area that should have been the easiest, to consistently use the chosen labels, is the one where sites matched the criteria the least. Bringing this area in line with the criteria and continuing to refine the wording of the labels will help to make the sites more usable and will go a long way to facilitate the findability of the content for users.

Specific label terms

Figure 10 summarises the results from the Specific label terms section. It shows the criteria in order from the highest to the lowest scoring.

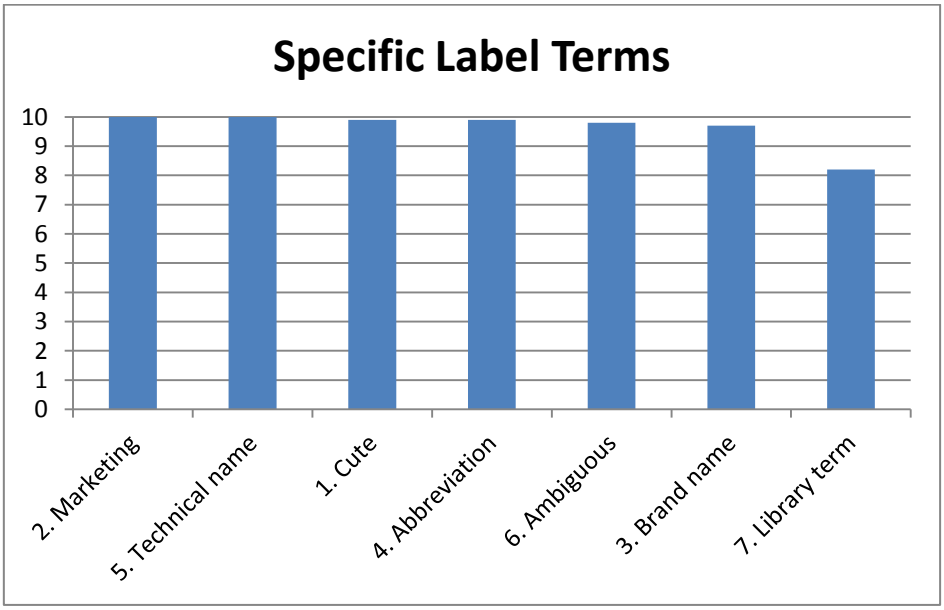

Figure 10: Specific label terms scores summary

The library site fulfilled most of these criteria very well. This section of criteria was also about clarity of labels and ensuring that they were as usable as possible. Almost none of the labels on the sites were marketing focused, technical terminology, cute, abbreviation, ambiguous or brand names. Though there was an exception or two in some of the sites, for the most part the labels avoided the majority of these common mistakes that cause confusion among users. It is good that these libraries have been able to recognise the

importance of using plain and simple language to communicate to their users in the way they understand (Nielsen, 2011, January 1).

There was however, one exception to this; the sites did use some library terminology in their labels. These terms were ones that are either exclusively used in the library context or have a specific meaning within the library with which new users may not be familiar. This is often difficult to change in a library setting because the terms are so ingrained into the library culture and the website creators find it difficult to even see them as jargon because it is not easy for them to see from the users' perspective (Kim, 2011, September). It is also difficult to develop replacement terms, as was discussed before, because choosing precisely the right label is not an easy task. No matter how difficult it is however, these terms are seen as jargon to users and may be the cause of confusion for them (Born, 2007). This makes it worth changing in order to make a website more useable.

The terms used in the labels on these sites have mostly avoided falling into common website terminology errors and this is something that site developers need to stay aware of so they can continue to avoid these pitfalls. However, the issue of library terminology does need to be addressed. The vocabulary used on a site is of the utmost importance (Morville, & Rosenfeld, 2007; Lehman, & Nikkel, 2008). Using library terminology when labelling a site shows a focus on those who understand the terminology, the librarians, and not on the users. To create a user focus in the terms used on a site it is important that they are terms that users understand and terms that users would use (Morville, & Rosenfeld, 2007). Using terms that make sense to users will enhance users confidence in the site (Born, 2007) and will improve the usability of the library site overall.

Other patterns

As we have seen, some sites were able to match well against the criteria while others did not match so well. Looking at other patterns in the data can make some of the reasons for this clearer.

Figure 11 shows a comparison between the average scores for the university sites and the average scores for the polytechnic sites. The wananga score was not included as there was only a single score and this data was insufficient for comparison against the other types of institutions. The average score for the university sites was higher than that of the polytechnics, though not by much. This might have been expected as universities are seen to have a more academic focus than polytechnics and may be expected to have a high standard of presentation and access to academic resources.

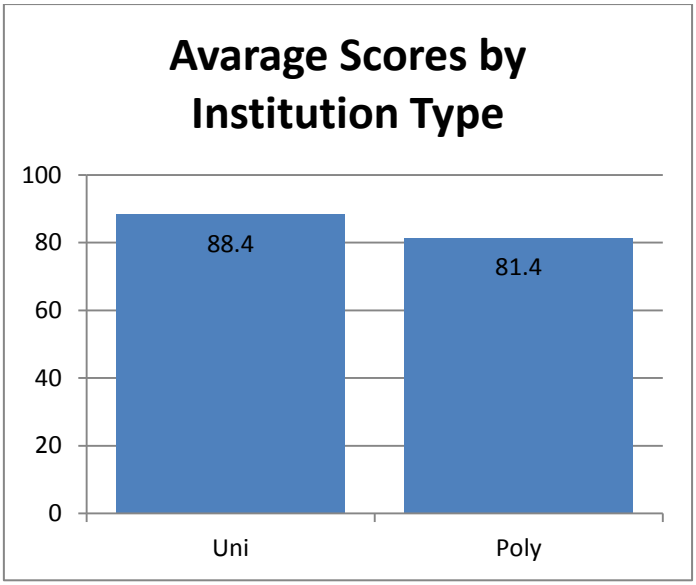

Figure 11: The average of the overall scores on the checklist compared by institution type

The issue may be wider than this however, as can be seen in another interesting comparison. Comparing each site's overall score on the criteria with the number of equivalent full time students (EFTS) the institution had in 2012 is illustrated in Figure 12. The regression line shows a strong positive relationship between these two variables with a Pearson r correlation of 0.56. This is able to reach a level of significance at 0.1 so is can be said that 90 times out of a 100, this strong positive relationship between an institutions score on the checklist and the number of EFTS they have will be present.

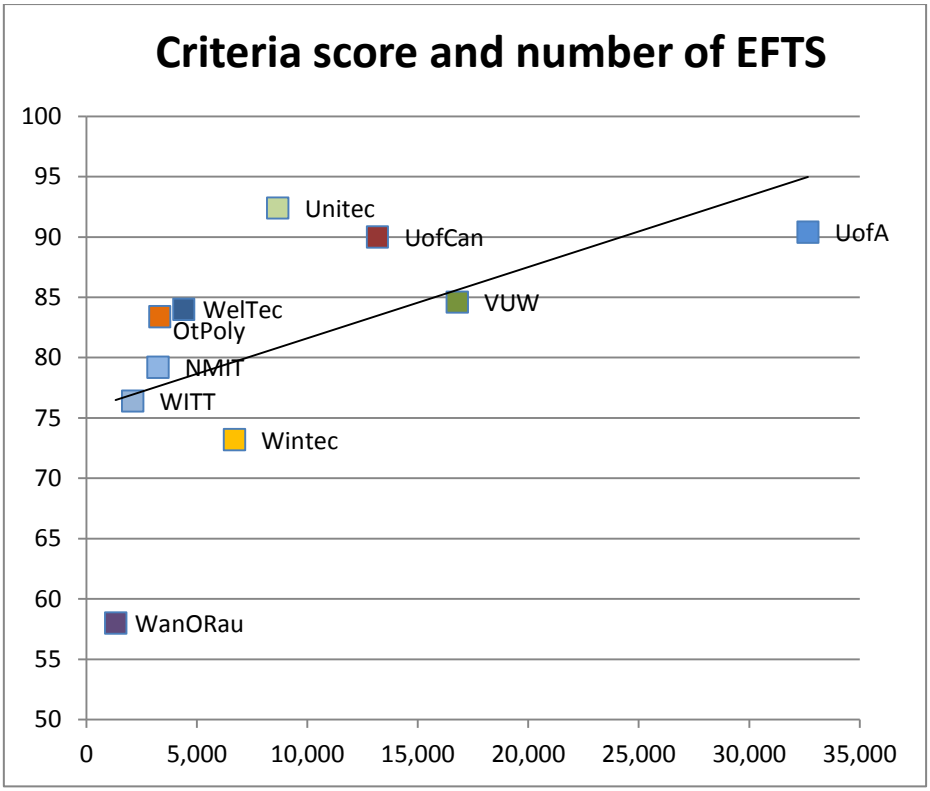

Figure 12: Each institution's overall criteria score compared with their number of EFTS in 2012

Though there is no way to be certain what the cause of the correlation is, there are some possibilities. An institution with more students can mean several things, it means more people using the library website, it means the library will mostly likely contain a greater number of resources and it also means that the library could potentially be better resourced as the more students enrolled means more money coming into the institution. All of these things and especially their effect on resources available to the library to develop and maintain the website can affect the quality of the site (Connell, 2008).

Though resources may have an effect on a library site it does not necessary determine the quality of the site. Unitec, with 8,657 EFTS in 2012, still scored slightly better overall on the checklist than UofA, which had over three and a half times the number of EFTS in the same year. Even if it is financial and staffing resources that are affecting the quality of the IAs of these sites, they do not have to be the determining factor.

Changing technology

One of the limitations of this study is its temporal relevance. This study was done to look at current best practice and how current sites matched this. The very nature of the study limits its future viability. What is current, especially in technology such as websites, will change from year to year if not more often. Websites themselves are works in progress and are

constantly being changed and updated. This can be seen clearly in the huge changes that have occurred in the sites in this study since the website analysis was completed.

After the WanORau site was analysed a library search feature was added to this site. This was a significant weakness of this site that was shown in the analysis that has now been updated and can be seen in Figure 13 and Figure 14.

Figure 13: WanORau's library home page at the time of analysis

Figure 14: WanORau's library home page with the *Library Catalogue* page

Another site that has changed since the analysis took place is the Weltec Library site. After the analysis for this research was completed the site was completely updated and improved, changing from what can be seen in Figure 15 to what is shown in Figure 16.

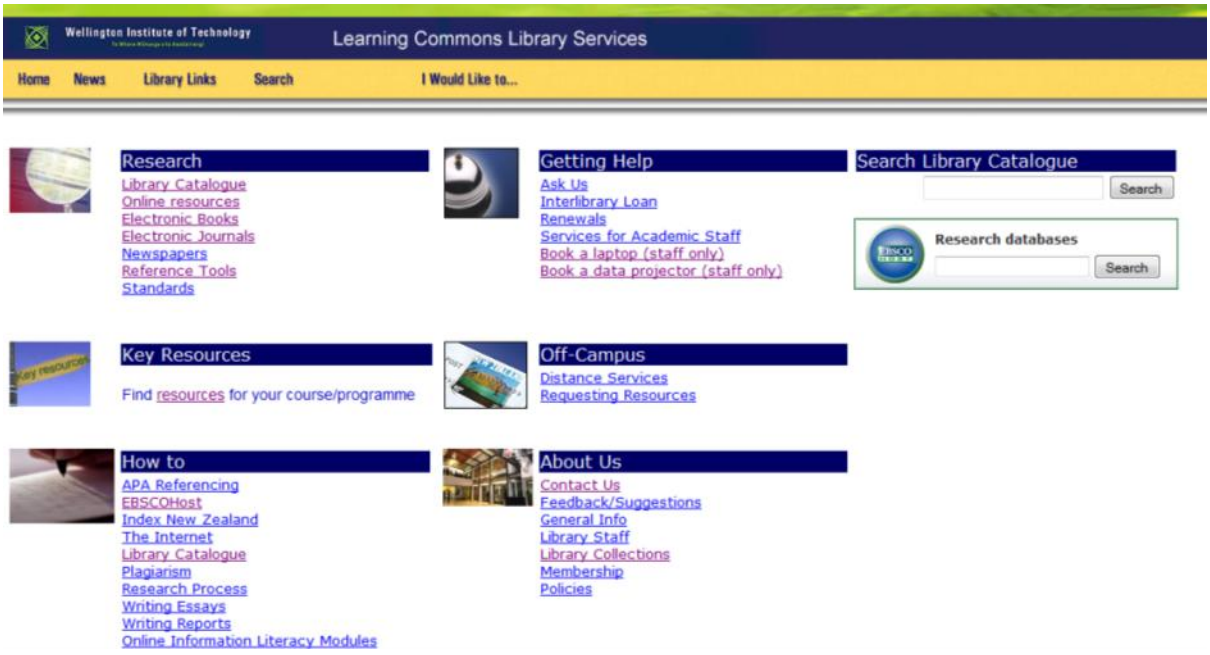

Figure 15: WelTec library's home page at the time of analysis

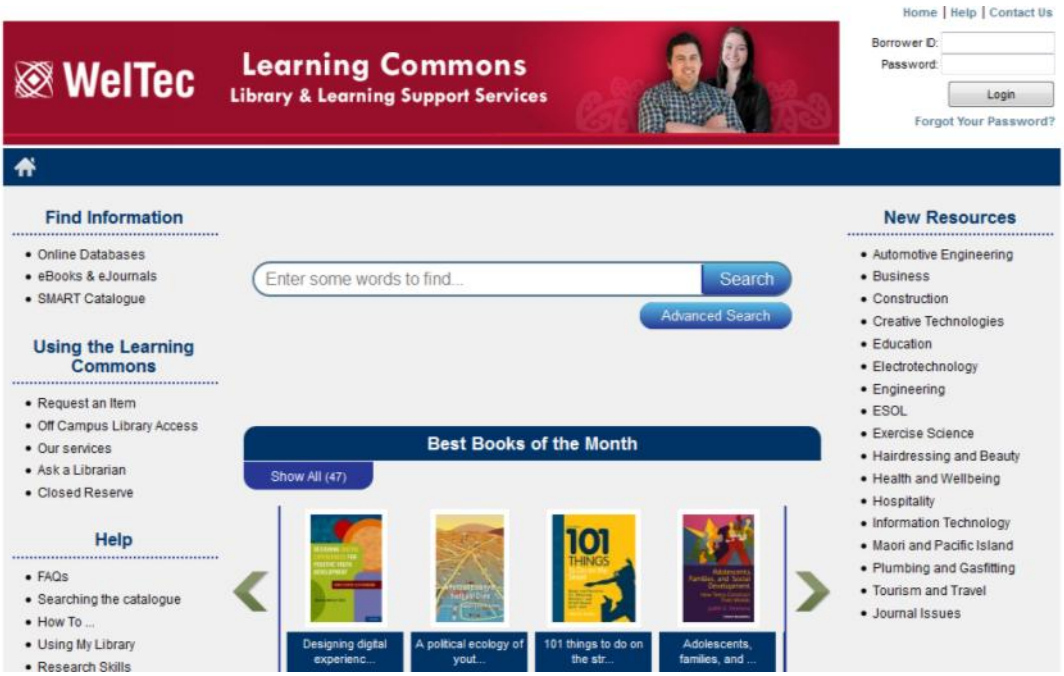

Figure 16: WelTec library's new home page

The NMIT site has also drastically changed their library site since the site analysis for this project was completed. The old site can be seen in Figure 17 and the new site in Figure 18.

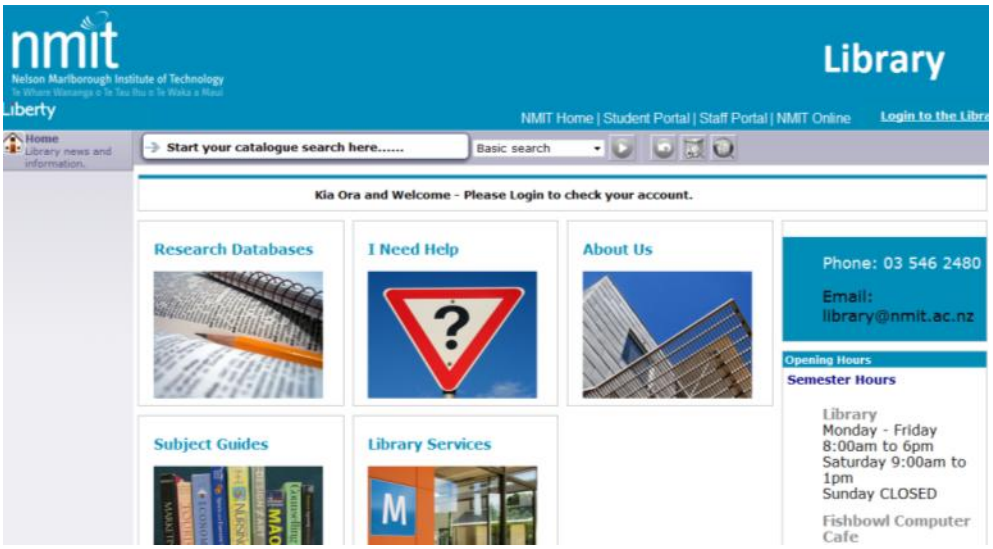

Figure 17: NMIT library's home page at the time of analysis

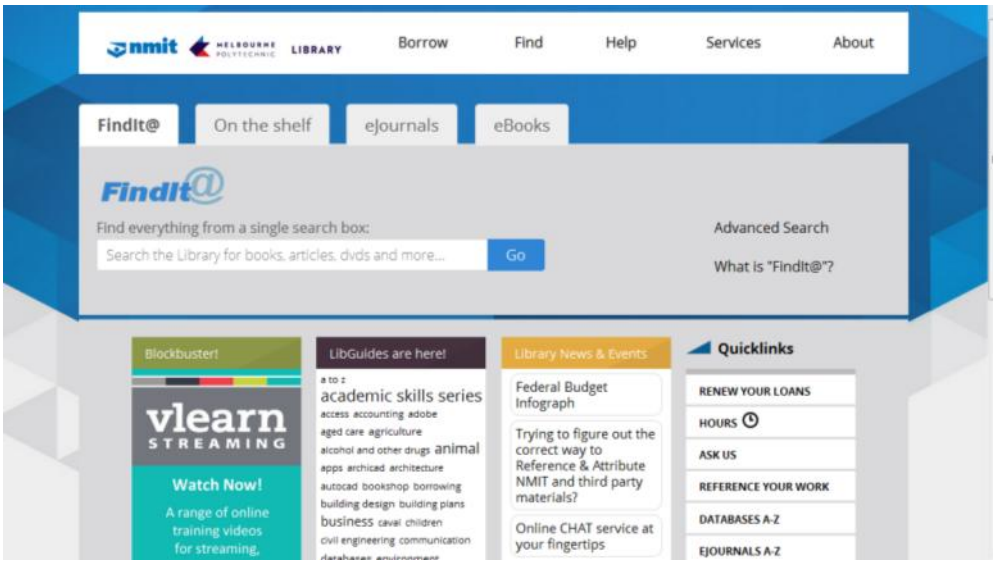

Figure 18: NMIT library's new home page

Because changes are occurring so rapidly, the information gathered from this study about these sites may not be highly relevant for long. These examples reinforce the continuing changes that are occurring in library sites. This is a very important part, of not only the information architecture but the site as a whole, which it is continuing to be improved and updated constantly so that does not become stagnant. The time restraints on this study did

not allow these sites to be re-evaluated and so much of the specific information gathered in this study may quickly become outdated. However it may still be useful further into the future as an example. The best practice checklist in particular has potential be relevant for many years to come, as through its creation it was clear that, though websites do change frequently, what users want from them, and thus some elements of best practice, have stayed fairly consistent over many years (Krug, 2000; Reiss, 2012; Resmini, & Rosati, 2011; and Ding, & Lin, 2010).

Conclusion and recommendations

Library websites are not something that a library or an institution can afford to brush aside as a simple extra. For many library users, the library website is the library (Duncan, & Holliday, 2008, July) and for some users it may be the only part of the library they ever see.

This study found that in many areas New Zealand tertiary library website are not falling too far behind current best practice in IA. Many sites included key IA features, provided a variety of searching options, grouped information logically, had clear navigation and used user-friendly labels. The average total percentage match of sites to the checklist was 81.2%. This is a satisfactory score overall, showing that New Zealand tertiary library site's IAs have been developed to a good standard, with particular strength in the effectiveness of the sites' navigation systems and in the clarity of the labelling terms used.

The degree to which the sites matched the checklist does leave some room for improvement. It is recommended that libraries work toward strengthening their library branding within their institution. Some criterion that the sites did not match well with were ones that required the library branding to be clearly indicated on the site, that the library have its own site search and its own site map. These reflect each library's need to show it is a valuable part of its institution and should be given the resources it needs to develop these parts of its site to a standard that works best for students. This also includes upgrading to more user-friendly searching tools like federated searching. Another recommendation is that libraries look at their sites from a more user focused perspective, making it clear to users through the language that is used and even in the clarity by which the site is organised, that the site is designed firstly with users in mind.

This study has produced many valuable results that can be useful for current practice and for research in the future. The checklist developed in this study may be used for library sites in many places around the world, as many of the criteria were gleaned from studies outside New Zealand. The results of the comparison of the sample of New Zealand tertiary library websites against the best practice checklist gives some indication of where these site stand

against current best practice and this can be generalised to the wider population of these sites. This study shows that tertiary library sites in New Zealand currently have good standard in their IAs and it also shows areas that can be developed to make these sites even better.

For a site to have a good IA it is important for those who manage it to keep up-to-date with what good IA looks like. Resources like time and money don't have to entirely dictate the quality of this element of a website. Things like simplifying language and making important information available and prominent on a site can go a long way to improving a site's usability. However, the quality of a site's IA is not something that can be determined by the sites developers because they come from a different perspective than users and this may cause their definition of good IA to be different (Kim, 2011, September). In the end, it is important that the quality of a site is defined by its users (Crowley et al., 2002).

Though this study's aim was to provide a broader and more general look at what good IA is, the very best way to know what makes a specific website usable and its information findable for users is to ask them (Krug, 2000). Conducting usability tests on a website can reveal a huge amount about how the users of a site think, what makes sense to them, what does not, and what their priorities are. This is not always possible for website managers and in these cases it may be best to use the best practice checklist created in this study or a similar list of criterion, to adjust their website, and then be proactive about collecting any feedback from the site's users and continue to develop the site accordingly.

The strongest theme that has come through in this study is the importance for the IA of library websites to be user focused. The literature has been very clear that websites primary design principle should be to design sites around user tasks (Detlor, & Lewis, 2006; Kim, 2011; Surla, 2007, August/September; Born, 2007; Hulseberg, & Monson, 2011; Duncan, & Holliday, 2008, July). It is no longer acceptable to ask users to conform to library practices, however logical or long standing they may be. The library and its website exist to serve the user and they should be designed to do just that. Library sites are the gateways to vast amount of information (Aharony, 2012) and a good IA makes it clear to users that this gateway was designed for them and that it is wide open for them to use.

Future research

Future research should aim to do more in depth investigation into the area of library website IA. This research project was limited by its small size but it could be expanded in future studies. In this research the criteria were not able to be weighted in terms of their importance, so a criterion that is crucial for usability was given the same weighting as a

criterion that is simply helpful. To have weighted these would have produced more useful results but this kind of literature analysis would only be possible in a bigger project.

Another aspect of this project that could be extended in future research would be undertaking a more extensive and thorough literature analysis. The best practice criteria checklist was created to be a full list of currently relevant criteria. However, it is not possible to determine if it is a comprehensive list of all aspects of IA for websites without doing a more extensive investigation of current literature. This study focused mostly on academic resources but there is a large body of information available about IA on the open web that was not explored. This added information would give a better indication of whether the criteria are accurate in that they are able to thoroughly examine each website's IA.

This project gives a general overview of best practice, where future research could be more targeted. Future research could look more in depth into specific user populations and specific sites in New Zealand to discover more clearly what it is that they want and need from the IA in their tertiary library website. This would allow a more accurate and specific examination of the need of the users in individual institutions.

Other research could use the checklist from this study to examine the IA of websites of other tertiary institution and some of the criteria for other library sites around the world, to see how New Zealand sites compare against sites in countries like Australia, the United States of America or the United Kingdom. This would give New Zealand a bench mark with which to compare themselves against other similar institutions outside of New Zealand. This also has potential to reveal areas where these other sites performed well and for the methods used to be considered for possible implementation on other sites.

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Appendix A: Tertiary institutions in New Zealand

Institutions selected for analysis are highlighted in yellow.

Name	Region	Library website	EFTS in 2012
Universities			
Auckland University of Technology	Auckland	http://www.library.aut.ac.nz/	26,787
Lincoln University	Canterbury	http://library.lincoln.ac.nz/	3,036
Massey University	Wanganui	http://www.massey.ac.nz/massey/research/library/	19,704
University of Auckland	Auckland	http://www.library.auckland.ac.nz/	32,657
University of Canterbury	Canterbury	http://library.canterbury.ac.nz/	13,171
University of Otago	Otago	http://www.otago.ac.nz/library/	18,951
University of Waikato	Waikato	http://www.waikato.ac.nz/library/	10,371
Victoria University of Wellington	Wellington	http://library.victoria.ac.nz/library/	16,787
Polytechnics			
Aoraki Polytechnic	Canterbury	http://www.aoraki.ac.nz/student-support/aoraki-polytechnic-library	2,012
Bay of Plenty Polytechnic	Bay of Plenty	https://www.boppoly.ac.nz/go/library	3,204
Christchurch Polytechnic Institute of Technology	Canterbury	http://www.cpit.ac.nz/services-and-support/Learning-support/library	6,094
Eastern Institute of Technology	Hawks Bay	http://www.eit.ac.nz/students/library/	4,472
Manukau Institute of Technology	Auckland	http://library.manukau.ac.nz/	7,951
Nelson Marlborough Institute of Technology	Nelson	https://nmit.softlinkhosting.co.nz/liberty/libraryHome.do	3,231
NorthTech	Northland	http://www.northland.ac.nz/For-Student/Library.aspx	3,572
Open Polytechnic	Wellington	http://library.openpolytechnic.ac.nz/	5,564
Otago Polytechnic	Otago	http://www.otago.ac.nz/library/robertson/	3,314

Southern Institute of Technology	Southland	http://catalog.sit.ac.nz/liberty/libraryHome.do	3,582 (2011)
Tai Poutini Polytechnic	West Coast	http://library.tpp.ac.nz/elmweb/jadehttp.dll?newwebopac	2,454
Unitec New Zealand	Auckland	http://library.unitec.ac.nz/	8,657
Universal College of Learning	Wanganui	http://library.ucol.ac.nz/	3,677
Waiariki Institute of Technology	Bay of Plenty	http://libcat.waiariki.ac.nz:8080/liberty/libraryHome.do	4,080
Wellington Institute of Technology	Wellington	http://library.weltec.ac.nz/	4,401
Western Institute of Technology Taranaki	Taranaki	http://libraryhome.witt.ac.nz/home	2,087
Whitireia Community Polytechnic	Wellington	http://www.whitireia.ac.nz/resources/Pages/LibraryPage.aspx	5,030
Wintec: Waikato Institute of Technology	Waikato	http://opac.wintec.ac.nz/vwebv/searchBasic?sk=en_US	6,702
Wanangas			
Te Wananga O Aotearoa	Waikato	http://www.twoa.ac.nz/Tauira-Students/Te-Pataka-Maramatanga-Library.aspx	20,280 (2011)
Te Wananga O Raukawa	Wellington	http://www.wananga.com/index.php/library	1,318
Te Whare Wananga O Awanuiarangi	Bay of Plenty	http://library.wananga.ac.nz/library/	2,786 (2011)

Appendix B: Best Practice Criteria Checklist

Site features

1. Is the library's parent organisation clearly indicated on the home page? (Hulseberg, & Monson, 2011)
2. a. Is the library logo present. b. Is it located at the top of the home page? (Born, 2007)
3. Is the navigation clearly distinguishable from other features on the site? (Nielsen, 2011, January 1)
4. a. Is there a help feature on the site. b. Is it easily accessible? (Born, 2007)
5. a. Is there contact information on the site. b. Is it easily accessible? (Born, 2007; Hulseberg, & Monson, 2011)
6. Does the site have a site map? (Born, 2007; Detlor, & Lewis, 2006; Le, 2006; Tedesco et al., 2008)

Searching

1. Unless site is very small, a site search box is present? (Krug, 2000)
2. Is the site search easily accessible? (Hulseberg, & Monson, 2011)
3. Is there a library search box for federated searching? (Detlor, & Lewis, 2006)
4. Is the library search box in a prominent place on the home screen? (Detlor, & Lewis, 2006; Born, 2007)
5. Are the search boxes clearly labelled as to what they are searching? (Lehman, & Nikkel, 2008)
6. Are resources able to be searched by subject? (Hulseberg, & Monson, 2011)
7. Are resources able to be searched by format? (Hulseberg, & Monson, 2011)
8. Are resources able to be searched by course? (Hulseberg, & Monson, 2011)
9. Are there browsing options for searching? (Detlor, & Lewis, 2006)
10. For long lists of information, is a search box is provided? (Mvungi et al., 2008)

Information grouping

1. Are hierarchies used instead of flat lists? (Ding, & Lin, 2010)
2. Is the navigation hierarchy broad and shallow? (Howie, 2013; Schmidt, & Etches, 2012; Lehman, & Nikkel, 2008)
3. Is it clear what the major groupings of the site are? (Krug, 2000)
4. Are the sections clearly distinguishable from one another (i.e. Do not have overlapping content)? Lehman, & Nikkel, 2008)
5. Do menu items appear to have a logical method of being grouped? (Schmidt, & Etches, 2012; Nielsen, 2011, January 1; Morville, & Rosenfeld, 2007)
6. Is information grouped by subject? (Lehman, & Nikkel, 2008; Crowley et al., 2002)
7. Is information grouped by user? (Lehman, & Nikkel, 2008)
8. Are pages grouped by category and sub category? (Nielsen, 2011, January 1; Morville, & Sullenger, 2010)

9. Are key resources and services no more than three clicks away? (Becker, & Yannotta, 2013, March; Morville, 2005; Detlor, & Lewis, 2006)

Navigation

1. It is clear what site the navigation is for (i.e. No confusion between institution and library navigation)? (Born, 2007)
2. Do all menu buttons and links work when clicked? (Reiss, 2012)
3. Is there a home page link on every page? (Krug, 2000)
4. Is the link to go back to the home page obvious? (Born, 2007; Lehman, & Nikkel, 2008)
5. a. Is the Global navigation clear? b. And is it consistent throughout the site? (Krug, 2000; Brown, 2010; Ding, & Lin, 2010; Born, 2007; Nielsen, 2011, January 1)
6. Can the user navigate around the site starting from any page? (Morville, 2005; Brown, 2010; Nielsen, 2011, January 1)
7. Does each page give the user an indication of where they are in the site? (Nielsen, 2011, January 1; Schmidt, & Etches, 2012; Krug, 2000)
8. Is it clear, on each page, what the page is about and what it can do for the user? (Becker, & Yannotta, 2013, March; Krug, 2000)
9. Do pages suggest connections (i.e. Links to other places in the site or outside)? (Resmini, & Rosati, 2011; Nielsen, 2011, January 1; Ding, & Lin, 2010)

Labels

1. Do labels represent the content beneath them? (Morville, & Rosenfeld, 2007; Brown, 2010)
2. Are the labels used consistently throughout the site? (Lehman, & Nikkel, 2008; Reiss, 2012)
3. Are labels concise? (Becker, & Yannotta, 2013, March; Morville, & Rosenfeld, 2007)
4. Are labels precise? (Lehman, & Nikkel, 2008)
5. Are labels simple? (Nielsen, 2011, January 1; Becker, & Yannotta, 2013, March)

Specific label terms

Labels are not:
1. Cute. (Krug, 2000)
2. Marketing focused. (Krug, 2000)
3. Brand names. (Krug, 2000; Mvungi et al., 2008)
4. Abbreviations. (Hulseberg, & Monson, 2011)
5. Technical names. (Krug, 2000)
6. Ambiguous. (Born, 2007; Schmidt, & Etches, 2012; Mvungi et al., 2008)
7. Library terminology. (Born, 2007; Schmidt, & Etches, 2012; Mvungi et al., 2008)