University of Windsor
Computer Science Software Engineering

Comparative Usability Study of a University Website

University of Windsor Information Technology Services
Windsor, Ontario

Submitted To: Richard Dumala
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Submitted By: Janna-Lynn Weber
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September 12, 2005

Kate Scanlan
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Dear Ms. Scanlan,

Please accept this report entitled "Comparative Usability Study of a University Website" as my submission to satisfy my work term requirements.

Over the summer of 2005, I completed my first co-op work term with Information Technology Services (ITS) at the University of Windsor. ITS is responsible for many of the university's computing needs. I worked as part of the web team under the supervision of Richard Dumala. The web team serves many purposes within the ITS group. My main responsibility was a usability study for the university website. This included researching, testing, report writing and finally presenting my results. The intended purpose of the study is to identify critical problem areas with the website and make recommendations to improve the general usability of the site where I can. This report will outline the methods used for the usability study.

My work term has been a positive and effective learning environment. I have been able to make and achieve my goals easily and competently with the help of my supervisor. The given tasks, allowed me to not only learn new application of website and software testing, but gave me the chance to think abstractly and make recommendations based on what I have learned. Being able to present my results also allowed me to develop my poise and presentation skill, which will be significant in my future plans. The experience I gained at the placement I will carry for the rest of my life.

I would like to thank Richard Dumala for his excellent guidance and criticism. The advice he has shared with me is something that I will take with me to my career in the future. I would also like to thank him again for the opportunity and experience of working at ITS.

Sincerely,

Janna-Lynn Weber (#101494942)

Executive Summary

Background

The fundamental cornerstone for making an effective website is usability. Making a website easy and efficient to use will improve a visitor's impression of the site and, specifically in the university's situation may increase the number of student applicants. The University of Windsor's website www.UWindsor.ca is a comprehensive website used by many people. The target audience includes students, faculty, staff, alumni and guests. This target audience is common among most university websites. The audience and information presents an opportunity to perform a different kind of usability study: a comparative study. This study incorporates the methodology used in many usability studies, but includes a comparison of other university sites as well, in order to study and learn from the common design and layout features of the university websites.

Objectives

The study's objectives are to gather information about the University of Windsor's website -- how it is perceived and how it is used. We will get a general overview of the website and how target audiences use it. The university's website will be compared against two other universities in order to assist in pinpointing navigation and usability flaws. With this information, we will be able to implement changes, if necessary, to improve the quality of the site; gaining experience in existing usability methodologies and developing new methodologies that are specific to the post-secondary education genre of websites.

Method

Over the course of the usability testing for this study there were two types of tests. The first would perform the tasks without the aid of the search bars. The second would compare two university sites directly. Under both types of test, visual observations are made while the test is taking place. The participant is asked to talk aloud and is taped so his or her thoughts can be considered later. During the test a computer program records each page visited and the time. Calculations after the tests determine the time to complete a task, the number of clicks and the number of searches. Comparison of the data through analysis of variance (ANOVA) shows the quantitative strengths and weaknesses of each site on each question. Most of the information in this report will focus on the second of the two tests.

Findings and Recommendations

The methods and procedures used during the testing period provided a number of results. The methods themselves worked to clearly demonstrate the intent of the study. Possible software and human related errors have been identified. Careful monitoring of the test and statistical analysis is needed. Recommendations for the future include follow up studies and careful look at the task questions and their goals.

Contact

For information about the University of Windsor's website or web development please contact Richard Dumala at ITS at Dumala@uwindsor.ca. For more information regarding usability studies or this report please contact Janna-Lynn Weber at ITS at Weberd@uwindsor.ca.

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Introduction

What is a Usability Study?

There are many definitions of usability; Jakob Neilsen, a respected usability expert, claims that "Usability is a quality attribute that assesses how easy user interfaces are to use." (http://www.useit.com/alertbox/20030825.html) Usability is applied to a wide range of tools or systems. The most common use is software engineering. The term "user-friendly" is often applied to usable software. The better the usability of a product the more user-friendly it is. Occasionally however, people use the term user-friendly while referring to accessibility. Usability and accessibility are different. A website can be accessible without being usable, and vice versa. Accessibility usually refers to how users with disabilities negotiate a website. We will only be focusing on usability for the purpose of this study and report.

Usability testing is quickly becoming common practice for good website design, especially in the commercial sector. There are a variety of ways to test a website, and many ways to interpret a result. Strictly speaking, there are no standards to follow when performing a usability study. It has been showed that even when two people test the same product, the interpretations may be different. Looking close at what you would like to test, such as navigation, content or vocabulary, will indicate more about how the test should be performed, for example, task oriented or user focused. Fact based questions are good for testing navigation. More subjective questions will point out the design and layout flaws. It is key to note that there is no magic bullet that can be used to determine if a website has achieved a final optimal performance level of usability. This desired performance level is more difficult to achieve on a University website because of the complexity of the site itself. Therefore, it is crucial that ongoing usability testing be used to improve the website. This report will mainly focus on the methods used while testing the University of Windsor's website and the recommendations that followed.

The Nature of University Websites

Many commercial websites have individual aspects of their business, which they want the customer to focus on. University websites are an entirely different breed of website. The audience, information and purpose present different opportunities and obstacles for university websites. In many commercial websites the audience is specific to a certain demographic of the population. On university websites, the audience is unlimited, young and old users from any nationality are accessing the site. This makes it hard to target the information in a suitable way for everyone to enjoy and understand. The information presented has to be clear and a distinction of audience type sometimes has to be made if visitors need to use the information in different ways. For example, a current student and a prospective student would need to know different information about how and when to register. Finally, the purpose of a university website is not entirely to sell a product, or entertain a guest, but to inform and educate. The purpose also depends on the audience member. Sometimes it has a specific focus other times it is much more self-driven. In the case of prospective students, we want to attract them and have them apply for admission right away. On the other hand, when looking at current students their purpose on the site is mostly self-driven. They are looking for information that will help them as students. The university website can prove to be a very powerful tool when designed and used properly.

A Direct Comparison Test

Most university websites share common features. It would be reasonable to assume that visitors should use all the sites in the same manner. It follows that we should be able to identify and use the features and structures found on other university sites that are proven to work best. The design of this study is to compare usability among university websites. Participants were asked to complete a set of tasks at two different university sites to determine if even subtle differences in design can have a profound effect on usability. For example, is "Find a person" easier to understand than "Campus Directory"? What has been shown is, if the link is easier to understand, the user will complete the task at a faster rate. The participant's skill level becomes a negligible factor, since performing well on one site would imply performing equally as well on the second site unless the functionality of the site differs.

Method

Choosing the Websites

Obviously, we cannot test all university websites together at the same time. Therefore, the first step is choosing a meaningful set of websites. For this study, three websites were taken into consideration: University of Windsor, University of Alberta and McMaster University.

University of Windsor

The University of Windsor website is the primary focus of this study. From a technical point of view, the website has at least four integrated structural levels. First and second level pages would be considered the main home pages or entry points for the target audiences. The one first level or homepage is the university's entry point. Second level pages are designed for one of the five self-identified visitors groups: prospective students, current students, faculty and staff, alumni and guest and visitors. Third level pages can be used by the department as an introductory page where as fourth level pages are used to present information and use forms to gather information. The website appearance and navigational tools are designed to be consistence throughout the site. Many notable usability experts such as Steve Krug and Jakob Nielsen will agree that consistency is important for the user's experience.

The website also has many other inherent properties. The website serves as many as 31,000 web pages each day during the academic year to about 12,500 students. These pages serve the needs of a complex audience with widely varying demographics; young, old, rich, poor, Canadian, International, etc. The website has many forms and web applications to assist visitors including: a Google powered search engine, a campus directory of staff and faculty, and the newest feature a directed search facility called intelliResponse or askUwindsor question search[3] to name a few.

The general layout of the website (Fig 2.1) consists of a banner at the top of the page which integrates the university's corporate identity, tagline and links to the five self-identified groups. Below this is a toolbar containing the Google search on the left and the askUwindsor search. Finally, the table of contents, Quick Links, and contact information are listed along the left hand side. The rest of the page is devoted to the presentation of information in graphic and text.

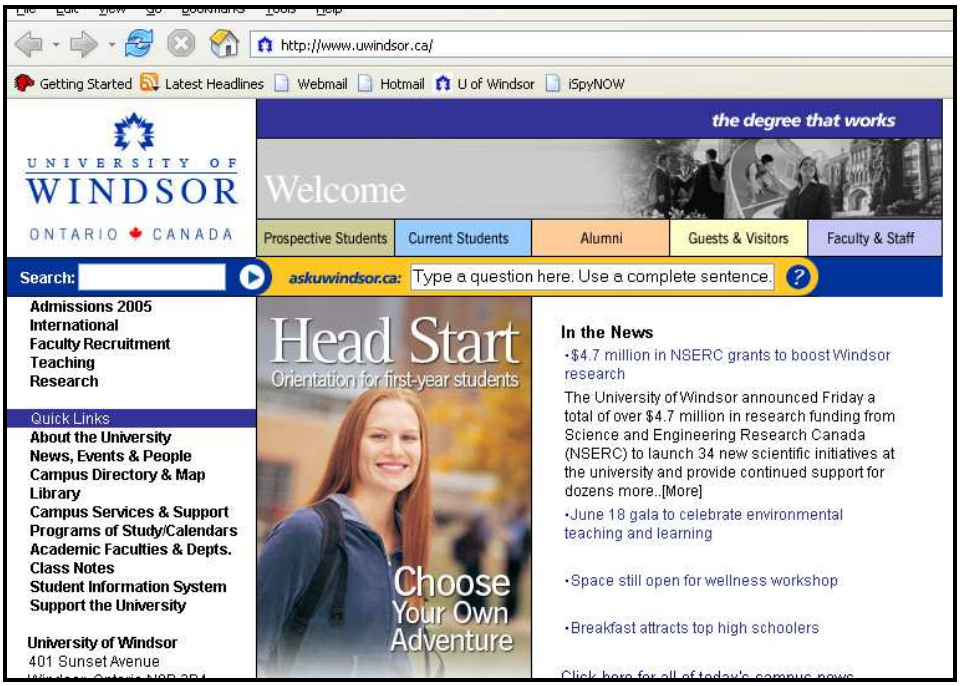

Fig 2.1 – www.UWindsor.ca

Here is the first level page as it was at the time of testing. The basic layout is consistent with the rest of the website.

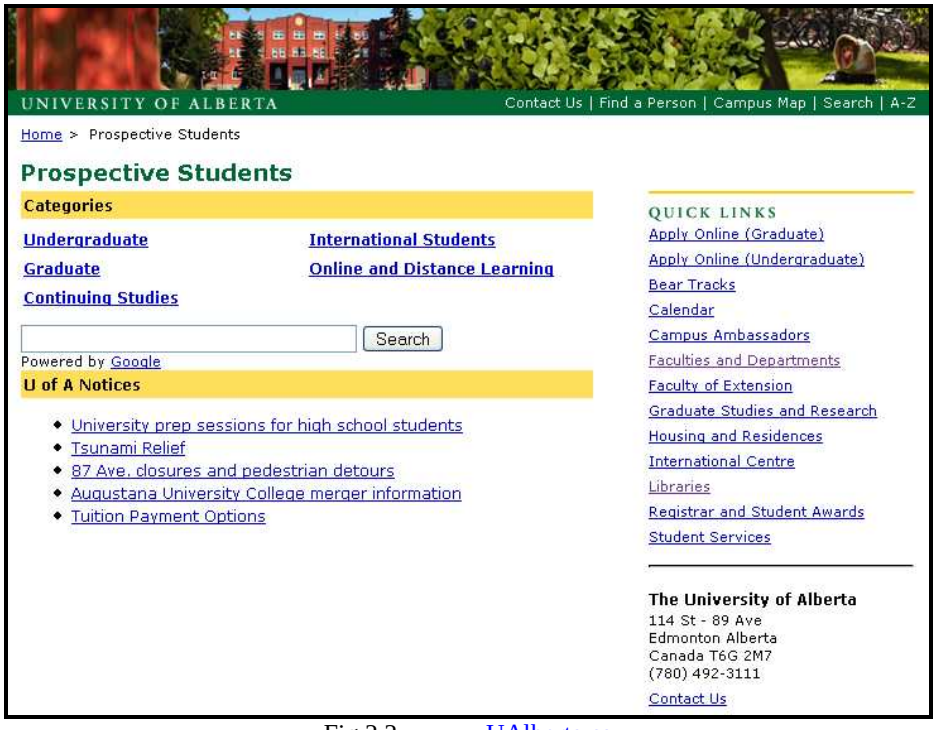

Fig 2.2 – www.UAlberta.ca

Alberta's front page consists of a different layout from this one. However the layout provided here is common to most pages.

University of Alberta

The large university located in Edmonton, Alberta, host over 35,000 students in 370 programs. The University of Alberta recently (2003/2004) changed the layout of their website to a common template. During this change, they performed a usability study to assess the ease of use of the new layout. They have posted their report online and feel confident about the usability their new layout. The layout is different from Windsor's, it consists of a banner at the top followed by breadcrumbs[4] just underneath. In addition, Alberta's site places most of their table of contents and quick links along the right hand side. (Fig 2.2). It is useful to use this website because the layout is greatly different from Windsor's. Because of the differences, we can see what works or does not from a layout point of view.

McMaster University

Located in Hamilton Ontario, McMaster University is only slightly bigger than the University of Windsor with a current enrollment of 18,000 students. They have not performed a usability study in recent years, or at the very least have not posted it to the public. It was interesting to test against their site because they have a similar layout to Windsor's website. They have their main banner at the top of the page followed by a table of contents and quick links at the left hand side, as shown in Fig 2.3. This made it easy to emphasize the differences in the vocabulary used.

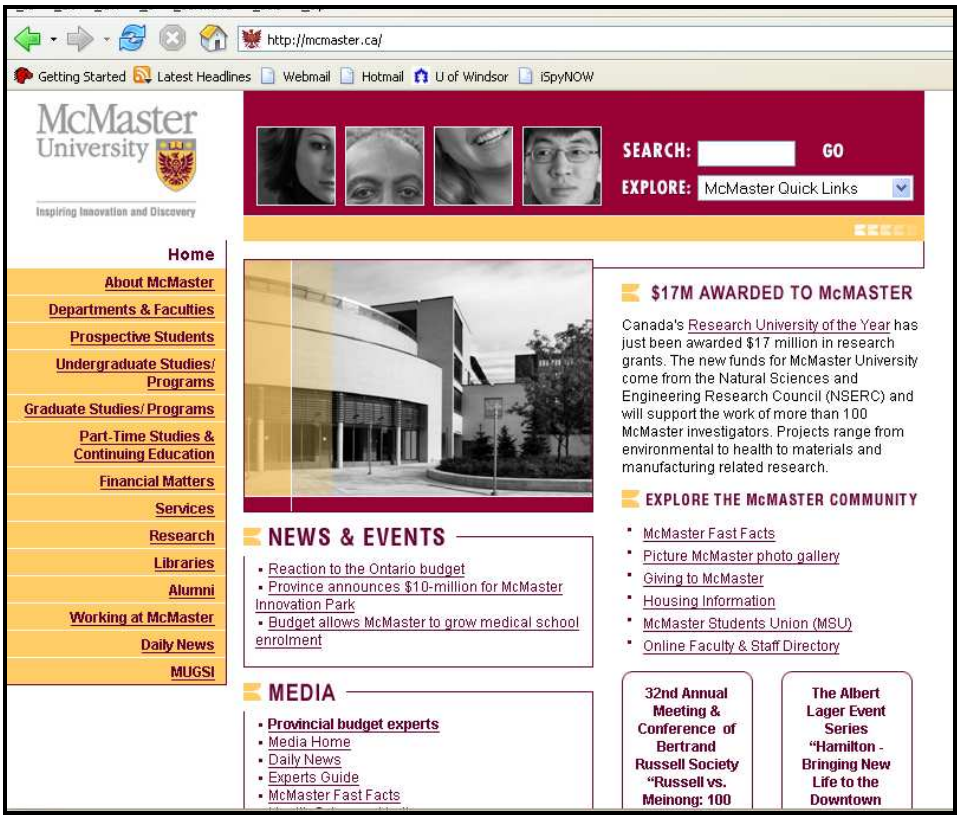

Fig 2.3 – www.McMaster.ca
This is the common look of each page. Colors, underlining and the pull down menu will play a big role in this sites usability

To account for network time of the websites, from the different servers, the need for a correction factor was assessed. Trace routes[1] were performed for each of the websites, from the university, as well as off campus. The average trace time was calculated and determined to be at worst 0.3 of a second difference[2]. This was determined to be negligible and there was no need for a correction factor.

Context

For this usability study, there were two variations of the test. At random, the participants will be asked to perform one of the two. Along with performing the test the participant was asked to talk aloud about what they are doing, what they are thinking and why they believe that. This is to get a better understanding of the participant's actions. The recorded thoughts gave us additional insights that a straightforward numerical approach might not have revealed. In many commercial usability tests, a video camera or video feed is set up to watch all the screen movements. The video capture was not used because it was felt the participants would be too nervous about the test.

Participants were asked to find nine websites or a fact about the university. These nine websites or facts represent common tasks most visitors would do. For example, asking the participant to look for the professors email address instead of asking where the staff directory is. Start to finish time was recorded as well as the number of searches and the number of clicks[5]. This information was recorded using the data collection software[6] to help eliminate human errors in the collection process. This software gathers all keystrokes and websites visited, recording the date and time. This tool eliminated a lot of the moderators work in the process. Under normal conditions the moderator of the test would have to time and record each task. Viewing a list of websites visited in sequence would be virtually impossible.

During the first test, participants were asked to complete the nine tasks on the University of Windsor's website without using either, the Google powered search or the askUwindsor bar. This was to evaluate the navigational abilities of the site by revealing when the vocabulary is unclear or when it seems like there is no way to find the information.

The second test required participants to perform random selection of the original nine tasks on Windsor's website. Then repeat the same questions on either Alberta's or McMaster's website. In this manner, the study is able to keep most factors equal to show the dramatic differences in the sites and not the users.

Participants

Testing was carried out over 13 days from May 26 to June 10 at various locations on the campus. Most of the testing took place at the CAW center during HeadStart (May 26 to June 3) when prospective students could be interviewed. Staff, faculty, guests and current students were interview during the last week. All participation was voluntary. Forty-seven participants took part in the study, thirty prospective students, ten current students and seven faculty, staff or guests. Prospective students are those planning to attend the University of Windsor in the fall. Current students included undergraduate and graduate students who are presently enrolled at the university. Faculty, staff and guests consisted of those who work or teach at the university or those who are attending conferences. Participants were asked to complete a short survey that described their internet usage habits. This data is shown in Table 2.1

Participant Table

Education	Currently	YOB	Online per Week	On Windsor's Site
High School	Prospective Student	1987	8 to 12 hours	Weekly
High School	Prospective Student	1987	12 to 16 hours	Weekly
High School	Prospective Student	1987	12 to 16 hours	Weekly
High School	Prospective Student	1987	0 to 4 hours	Monthly
High School	Prospective Student	1986	4 to 8 hours	Monthly
High School	Prospective Student	1987	8 to 12 hours	Monthly
High School	Prospective Student	1987	4 to 8 hours	Monthly
High School	Prospective Student	1987	0 to 4 hours	Monthly
High School	Prospective Student	1987		
High School	Prospective Student	1987	4 to 8 hours	Weekly
High School	Prospective Student	1986	12 to 16 hours	Monthly
High School	Prospective Student	1987	8 to 12 hours	Daily
High School	Prospective Student	1987	4 to 8 hours	Daily
High School	Prospective Student	1987	0 to 4 hours	Monthly
High School	Prospective Student	1986	4 to 8 hours	Weekly
High School	Prospective Student	1987	4 to 8 hours	Weekly
High School	Prospective Student	1986	12 to 16 hours	Weekly
High School	Prospective Student	1987	0 to 4 hours	Weekly
High School	Prospective Student	1987	0 to 4 hours	Weekly
High School	Prospective Student	1987	4 to 8 hours	Weekly
High School	Prospective Student	1971	8 to 12 hours	Weekly
PhD	Guest	1973	8 to 12 hours	Weekly
High School	Prospective Student	1987	8 to 12 hours	Weekly
High School	Prospective Student	1988	4 to 8 hours	Weekly
High School	Prospective Student	1987	16 + hours	Weekly
High School	Prospective Student	1986	16 + hours	Monthly
High School	Prospective Student	1987	4 to 8 hours	Weekly
High School	Prospective Student	1987	12 to 16 hours	Monthly
High School	Prospective Student	1987	4 to 8 hours	Each Semester
High School	Prospective Student	1987	16 + hours	Monthly
High School	Prospective Student	1987	0 to 4 hours	Monthly
Graduate	Current Student	1975	0 to 4 hours	Daily
PhD	Staff	1959	16 + hours	Daily
Graduate	Current Student	1975	16 + hours	Daily
PhD	Faculty	1948	4 to 8 hours	Daily
Undergraduate	Staff	1981	16 + hours	Weekly
Graduate	Current Student	1973	12 to 16 hours	Daily
Undergraduate	Staff	1973	16 + hours	Daily
Undergraduate	Current Student	1982	4 to 8 hours	Daily
Graduate	Guest	1975	16 + hours	Weekly
Undergraduate	Current Student	1984	8 to 12 hours	Daily
Undergraduate	Current Student	1983	16 + hours	Monthly
Graduate	Staff	1957		Daily
Undergraduate	Current Student	1979	16 + hours	Daily
Undergraduate	Current Student	1985	16 + hours	Daily

Undergraduate	Current Student	1982	16 + hours	Daily
Undergraduate	Current Student	1984	16 + hours	Daily

Table 2.1 – Participant's Table
The participant fact sheet that was used in the study and
Information collected from the questionnaire

Tasks

The tasks were designed to get the participant to use commonly accessed information and features of the site. Table 2.2 is a list of the questions used and a brief description of the intended purpose of the question.

Task	Reasoning
What is the phone number of the Library?	Question 1 is intended to get the user to find the library site and the contact information.
Who is the current Dean of Science?	The dean of science question was used to locate specific faculties or to see if people would use the campus directory with the department feature.
What is [Professor's] email address?	The question was intended to find and use the campus directory.
What time can you go for a campus tour?	This is a common guest or prospective student question.
Who is the President of UWSA?	This question was created with the current student in mind, and if they can find information about their student government.
What time is the Health Clinic open?	The health clinic is a sample of the campus support and service site.
What is the entrance average needed for Science?	This question was used to locate the admission requirements for a prospective student.
What is the slogan on the Lancers Webpage banner?	This provides a demonstration of the athletic and recreational pages of the website.
When was the fall 2005 timetable revised?	This question slightly changed into locating the master timetable for the fall semester; designed for the current students as well as the prospective students.

Table 2.2 – Task list
A list of all the tasks asked during the study.

Resources

The same facilities and equipment was used for the entire study. Participants used a new Toshiba notebook on a high speed, 100 megabit LAN connection to complete the tasks. The computer was equipped with data collection software, called ISpyNow, which would record date and time of each website visited. For compatibility issues with the software, all users preformed the tasks using Microsoft Internet Explorer. Testing took place mainly in the CAW centre with the occasional test elsewhere, but always within the university network. At all locations, a level of distraction was included; these distractions would be equivalent to using the internet anywhere. Whenever possible the external factors were kept constant to minimize their influence on the results.

Instructions

If the participant agrees to perform the study, they must first sign a waiver of permission. Following the agreement, general instructions are given:

1. Ask the participant to be honest about the website and its features. This is a test of the website and not the participant.
2. Ask the participant to talk aloud about what they see and feel about the site.
3. The participant is then asked randomly to complete test one or test two. Given test two they will be asked to go onto the first university's website and complete a task. Then go to the second university and complete the same question. Important to note, for this test, make sure one of the universities is the University of Windsor; Windsor cannot all ways be first and the same question cannot always be first.
4. Repeat until a selection of questions have been completed.
5. Finally, when the participant has completed enough questions, as determined by the moderator, they were asked to complete a short questionnaire about themselves and their internet habits.

Collection and Scoring

Qualitative data was collected by observing the participant, making notes and listening to the audio tapes. While the participant completed each task, the moderator of the test watched where they were going on the screen. Occasionally, the moderator would ask questions to prompt the user to give general thoughts or a description of their actions. Each participants questionnaire had an essay question about their "likes and dislikes" of the Windsor website. The qualitative data was complied and used to assist in the interpretations of the quantitative results, to create recommendations.

The data collection software provided a list of web pages to create a basis for subsequent analysis. Given the list of websites visited along with the time, the time to complete each task was determined in seconds. The number of clicks and number of searches per task could also be determined. When the participant gave up it was counted as a failure and given the default time of 120 seconds. When a user continued to look and find the answer after 120 seconds, their time was also adjusted to a maximum of 120 seconds to reflect a failure. This was done to account for failures when completing the statistical analysis.

Statistical Analysis

After the time per task was established for each of the completed tasks the information was stratified. First, it was separated by schools to keep a running tally of each school's data. Excel was used to calculate the school's average, median, standard deviation, inter-quartile range, count and confidence interval within 95%. The

information was then subdivided into task questions. This was the first level where the information (still divided by school) was compared and analyzed. An analysis of variance (ANOVA) test was performed on the sets of data. From the original set of data, the information about the University of Windsor was used to analyze by participant. Each participant's time to complete each task was recorded with his or her personal information from the questionnaire. The ANOVA test was performed using this information between the self-identified groups of prospective students, current students and others.

The directly compared tasks are sorted into Windsor-Alberta and Windsor-McMaster. The time difference on each task is calculated where a positive time means Windsor performed faster and a negative time represents when Windsor performed worse. ANOVA was performed between the two schools, as well as on each question at both schools. The average, median, standard deviation, inter-quartile range, count and confidence interval within 95% were calculated based on the difference in time.

Finally, the clicks and searches are separated by school and by question where their average, median, standard deviation and confidence interval within 95% were calculated. In addition, the clicks do not have a maximum number as the time does. What this means is there is another set of data on clicks, for when the user fails the task. Therefore, it is easy to see how many clicks take place before the user gives up on a task.

ANOVA: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Alberta	11	417	37.90909	1328.891
Windsor	18	984	54.66667	1276.471
McMaster	6	430	71.66667	1599.067

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F cit.*
Between Groups	4629.3	2	2314.65	1.723162	0.194653	3.294537
Within Groups	42984.24	32	1343.258			
Total	47613.54	34				

Table 2.3 – ANOVA: Single Factor
This is an example of an ANOVA Table use primarily in this study

The Importance of ANOVA

The ANOVA or f-test is "a statistical analysis by which variance ratios are compared in such a manner as to determine the probability that differences among populations or treatments are too large to be due to chance." (http://www.northmoortrust.co.uk/home/land_science/research_overview/glossary) The test uses f-test to show significant difference. While this test shows significant difference, the mean will indicate which group was best. This was determined to be the best test to perform on the type of statistical data presented. Table 2.3 shows a sample ANOVA table from the data collected. In this example there was no statistical difference found in the set of data.

Looking only at the means of the groups, one may assume there is a significant difference however further analysis would show otherwise.

Results

Some Selected Result

For the purpose of this report, the actual results listed here are only a small sample of the entire results. The intentions of these results are to give an idea of what the methods and procedures are capable of producing. Table 3.1 and 3.2 demonstrate the average time (in seconds) for completion of the task by the given school or group.

Average between Schools

	Windsor	**Alberta**	**McMaster**
Overall	53.25	49.20	55.11
Question 1 *	21.76	69.00	57.71
Question 2 *	65.52	31.90	53.60
Question 3 *	42.00	43.44	90.43
Question 4	45.95	34.87	21.00
Question 5	60.23	69.18	60.33
Question 6	28.37	40.11	56.00
Question 7	80.47	47.11	81.71
Question 8	54.67	37.91	71.67
Question 9 *	92.20	82.71	31.29

Table 3.1 - ***** Show when there is a statistical difference to be noted.

Average between Participants

	Prospective	**Current**	**Others**
Overall +	61.61	44.34	47.14
Question 1	23.19	12.75	24.40
Question 2 +	93.16	43.60	49.00
Question 3	56.53	26.75	40.50
Question 4	67.29	55.50	36.60
Question 5 +	75.23	34.86	31.00
Question 6	36.50	19.20	37.50
Question 7	77.41	70.00	88.00
Question 8	64.20	60.43	88.50
Question 9	95.50	73.50	60.17

Table 3.2 - + shows a statistical difference between participants

Given the above charts and the relevant ANOVA test it is shown that the dean's name (question 2) is found quickest on Alberta's website and that prospective students are the slowest at finding it at Windsor. Using the taped and moderator's information, we know that one place that prospective students were trying to find the information was under the faculty and staff tab on the University of Windsor's website. They were unaware that the tabs indicated who the site should be used by. The difference of "for

faculty and staff" versus "about faculty and staff" was unclear. Alberta did consistently better for two reasons; first, when their search was used it provided positive results the first time. The other university's searches provided too many vague results. Secondly, information about faculties and departments were easy to find from the home page, and the dean's message was a predominate link. The results can then go on to explain recommendations learned from this specific question.

Method Results

The methods and procedures used produced many results and many interpretations. For any one question, there was four ways to look at the results: by school, by participant, by clicks and by searches. ANOVA identifies clear usability leaders in some areas. Given all the data, the final interpretations were easy to extract. The four ways to look at the results would often overlap providing a strong case for the interpretation. When a task was statistically different by school or participant, it was often different by clicks or searches too.

On the negative side, there are still some drawbacks to this type of study. The dependency on the moderator; who ever moderates the tasks has to be paying very close attention and has to try not to influence the participant. Verbal comments and even body language can effect how the participant uses the site. If they pick up a clue from the moderator their time really is not completely accurate. In addition, since much of the interpretation after the test is dependant on what the moderator saw and understood it is important that he or she is are taking clear and complete notes.

Software related issues could affect the results. The data collection software is not perfect at collecting all the information. If the page does not fully load in the browser, the site is not collected. Also, if the page title does not change from one page to the next it is not collected. If the site is not recorded it will affect the number of clicks used, making the count dramatically less than it should be. This software is only compatible with Internet Explorer, and when other browsers are used the information is not collected.

Finally, some of the data refinement and statistics are done by hand. The times calculated for each task must be done by the person doing the analysis. In addition, the sorting of tasks into their proper subgroups is done by hand. This introduces the possibility for human error in the data. Human error could be a missed completed task in one subgroup or the time being miscalculated. It is possible that small macros in Excel could assist in the calculations and data sorting process.

Recommendations & Future Studies

An important part of the usability study is being able to follow up on the results. After the recommendations have been implemented, the website should be tested again to judge the effectiveness of the changes. As mentioned earlier this is not the end of usability studies at the University. Some follow up studies will be based on the results and some can be based on the method. Using the methods to guide us there should be a follow up study using different universities to see how repeatable the study is. This would eliminate the idea that the results were beneficial to a particular school just because of the schools picked. This would also provide an opportunity to learn from a new set of results. The use of a comparative study to look in depth at a particular common aspect would give insight in to how to use it. For example, most universities offer some sort of quick links to navigate the site easily. Where these links are placed and the content of them may

have a subtle influence on usability. A comparative study would be able to show what seems to work the best.

Recommendations regarding the methods cover a different scope and may need to include an increase in resources, like better data collection software or more moderators. Because of the flaws found in the data collection software, a new system would be put to good use on another usability study. Since security and monitoring children's online behavior has become a popular topic, there have been many advances in monitoring software. Secondly, it would improve the qualitative results to have two moderators for the testing period. In this way, ideas can be shared and expanded and both people would have the same reference. The trouble with only one person doing the testing is that what they observed is not always going to be what they remember or report; the tester is only human.

The final recommendation is in regards to the task questions. Due to the nature of some of the questions, the results could have changed. For example, the participants were asked to find the phone number for the library. At Windsor, this posed no problem because there is only one library. At the other universities, however, there were multiple libraries and thus multiple phone numbers.

Some of the questions can be more generalized to suit the needs of each website. The University of Windsor new web application called askUwindsor, collects and tries to answer students' questions. This tool can be used in the development of the next usability study's questions to demonstrate what is being asked that users are having trouble finding. For example, the top requested answer on askUwindsor now is "How much is Tuition?" The next usability study should include something about finding tuition fees or the cashier's office.

Conclusions

It has been shown that the nature of the University site is a different genre of website from commercial websites. When we compare two commercial websites they will have two different intents and purposes. It can be assumed that the University of Windsor website's intent is similar to that of most other University websites. Keeping this factor in mind, we are able to compare and contrast the websites in this genre. The methods and procedures laid out in this report illustrate how to do a comparison usability study; how to prepare, perform and finally interpret the results. Based on the final reports and the amount of data collected and interpreted, the study clearly was successful at demonstrating some aspects of the current usability of the university website. However, this is not the end of the testing, and the methods can be improved upon. Using the direct comparison method, many external factors can be controlled and the participant's education and internet background will not affect the outcome. This is an important factor to consider when testing for usability.

Finally, the comparison usability testing method is new and does require further assessment. The testing preformed in the spring and summer of 2005 presents a solid basis for future testing. If the recommendations are considered the testing may provide even more accurate and relevant results. The basic idea has been put into motion and proven effective; the next step is refining and improving those methods so more universities can benefit from them.

Appendix

Notes

1. **Trace Route** - TCP/IP utility that calculates the time and route between the source and destination of two machines on a network. A number of packets containing small amounts of data are sent to the destination. Each hop along the network is recorded and the average time is calculated.
2. **"The average trace time was calculated and determined to be at worst 0.3 of a second difference"** - A trace route software package called VisualRoute was used to determine the average trace time for each website. The tests ran over 4 days from 2 different locations, one within the university's network and one outside. The trace's that took the most time were from within the campus. Using confidence intervals of 95%, the maximum time to travel along the network is 318.92 ms, which is 0.319 of a second.
3. **Bread Crumbs** - A new navigation technique used for websites. A usually horizontal listing of links to the previous pages that were used to navigate to the current page. Used in this manner they provide a trail for the user to follow to go back as far as they feel necessary.
4. **askUwindsor** - askUwindsor is the new search function on the University of Windsor's website. Powered by the intelliresponse system the search uses predetermined answers and criteria to answer the questions of the users.
5. **"Number of clicks"** - The number of clicks refers to the number of websites visited from start to finish of a task. Clicks meaning mouse clicks from one page to the next. The number is determined by using the data collected and counting the websites.
6. **"Data collection software"** – This software from ISpyNow is essentially a spyware virus. More information on the data collection software can be found online at www.i-spynow.com.

Materials

The following two pages are the actual material used in the usability study and have been include as a reference for future studies. The task list of the questions used and the post test questionnaire. The official post test questionnaire was made available online at: http://cronus.uwindsor.ca/units/its/Usability/Study.nsf/UsabilityQues?OpenForm

Usability Study Task Questions

Please find the following: Allowed (Search / No Search)

1. What is the phone number of the Library?
2. Who is the current Dean of Science?
3. What is Dr. Kent's email address?
4. What time can you go for a campus tour?
5. Who is the President of UWSA?
6. What time is the Health Clinic open until?

7. What is the entrance average needed for Forensic Science?
8. Name a headline from the Daily news
9. What is the slogan on the Lancers Webpage banner?
10. Describe SIS and what it is used for?
11. When was the fall 2005 time table revised?

Usability Study Questionnaire

Number: Date: Start Time: End Time:

1. What is your Current Educational Background?
    a. High School
    b. Undergraduate
    c. Graduate
    d. PhD
    e. College

2. What best describes you?
    a. Current Student
    b. Prospective Student
    c. Staff
    d. Faculty
    e. Guest

3. What year were you born? _____

4. How often do you use the internet during the week?
    a. 0 to 4 hours
    b. 4 to 8 hours
    c. 8 to 12 hours
    d. 12 to 16 hours
    e. 16 + hours

5. What type of sites do you normally visit?
    a. Commercial (ex. Amazon.ca or Pepsi.com)
    b. Informational (ex. Google.com or Wikipedia.org)
    c. Entertainment / Humor (ex. YahooGames)
    d. Blogs (ex. Blogger.com)
    e. News (ex. CNN.com)

6. How often do you use the University of Windsor's website?
    a. Daily
    b. Weekly
    c. Monthly
    d. Each Semester
    e. Never

7. Rate the UWindsor.ca Website's Functionality out of 10? (1 – Worst, 10 – Best)

8. How do you feel after the test?

a. Happy
b. Intrigued
c. Tired
d. Stressed
e. Indifferent

9. What do you dislike the most of the University of Windsor's website?

10. What do you like the most?

Bibliography

Chi, Tom and Kevin Cheng. OK/Cancel. http://www.ok-cancel.com

Krug, Steve. Don't Make me Think: A Common Sense Approach to Web Usability. Indianapolis : New Riders Press, 2000.

LaTrobe University Usability Studies
http://www.latrobe.edu.au/its/usability/testing.htm

Nielsen, Jakob. Usability Engineering. San Francisco, Calif. : Morgan Kaufmann Publishers, 1993.

Neilsen, Jakob. Useit.com: Jakob Neilsen's Website. http://www.useit.com

Pearrow, Mark. Web Site Usability Handbook. Rockland, Mass.: Charles River Media, 2000.

Poock, Michael C. and Dennis Lefond. "How College-Bound Prospects Perceive University Websites: Findings, implications, and turning browsers into applicants." C & U Journal Summer 2001: 15-21.

Pula, Katie and Sylvia Smith. Usability Testing Methods: Usability Methodologies and Strategies. McGill, March 15, 2004

Sauro, Jeff. Measuring Usability. http://www.measuringusability.com

Schaffer, Eric. Institutionalization of Usability A Step-By-Step Guide. Boston Mass. : Pearson Educational, 2004.

Spool, Jared, Tara Scanlon, and Carolyn Snyder. Web Site Usability: A Designers Guide. San Francisco : Morgan Kaufmann Publishers, c1999.

University of Alberta, Usability Reports,
http://www.uofaweb.ualberta.ca/usability/index.cfm