

# The Usability of University Websites: A Study on Sri Lankan Universities

J. A.V. M. K. Jayakody<sup>a,b\*</sup>, Ajantha S. Atukorale<sup>a,c</sup>

<sup>a</sup> Faculty of Graduate Studies, University of Colombo, Sri Lanka

<sup>b</sup> Department of Computer Science and Informatics, Uva Wellassa University, Sri Lanka

<sup>c</sup> University of Colombo School of Computing, Sri Lanka

\* Corresponding author email address: vihara@uwu.ac.lk

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## Abstract

Usable website benefits universities by attracting, retaining, and satisfying their users. As knowledge-producing organizations, universities be obliged to uphold the usability of their websites. A preliminary study on user satisfaction with the Sri Lankan university websites stated that most Sri Lankan university website users are not satisfied with the usability of their university websites. It prompts the importance of studying the usability of Sri Lankan university websites by providing usability improvement recommendations. On the other hand, researchers have not focused on study the usability of Sri Lankan university websites from the perspectives of both website developers and website users. This research aimed to identify website development issues by testing websites with website testing tools and evaluate the quality of the user experience on websites using a questionnaire-based evaluation method. Results of the survey presented that, usability of Sri Lankan university websites is at an average level and different website usability testing tools have observed development issues based on the website development standards. Finally, the study recommends best practices for university website developers to improve the helpfulness, attractiveness, controllability, learnability and efficiency of the university websites in order to provide a better user experience with increasing the usability of Sri Lankan university websites.

Keywords: Website Usability, Sri Lankan University Websites, Website testing tools

## 1 Introduction

Information and Communication Technology (ICT) is an instrument to empower technology into the educational process by adding values to teaching and learning activities. It prepares the next generation to grow and develop for the 21<sup>st</sup> century. The Internet plays a leading role for that over every other ICT tool, and it is known as the technology which provides an infrastructure to engage individuals all over the world in a second as the largest network in the world. Furthermore, the World Wide Web (WWW) facilitates for spreading of information over the Internet. The use of the Internet and WWW changed the style of technology, especially in the way people communicate and interact with others. Today, people tend to use the Internet to find information about anything, and the most common way to share information through the Internet has become a habit [1]. Website is a key component for organizations to survive in the global competition by sharing required information with their stakeholders. As organizations that create knowledge to the world, universities also maintain websites and usable websites unknowingly increase the trust of website users and their loyalty to the universities [2]. Also, the usable website encourages the user to keep on and revisit the website. Website Standards Association (WSA) has proved with its statistics that guests take at least ten seconds for decides to keep on or leave a webpage [3].

Thus, university website developers have to make sure that different types of users/stakeholders satisfy by successfully achieving their purposes on the university website without facing any issue [4]. The quality of usability can be defined as “the extent to which specified users could use a product to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use” “(ISO 9241-11)” [5].

A preliminary study conducted to evaluate the user satisfaction on Sri Lankan university websites recommends testing the usability of those websites. This preliminary study was conducted in January 2020 with collecting data from different Sri Lankan university website users including university students, academic staff, non-academic staff, administrative staff, and external users who visit the academic websites. The following figures show the results of this preliminary study.

**Hours spend on the computer per day**

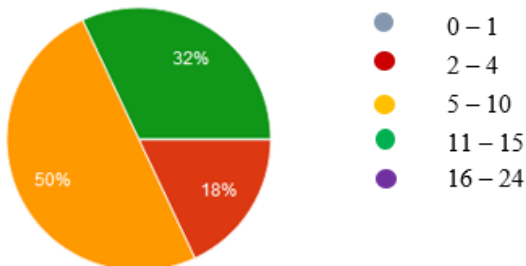


Fig. 1 Hours spend on the computer per day

**Hours spend on the Internet per day**

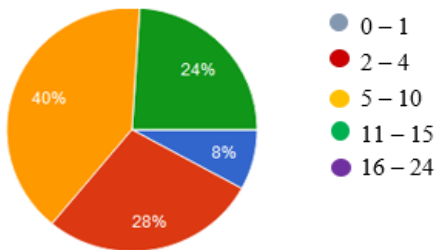


Fig. 2 Hours spend on the Internet per day

**Frequency of access to the university website**

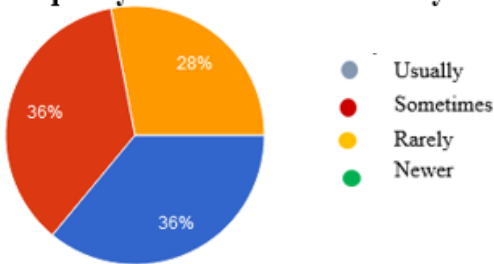


Fig. 3 Frequency of access the university website

**Do you satisfy with your university website?**

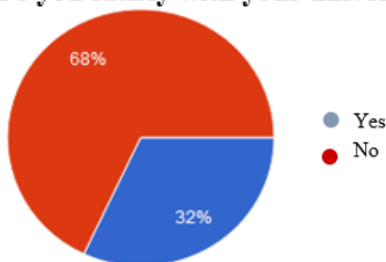


Fig. 4 User satisfaction on the university website

According to this preliminary study, most of the users spend their time on the Internet while using their computers and smartphones as shown in Fig. 1 and Fig. 2. Furthermore, the frequency of access to the university website is shown in Fig. 3. And also, Fig. 4 confirms that most of the users (68%) are not satisfied with the Sri Lankan university websites. Because of that, it is important to find the problems associated with the Sri Lankan university websites that affect users' dissatisfaction. User unhappiness on the website is about

not fulfilling the user's expectations or the pleasure derived from the website [6]. This preliminary evaluation is intended to help the researchers to observe the usability of academic websites across Sri Lankan universities that add value to and expand the quality of those academic websites.

**1.1 Problem Statement**

In the context of the development of university websites, it is important to investigate the design quality of university websites according to the website design principles and standards of assessments and measure user satisfaction with the usability of websites which helps to detect the website usability issues and provide a usability level that facilitates usability improvements and feature enhancements of the university websites.

**1.2 Research Questions**

To provide an excellent answer to the above problem, the study aimed to answer the following questions.

- Q1 - What does an assessment of Sri Lankan University websites show regarding website development and usability standards?
- Q2 - How are the Sri Lankan university website users satisfied with the usability of those websites?
- Q3 - What does an assessment of Sri Lankan University websites show in relation to their attractiveness, controllability, helpfulness, efficiency, and learnability?

**1.3 Research Objectives**

- To evaluate the design of the university websites according to website development principles and standards
- To measure the user satisfaction about the usability on websites
- To provide suggestions for a better design or better feature enhancements of the university websites

With attaining the above objectives, this research discusses the strengths and weaknesses of usability aspects in the design of university websites, and the results will support website developers to reduce those weaknesses and append better qualities to Sri Lankan university websites.

**2 Literature Review**

Usability assessment of university websites has been carried out by many researchers over the past years. Sri Lankan researchers also, studied about the usability of Sri Lankan university websites. However, any research conducted on Sri Lankan university website usability not focused to test the usability in both website users and website developer's points of views.

The usability level of the Namik Kemal University website was evaluated by Mentés and Turan [7] with the aim of providing guidance to develop better and more usable websites for higher educational institutions. This study has observed the user opinion by Website Analysis and MeasureMent Inventory (WAMMI) questionnaire

which follows five website usability categories as attractiveness, helpfulness, efficiency, controllability, and learnability. Results presented that, the NKU website is positively associated with attractiveness, helpfulness, efficiency, and learnability of the website and negatively associated with the controllability of the website. Many researchers focused on the website development problems considering more about the web development technology, organizational structure, and organizational objectives rather than the wishes of the website users. It motivated Mustafa and Al-Zoua'bi [8] to evaluate the user opinion on the usability of Jordan University's website. This research also applied the WAMMI questionnaire similar to the previous. Likewise, Sengel and Oncu [9] investigated the website usability of Uludag University with four methods as the model-based method, inquiry-based method, conduct an inspection and testing method. Their findings published that there is a significant influence on website usability by gender of the users and they have suggested future researchers to improve the accuracy of the survey by collecting information through a questionnaire from users representing all the possible areas. Similarly, European university websites were also evaluated by Caglar and Mentis [10] by applying the WAMMI questionnaire. According to their findings, European university website users are highly satisfied with the helpfulness, efficiency, and controllability of the website. But they did not satisfy with the attractiveness and learnability of the website and satisfaction with the website is not at an acceptable level also opinions of the users from different faculties were different. Based on the above findings, researchers have recommended improving the usability by involving more website users in the process of website development, expanding the website content to find information easily by users from each faculty, and generally advised to have consistent design and navigation in the website. In the same way, Undu and Akuma [11] used WAMMI questions to measure the usability of university's websites from the user's perspective through an empirical study of Benue State University website. They have researched the usability of university websites from the user's perspective. According to the survey results, usability levels for controllability, efficiency, and helpfulness were poor, and obtained the neutral usability level for attractiveness and learnability and the overall usability level of the BSU website was labeled as neutral. Major usability issues found by the study were inconsistency in the design and layout of the website, invisible images, problems with the site navigation, appropriate labeling system, difficulty coming back to the home page, and more load time, and so on. Researchers recommended redesigning required web pages concerning the user interface with color, images, fonts, and other required features to improve the attractiveness, effectiveness of links and menus, quality images with small volume, reduce load time, and more. As same as, a group of researchers from different universities in Quetta and Balochistan conducted a research [2] on the importance of

the higher education website and its usability. They examined two university websites using a questionnaire. Results of the survey presents that the most significant factor of a website to make user satisfaction is the usability of the website and both university websites were not in the approved satisfactory level. The study recommended providing an online facility to check exam results, update faculty profiles, update news and events continuously, and improve the user-friendliness of both websites.

More than the questionnaire survey, Temitayo, Dandison, and Adekunle [12] used website usability analytical tools to conduct a comparative analysis by evaluating inhibitors, improvements, quality, and future updates of the Nigerian university websites. Findings recommend software developers to pay their attention strictly to reducing security issues and updating websites frequently, allocate a realistic budget for the development and maintenance of the website, and should regular search engine optimization for university websites that facilitate to increase in the visibility and relevance of their website nationally and globally. Similarly, Niazi, Karbala and Kamran [13] researched the design principles of Iranian university websites using WebQEM webpage testing tool. Analysis was conducted based on main four criteria such as usability, functionality, reliability, and efficiency, and sub-terms also used as understandability, feedback, help features, performance, and accessibility. The findings of this survey presented that all four main criteria were in good condition on the university websites and the correlation between Iranian state university ranking and Iranian state university website ranking is weak. Correspondingly, thirty Indonesian university websites were sampled through the random sample method and analyzed by Jati, Nurkhamid, and Wardani [14] to assess the website quality from a usability perspective with a multicultural decision analysis method. Results rank the Indonesian university websites based on their usability performance. The observation was conducted by assessing six usability factors as load time, response time, page size, number of requests, markup validation, and broken links by using website testing tools such as the Pingdom tool, GT Metrix tool, Site Speed Checker, W3C Validation, W3C Link Checker, Dead Link Checker, and Achecker. The research concludes by providing the results as the usability performance based on the load time and markup validation of the Indonesian university websites is poor. Sriwijaya University website came to the first rank among the websites of Indonesian universities. In the same way Galovicova, Kremenova, and Fabus conducted a survey titled "Usability Evaluation of University Websites" to evaluate and find out the current usability status of university websites in selected countries as Slovakia, Czech Republic, and Finland [15]. The researchers applied System Usability Scale (SUS) tool to measure usability since it provides quick and dirty reliable results. The results of the analysis explained that only six websites are usable and other twenty-three websites are not. Furthermore, researchers have recommended continuing

usability evaluations by combining usability evaluation methods to improve the level of usability.

More than the above, Sengel [16] applied learnability of the content, effectiveness & efficiency of the website, and user satisfaction with the website as the chief factors for evaluating the usability of university websites. The researcher applied two methods to assess the usability of the Sakarya University website a questionnaire survey and a case study method. Results indicate that the Sakarya University website is easy to use but not efficient. Finding of the research recommends redesigning the related web pages with some changes such as; the size of text could enlarge, the color of text and color of the background should be diverse to make it easily readable, include a search box to the website, main topics / most important required information to different types of users should add to the home page or main menu of the web site. Correspondently, Jayathunga, Jayawardana, Herath, and Wimaladharma evaluated Sri Lankan university websites according to their usability in 2018 [17]. The survey has conducted with a case study based on four dimensions; website content and organization, website navigations and links, user interface design, and website performance. They collected data from the undergraduates of the Uva Wellassa University who are knowledgeable about website usability. Results of the study proved that there is a strong relationship between website usability and the arrangement of the website. However, there is no vital relationship between the navigation and the menu composition of the website with their usability. Also, it is better to consider the learnability and comfortability and use cheerful colors of the interfaces to improve their attractiveness. Finally, researchers have recommended improving website content, organization, and readability to improve the usability of university websites.

Correspondingly, Suwawi and Rochmani carried out a study [18] titled "Evaluation of Academic Website Using ISO/IEC 91". This survey has accomplished to study whether there were any required improvements attached to the academic website of Telkom University through the information collected by all university students. The evaluation of the study focused to measure the characteristics of websites under the ISO/IEC 9126 and "Kono Model". Based on the findings, researchers recommended improving reliability, functionality, availability, user-friendliness, content organization, and provide up to date information. Moreover, Ambe and Hufana judge the usability of the university website through interviews [6]. Results of the survey brought out satisfactory responses subject to the functionality and access to required information on the website. However, it has found usability problems with the content, navigation, and layout of the website. Researchers suggested repeating the evaluation on the same website after making the recommended changes. Furthermore, Devi and Sharma [19] presented a framework shown with five high-level website quality factors as usability, reliability, content, functionality, and presentation of websites followed by twenty sub-quality factors for

evaluating the academic websites by studying the different university websites, different website quality models and different website quality measurement factors.

The literature survey proves that many researchers focused on evaluating the usability of websites, and most organizations such as universities, banks, online sellers, and libraries are researching the usability of their websites. However, lack of researchers concerned about evaluating the usability of Sri Lankan university websites with different evaluation methods. Hence studying and assessing the usability of university websites has become the more vital aspect in Sri Lanka.

### 3 Methodology

The study evaluated the usability of Sri Lankan university websites by two website usability testing methods among the different types of website usability evaluation techniques [5,20,21,22]. As the first method, website usability testing tools were used to assess design principles on academic websites. It analyzed usability attributes of the university websites to confirm that Sri Lankan university website developers follow the website development standards and principles for the development with answering the first research question. The second research question was answered using a questionnaire survey as the second method with studying user perspectives on the website and analyzing the external attributes of the websites. There were three Sri Lankan university websites selected using the convenient sampling method as the sample to represent the websites of fifteen national universities registered in the University Grand Commission of Sri Lanka [23,24].

Five commonly used automated website testing tools as Web Page Analyzer, WAVE Tool, SEO Tool Box, Pingdom Tool, and Mobile User-Friendly Testing Tool were used to test the design principles of selected websites [25,26]. The questionnaire survey also used to collect responses from users of the same three websites to assess the user's perspectives on those websites [21,11]. The sample of this study consisted a total of 632 users composed at least twenty-five website users from each faculty of the selected universities representing students, academic staff, administrative staff, non-academic staff, academic support staff, and outside users of the website.

"Likert's scale" method used to provide multiple choice answers for each question and merit value allocated for the responses [14]. Then merit points accumulated for five categories of website usability as Attractiveness, Controllability, Efficiency, Helpfulness, and Learnability [11,21,22]. The mean value for each usability category was considered as the usability index. The usability level for each category calculated using the above-mentioned usability index. Finally, the usability point for overall Sri Lankan university websites was stated as the mean value of five usability points calculated for each usability category. The research concluded the usability level of selected university websites by results of the descriptive survey and test done by automated tools and provided

recommendations to ameliorate the usability of Sri Lankan university websites.

## 4 Results and Discussion

### 4.1 Website Testing Tool Based Results

In the first part of the research, selected university websites were tested using five automated website usability testing tools. Web Page Analyzer helps to improve the quality of website development standards by analyzing websites for the weight of web pages, Meta title and description, heading structure, content analysis, hyperlinks, images, and social interactions, and the investigation ends with providing an overall usability score for the website. According to the results given by Web page Analyzer, the average score for Sri Lankan university websites is 43%. It mainly recommends adding metatags for keywords and pages on the website, using correct heading structure, reducing external links of the websites, reducing empty alt attributes with filling image descriptions, using social links to promote the website, and reducing the page weight by improving the usability of university websites. WAVE Tool tests websites for web content accessibility, guideline errors, alerts, features, and structural elements. It found twenty errors, eighty-one alerts, thirty-five features, and ninety-two structural elements of the tested Sri Lankan university websites. The WAVE tool recommends Sri Lankan university website developers to improve the usability of websites mainly by adding alternative text for all the images, removing empty headings and links, considering the contrast, and correcting the missing heading levels. SEO Tool Box analyzes the website's blank links, common search engine optimization issues, speed, security, and mobile usability of websites [27]. The Site checkup scores for all tested Sri Lankan universities are more than fifty percent but less than seventy. This tool also provided recommendation for university web developers to improve quality of the websites. Mainly it recommends for adding meta description tags to the web pages and key words, adding sitemap files, reducing inline CSS styles, adding google analytics script, reducing number of plug-ins and http requests and many more. According to the results given by the Pingdom tool, the average values of the tested websites for the performance are 69, load time is 4.13 seconds, the number of requests is 145, and the average size of the home page is 5.3 MB. Pingdom tool suggested considering these statistics and obtaining a better grade for the performance of their websites. In addition to the above, the mobile-friendliness of Sri Lankan university websites was separately tested by the Mobile User-Friendly Testing Tool. According to the results, only one website is mobile-friendly out of three tested websites. It has given issues of the rest of the websites as content is broader than the screen, clickable elements too close together, text too small and hard to read and suggested to increase their mobile-friendliness by managing the width of the web content to the screen, increasing the space between clickable elements, and increasing the size of the text.

### 4.2 Questionnaire Based Website Evaluation Results

In next part of the study, the attractiveness, controllability, helpfulness, efficiency, and learnability aspects of websites were tested by a questionnaire survey to assess the website usability from the website user's opinion [28]. A total of 632 website users participated in this evaluation representing all the faculties of sampled Sri Lankan universities. The Table 1 shows a summary of the outcome obtained from the questionnaire survey.

**Table 1**

Overall usability level for Sri Lankan university websites.

Category	Overall Usability Point and Level for Sri Lankan University Websites		
	Usability Point	Usability Level	Secondary Usability Level
Attractiveness	0.45	Average	Lower Level of Average
Controllability	0.53	Average	Middle Level of Average
Efficiency	0.58	Average	Upper Level of Average
Helpfulness	0.53	Average	Upper Level of Average
Learnability	0.52	Average	Middle Level of Average
Overall Usability	0.52	Average	Middle Level of Average

The results pointed out that the usability level of Sri Lankan university websites related to all five categories tested by the questionnaire is at the average level. Furthermore, the areas of efficiency and helpfulness of the Sri Lankan university websites obtained the highest usability points as 0.58 and 0.53 with the sub-usability level at the upper level of average, and it is followed by the controllability and learnability getting 0.53 and 0.52 points with both sub usability level as the middle level of average. The attractiveness of the Sri Lankan websites is earned the lowest usability point as 0.45 with including the usability level as a lower level of the average. The results are graphically presented in the Fig. 5.

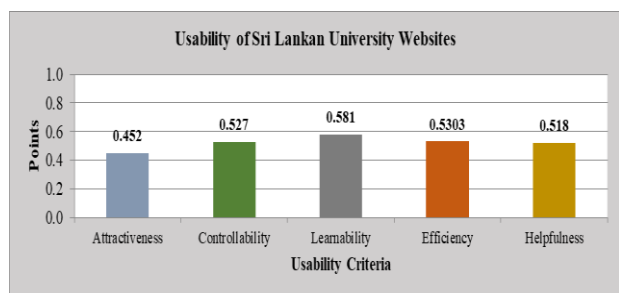


Fig. 5 Usability of Sri Lankan university websites

Finally, the overall usability value was pointed as 0.52, concluding that the usability level of Sri Lankan university websites is on average based on the user's point of view.

## 5 Conclusion and Recommendations

The purpose of this survey was to evaluate the usability of Sri Lankan university websites according to the website development standards and the satisfaction of the website users with providing suggestions for a better design and better feature enhancements for the university websites.

Potential problems of university websites based on the website development principles and standards were tested by automated website testing tools such as Website analyzer, WAVE tool, SEO Site Checkup tool, Pingdom tool, and Mobile User-friendly tool. Moreover, the quality of the user experience on the websites was tested via a questionnaire-based method according to five WAMMI usability measurement factors as attractiveness, helpfulness, controllability, efficiency, and learnability. The survey results demonstrate that the overall usability score for the Sri Lankan university websites provided by the Web Page Analyzer is 43. Moreover, WAVE tool presents all the errors and alerts on the websites and recommendations to reduce those errors and mistakes. Similarly, the SEO toolbox scores the usability of Sri Lankan university websites as an average of 58%. It suggests university website developers to reduce common issues and make necessary changes to their websites to increase the speed and security of websites. The grade for the performance of Sri Lankan university websites averaged as 69 by the Pingdom tool with suggesting website developers to increase their performance into higher grades by the effective management of the web content. As the last website testing tool used for this study, the Mobile User-friendly Testing tool explains that most Sri Lankan university websites have to increase their mobile-friendliness. Correspondingly, the questionnaire survey presents that the usability of Sri Lankan university websites is at an average level, and it recommends Sri Lankan university website developers to provide a better user experience on university websites by improving the attractiveness, helpfulness, controllability, learnability, and efficiency of the websites.

### Conflicts of Interest

There are no conflicts to declare.

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