A User-Centered Evaluation of a University Website

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Abstract—**Usability of a website used to be of very little or no weight at all for the company or academe it represents. With the changing time and increase of Internet users, usability is now a major consideration as website, though virtual, plays an important role for the company or university it represents. This study illustrates the process of assessing a university website. The value of doing usability testing and how it enriches the user experience is presented. Learning about the user and their satisfaction in all aspects of the website is learned through the testing process. A five-phased usability testing methodology is discussed that resulted into qualitative and quantitative data for the researchers study. These data were transformed into information through analysis in accordance to the type of data collected. These findings were then interpreted into concrete website usability assessment. The result showed that the methodology chosen and the test plan it produced was able to output website usability problems that can help assess and greatly improve a university website's usability. Lastly, study recommendations were presented being that usability should be a never ending endeavor for a user-concerned university.**

Index Terms—**human computer interaction, user-centered evaluation, usability testing, user satisfaction, web usability, user-centered design**

I. INTRODUCTION

Website usability is a traditional concept in human-computer interaction and if implemented correctly, cultivates a positive attitude about the website in its user group [1]. Universities from all over the globe are using websites to promote their school and to attract students to enroll. The websites have been the easy access for the students and other audiences. It serves as a tool for the students to discern certain information that they are looking for.

In making the website, there are things that should be considered. The website has to be visually appealing, polished and organized. It has to cater the necessary needs of the users and contain the information that the users came in the website for.

Usability is the extent to which users can use a computer system to achieve specified goals effectively and efficiently while promoting feelings of satisfaction in a given context of use [2].

If the usability is not enough, important task can be difficult and complex tasks cannot be done. It is the breadth to which the users can manipulate computer system to accomplish specified goals effectively and efficiently while extending state of comfort to the users.

A university website is a comprehensive website that caters to different type of users: current students, faculty, staff, alumni, prospective students, parents, researchers to name a few of these user types.

This target audience is common among university websites. The audience and information presents an opportunity to perform an in-depth usability for the website and to present pragmatic findings and guidelines which can be used to improve the university website.

II. PROBLEMS

A university that acknowledges the advancements of the information age would aim to serve their stakeholders better including services over the Internet. Thus their website plays an important role as the face of the university in the virtual world. University websites, such as state universities in the Philippines, in particular, have lapses on usability. Apart from the fact that usability is not a primary concern in the websites' development, these websites cater to many user groups, hence lessen users' satisfaction. If the university website continues to violate usability convention users will be continually confused as to how to use the website and might result to loss of revenue. Furthermore, university websites lack local data and information for them to answer existing yet still unknown usability problems.

III. OBJECTIVES

The researchers would develop and conduct usability test that would determine a university website's usability. This includes establishing a baseline of user performance, establishing and validating user performance measures, and identifying potential design concerns to be addressed in order to have a more usable university website which focuses on user experience.

The researchers' specific objectives are as follows:

In obtaining the general purpose of this research, the researchers need to meet the following specific objectives:

- To create a Test Plan that will be used to verify and ensure if the website meets usability heuristic principles.

- To conduct usability testing on a university website.
- To evaluate and analyze the results of the data gathered during the usability test.
- To recommend a list of changes that could be applied on the existing university website.
- To evaluate the methodology used in assessing usability.

IV. METHODOLOGY

The researchers performed the study on one university website as the test subject. In this study, researchers chose, Mindanao State University – Iligan Institute of Technology Website (www.msuiit.edu.ph).

Figure 1. www.msuiit.edu.ph homepage

Fig. 1 is the homepage of the subject website at the time of the study. This image was captured on February 7, 2013.

The researches distilled the testing process into five phases. These phases are patterned from the process presented in Carol Barnum's Usability Testing Essentials [3].

The first phase is Data Gathering. The researchers collected data about the technology to be tested and its users. In this phase, the researchers chose a website to be the subject of the usability test.

The researchers collected information from the web team so they can have a profile of the university website. Interviews were done to existing website users to have a starting point of the study. Base on the collected information, the researchers decided to test five user groups that are important stakeholders of the university website: Prospective Student, Current Student, Alumni, Faculty, and Staff. Initial interviews were done to have initial insights of the work ahead.

Second phase is Designing the Test Plan which includes the User Profiling, Team Roles, and the Preparing the Test Documents. During this phase, the researchers designed and wrote the test plan to serve as the guide in conducting the test; activities before and after the test, metrics to use, number of participants per user group, and the test scenarios.

This phase also includes the profile of the target users as participants and their set of qualifications.

There are five major roles in conducting the test: moderator or test monitor, data loggers, observers, test participants, and time keepers. These roles were distributed to the researchers and volunteers to be part in the testing team.

Screening questionnaires, background information questionnaire, pre-test questionnaire, orientation script, task scenarios and post-task questionnaire, data collection instrument, post-test questionnaire, and debriefing questionnaire are the test documents that were designed and prepared before conducting the test.

Upon completion of the test plan, the researchers were able to recruit the participants as part of the pre-testing process; thus the third phase, Conducting the Test. Prior to the actual testing day, participants are determined through screening questionnaire distribution then selecting who among them fit the user profiles.

In total, the researchers have fifty (50) participants; 10 per user group. This number is of ample amount to gain insights from these different user groups according to Jakob Nielsen, a renowned personality on web usability. [4]

With the participants scheduled, the researchers prepared then performed the actual testing: setting up the room, meeting and greeting, gathering of background information, orientation, performing actual testing, post-testing, and debriefing.

The fourth phase is Analyzing the Findings/Results. The researchers analyzed the results based on the compiled data from all subjects and focused on recurring problems, trends, and comments. The usability metrics such as completion rates, time on task (TOT) and users' subjective evaluations on rating scales was utilized in this study.

The benchmarks for the above usability metrics are as follow: average completion rate is 78% as resulted in the study of Jeff Sauro, a user experience statistics expert, of almost 1200 usability tasks [5], completion rate for per user group is the statistical mean but as for the entire 50 participants, the median was used [6]. Also, user's subjective satisfaction rating was collected using Likert-type response to questions.

Qualitative data, including the thought process through thinking out loud by the participant, post-test questionnaire open-ended questions, and interview, are used to back up the performance data.

As means of collecting the users' subjective evaluation, following suit Carol M. Barnum and Laura A. Palmer's study, the researchers used Microsoft Corporation's product reaction cards during the post-test session [7]. Word cloud was used to present the answers made from the product reaction cards as recommended by Barnum [8].

The last phase is Presentation of Results and Recommendations where the researchers presented the quantitative data and qualitative data found. Usability problems are distilled from the testing process. This is presented and was prioritized based on severity and frequency. Frequency is how often the usability problem occurred all throughout the testing process. Severity is the level to which the usability problem affected the users [9].

Base on the report from the Presentation of Results Phase, the researchers reviewed its steps and evaluated the process of assessing a university website.

V. RESULTS AND DISCUSSION

The methods and procedures used during the testing period provided a number of results both quantitative and qualitative data. The methods themselves worked to clearly demonstrate the intent of the study.

A. Quantitative Results

One of the three quantitative data collected was the completion rate. A total of 330 tasks were done by all 50 participants. Of the 330 tasks, 234 were completed giving the website's average completion rate of 70.606%. This number is below the general recommended average completion rate of 78%.

Though below average, the website's completion rate is considerably close to the 50% percentile being that it is better than 44% of all its tasks when computed base on Sauro's model on exponential nature of the cumulative distribution using a quadratic regression equation which fits well to the observed data (adj-R2 = 99.5%). [5]

Having more than 25 participants, the researchers used the median of the entire 330 TOT to find the average performance. It resulted to a median of 47 seconds.
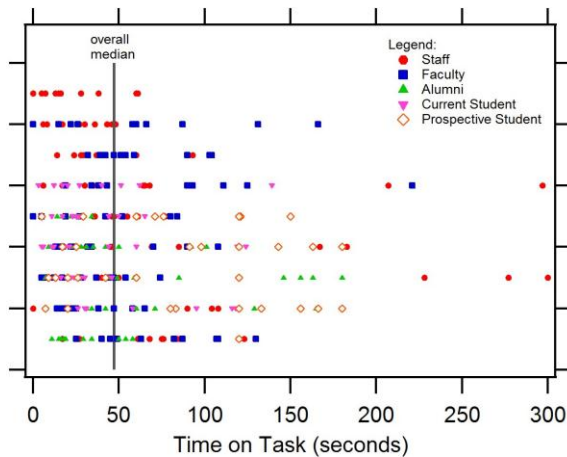

Figure 2. Time on task distribution.

Fig. 2 shows the distribution of TOT with respect to the median. Each of the five user group's TOT average was derived by getting the mean of 10 participants in that particular user group. It showed that per user groups' performance were below the 47-second average: prospective students TOT mean is 99.8 seconds, current students' TOT mean is 59.45 seconds, alumni's TOT mean is 67.24 seconds, faculty's TOT mean is 53.75 seconds and staff's TOT mean is 75.76 seconds.

The third quantitative data gathered is from the subjective user response done using the post-test session. The researchers asserted that the dominant rating participants gave to each questions is satisfactory. Such rating is collected from their response to the following statements:

- The website is easy to use.

- The navigation of the website is easy to understand.
- Finding the information is easy.
- The website gave you enough information.
- The information is presented in an organized manner.
- I find the information reliable
- I understand the content of the pages.
- The typography (letter size, font-family) is easy to read.
- The links and buttons recognizable and functional
- The contents are up to date
- The website provides complete information.
- I find the information useful and relevant.

They answer with the following rating scale: strong agree, agree, undecided, disagree and strongly disagree.
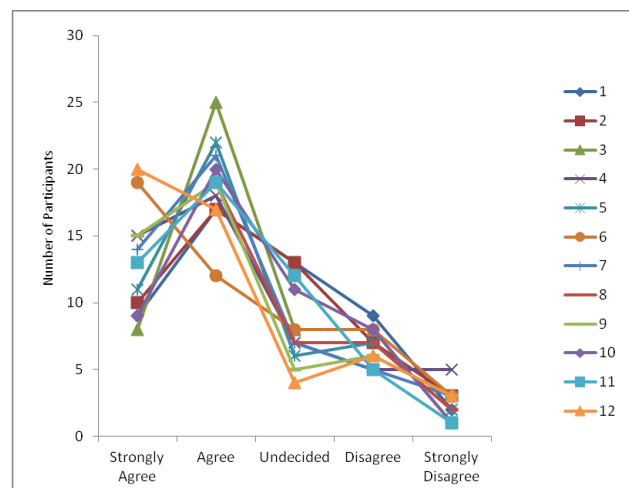

Figure 3. Subjective user response graph.

As the graph shows on Fig. 3, the results are favorable having 26.333% of users to strongly agree and 37.666% agree to the positive statements presented to them.

The quantitative data completion rate and TOT showed that the website's performance is below the average usability metrics standards on this area. On the subjective user response data, it showed that even with lower than 78% completion rate and longer time on task, the users still saw the website as satisfying for they rated agree and strongly agree to majority of the post-test positive statements about the website.

B. Qualitative Results

Qualitative data gathered from researchers' observations, user comments, interviews are presented in table format and word cloud.

TABLE I. PARTICIPANT'S NOTABLE COMMENTS AND SUGGESTIONS

Comments/Suggestions
Prospective Student
Make the website not so boring and some information are not organized.
Font is small but it's simple.
Make it more clean and easy to be explored. Give all information you can for all the recent activities of your school, especially for high school students and fresh graduates, cause I know that websites are one of the things that can give information and show what your

subjects have that give information and show what your subjects have that its worthy to read. It's not hard to use.
The background should be attractive enough to catch the attention of the visitors.
The website is not clearly giving information, difficult to find.
Put some other pictures, information, or events inside the MSU-IIT website.
Current Student
Keep the dean's list updated right after every semester, since it is one of the sections of the website that the students would likely visit and see.
The sites color should be darkened a little bit because it's too bright.
Avoid too much text content in the homepage.
Rearrange the links so that it will be visible to the users.
Alumni
More interaction for students to visit it often, like animation or cinematics, color coordination for the eyes in order to be pleasing for visitors.
There should be a page where you can process the document and can be sent to you using external carriers (LBC, FEDEX) for a more comfortable and hassle free document processing.
It should have an updated content. Announcements and memorandums must be posted there in a timely manner. Enrolment process must be applicable in the website to avoid long queue in Dep't & colleges.
The widgets are of good use; however, it somehow is confusing for the reason that all of them have the same color. If they will be designated with colors – that are of course different – then it would be easier to familiarize.
Keep information up to date. Apply online processes ex. Enrolment, application of documents at the registrar
Fixed/organized content. Consistency in design.
Too many text.
The website is full of words. Pictures on the homepage would be more effective. And try to move the widgets on the side, everything seems to be in the center.
Bigger Font size
More picture in the home page
Faculty
Map and directories now to get from one place to another, directory of the voice over IP phones (local) in the institute. Because this is really useful for new students and new faculty and staff.
Improve the search bar, add more filters perhaps for data to be easily sorted indexed and searched.
It should not look so cluttered. There are so many things, so many colors (shades in the homepage. It should look young, vibrant, boring *man gud tan-awon*).
The news should be updated.
There should be a chat room.
There should be a sounding board so that students, faculty and staff don't need to go to Facebook to air out their complaints and suggestions.
Update the chancellor's message to suit the Chancellor's message not only on Institute's activities but national and international events/affairs. Feature Outstanding Faculty, Staff, and students in the Spotlight.
I guess it is important to update this everytime (I mean monthly) so as to provide more information to the constituents. I believe there is a need to really re-develop the website because it does not look like a university website. The news should not only present the travels and activities of faculty members, though it is good, there should also be an information about our extension activities. Update this please. Make it a world-class website. Thanks!
Improve nodes, one page, no scroll, better photos, and current news.
Staff
I would suggest to provide additional information or or profile of faculty and staff e.g. age and consistency on hyperlinks or additional tab download and then group according to cost center or colleges or linkages. For Philhealth forms, pag-ibig, etc.
Make them lively
Change the color of the homepage
So far, I find it updated.
Maybe put some animation in the website.
Enlarge the font.

The participants' comments will help the reader or the web team concern visualize the severity of a problem and the users' insights [10]. Table I show some of the notable comments that the researchers felt the web team should know.

Two significant questions were asked during the debriefing sessions using Microsoft Corporation's product reaction cards. The fifty (50) participants were asked on what were the three things they liked best and were asked to pick their answers from the reaction cards.
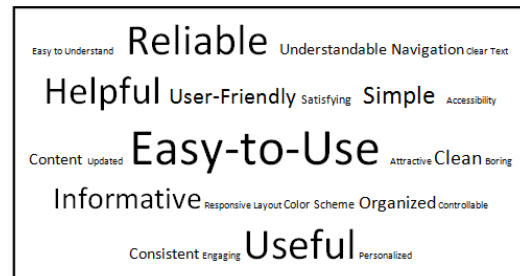

Figure 4.   Word cloud on the three things the users liked best about the website.

Their answers, reflected on Fig. 4, shows that the majority like the website because it is easy-to-use, reliable and useful.

Figure 5.   Word cloud on the three things the users liked least about the website.

When they were asked on the three things they liked least about the website, their answers as shown on Figure 5 states that they do not like that the website is boring, not updated and inconsistent.

It lacks the youthfulness that it needs to attract students, who are the website's dominant users. Also, current students and faculty participants expressed their motivation of using the website by stating that they have no choice but to use the website because they are required by their jobs or by their teachers.

On the other hand, some participants choose to use it due to functionality reasons. The fact that it is useful and helpful for their academic or professional needs.

The participants expressed that the website is satisfying as a whole, for the reasons that it gives them enough information and that it is reliable.

Participants were quite at ease in performing the specific tasks and some of them are quite loud about their opinions which are great for the study. The faculty user group has the most extensive results as they are more vocal on what they think during the testing process. In their pos-test questions and in the comment section they

also expressed dissatisfaction and they gave suggestions for the website.

C. Usability Problems Found

In this section the problems that were found during the testing are all listed down. Each of the usability problem is categorized base on problem frequency and severity of its corresponding usability problem; where severity levels are Level 1 – Prevented completion of task, Level 2 - Frustrated participant and caused significant delay on a task, Level 3 - Had a minor effect on usability and Level 4 - Caused no significant impact on performance, but participant indicated a preference or a suggestion for future changes [11].

TABLE II.   USABILITY PROBLEMS FOUND

Usability Problems	Category	Severity	Frequency
1. Some information are not updated specifically Dean's List, List of Staff Grantees, Chancellor's Message, Achievements and Awards, Tuition Fees	Content	Level 2	15
2. There are expired online services that are still listed under Online Services (My.IIT Portal, G.MSUIIT Mail, Mole, Paperless Clearance etc.)	Content	Level 2	1
3. No link to identify diploma and bachelor courses which MSU-IIT actually offers.	Content	Level 3	4
4. There is no information concerning the life of IITian.	Content	Level 3	1
5. Majority of the participants did not find the homepage attractive. The color scheme is bland and aesthetically chaotic with rest of the web element colors; and it does not picture the color of subject website.	Aesthetics	Level 3	25
6. Some participants were confused with the purpose of customizing the widgets, except from narrowing the contents of the site.	Aesthetics	Level 4	4
7. Some users are intimidated with search bar. In Figure A, this shows the search box of MSU-IIT homepage says powered by Google so the users thought it will produce Google results.	Navigation, Aesthetics	Level 4	3
8. The Systems Admission and Scholarship Examination Result search bar is difficult to use	Navigation	Level 4	2
9. Participants found each college's webpage to be inconsistent and not unified with the main and other school websites.	Aesthetics, Layout	Level 4	4
10. The students have to go through series of links before finding the specific information they are looking for.	Layout Navigation	Level 2	5
11. Some participants found the homepage overloaded with too much text content.	Layout Navigation	Level 3	14
12. Participants are having difficulty go back to the home page. They are confused as to where and what to click.	Layout Navigation	Level 4	2
13. Some texts are hard to read and often confused as hyperlink.	Aesthetics Navigation	Level 2	3
14. The participants are having hard time finding the downloadable curriculum and syllabus in every department/courses	Navigation	Level 4	5
15. Some users are having difficulty looking for student organizations because they were confused with the sudden change of the tabs layout.	Navigation	Level 4	4

The data on Table II is the basis for the prioritization of the usability problems. This will help the web team organize which usability problems to apply the recommended fix first. The ordered list of usability problems base on severity and frequency with their recommended fix can be found on APPENDIX A Findings and Recommendations.

D. Overall Result Assessment

As overall result, the researchers find that participants are satisfied in terms of functionality and getting the information they want. The subjective response from the users' both quantitative (users subjective response) and qualitative (product reaction cards) data show their positive thoughts about the website.

However, the quantitative data showed that the web team needs to improve how its users accomplish their tasks on the website thus usability problems found on content, navigation and layout is prevalent. In the comments and suggestions, the completion rate and TOT results can be understood. Apart from aesthetics improvement, the users want a more organized content and improved navigation.

Participants in general find the website helpful, especially to students and faculty members. It keeps them updated in school events, grades for students and the website serves as a portal for the faculty and staff to go to their my.iit account, where its constituents' web services are accessed.

The participants also expressed their hope for the availability of systems like online enrolment or online document requests. Participants want these parts of the website to be improved due the reason that they've experienced some difficulties in these areas.

VI. CONCLUSION

It has been shown that the nature of a University website is a different category of website from all other websites, especially commercial website. There are few factors to consider in developing a website. Some of them are content, organization, navigation, aesthetics and most importantly usability. There are different techniques that had been used by the past researches like talk aloud techniques, classification of usability problems and sample sizes.

It can be assumed that test subject website intends to provide all the necessary information and to preserve good interface. This study compelled endeavor in promoting the organization and its strive for excellence. The primary aim was to conduct a usability testing to a university website which helps in improving services in order to satisfy clients and so this test can serve as a concrete and organized user feedback for the web team. This study served as benchmark for similar studies of this kind.

The test produced results from multiple data sources. The first data source was the task completion rate. These results gave indications about which tasks the participants failed to accomplish. The second source of data was the timer sheet which results measured how long the participant performed the task. The results also showed which tasks that required a considerable amount of time. The presence of these data sources made the interpretation apparent and worthy.

From the data gathered, it showed that for most of the tasks, participants actually have completed it successfully though in a longer time frame. These process guides the researchers in analyzing what are the specific information that the participants have hard time looking for and which specific area of the website. Lastly, the participants' subjective experience with the system was measured in order to find the tasks that participants were commonly experiencing difficulties with.

Questionnaires were tallied and performed by analyzing the results from each questions. Based on the findings and the amount of data collected and analyzed, the study clearly was successful at demonstrating the positive and negative findings of the features of the current phase of the university website.

In conclusion the methodology used works well for the usability testing that the researchers performed. It guided the researchers all throughout the usability testing process and made the flow of the analysis in order. The process is not bias or detrimental to test subject website.

Nonetheless, this is not the end of the testing; guidelines in developing a university website, content-wise and interface-wise, were created and can be improved upon. Finally, the usability testing method does require further assessment. The testing performed in this study presents a solid basis for future testing and developing a university website. If the recommendations are considered, the testing may provide even more accurate and relevant results.

VII. RECOMMENDATIONS

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 review the effectiveness of the changes. This is not the end of usability studies at the University. There are a lot of aspects to be considered when conducting a usability testing. Some follow up studies will be based on the results and some can be based on the guidelines. Using the guidelines to develop university website, there should be a follow up study using different University to see how acceptable and repeatable the study based on test plan and guidelines.

APPENDIX A FINDINGS AND RECOMMENDATIONS

Appendix A is the arranged usability problems according to severity and frequency under Area of Concerns column. This document also indicates the recommended fix for each usability problem with the usability principle behind the recommendation. Illustrations are placed for a more clear understanding of the usability problem. These information are arranged in table-format.

ACKNOWLEDGMENT

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