

Common Usability Issues on University's Websites

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Abstract— Usability is an important quality factor for the success or failure of any website. Users of university websites encounter various usability problems during the navigation and information searching activities. Studying these problems is a critical issue for the success of the growing higher education market. The main goal of this paper is to identify usability challenges encountered by the users of university websites. We conducted an extensive literature review in this regard. We identified numerous aspects of usability and relevant challenges to those aspects. We also presented proposed solutions from the existing literature. This study will help to have a deeper insight into user requirements to develop usable university websites.

Keywords- Usability; Usability evaluation methods; Usability issues; University websites.

I. INTRODUCTION

Usability is one of the critical criteria of website quality. Nielsen has defined usability as "a quality attribute that assesses how easy user interfaces are to use"[1]. Another well-known definition of usability given by the International Standards (ISO 9241-11 1998) is the effectiveness, efficiency, and satisfaction with which specified users can achieve goals specified in a specified context of use" (ISO 9241-11 1998). The success or failure of any website relies on that user should not face any obstacles during the website's usage. Web usability has a combination of multiple components to look upon, which are relevant to the amount of time required to learn to navigate a website, how quickly the desired goal is achieved, and the user's perceptions[2].

Numerous studies have employed evaluation techniques to assess the site's usability by measuring user performance and satisfaction and then suggesting enhancements to the site's usability. Researchers proposed several evaluation approaches to assess the usability aspects. Usability Evaluation Methods (UEMs) could be classified into three categories: (1)User-based methods, (2)Experts-based methods, and (3)Tool-Based Methods[3]. User-based methods involve assessing the interface by the users and finding usability issues, such as questionnaires and interviews. Expert-based methods involve having several experts' examinations of the user interface, such as heuristic evaluation. However, both approaches were conducted to evaluate the external attributes of the site (e.g., design consistency). Unlike other methods, tools-based methods aim

at assessing the website's internal attributes that users or experts cannot perceive (e.g., the quality of the HTML code).

Nowadays, the importance of universities' websites has increased with the rapid development of technology. Such websites' importance comes from being a gateway to provide information and services. It is also a marketing tool to reach potential students. Most universities' websites provide the same information and services. In order to achieve the aims of such websites, universities should consider usability while developing and improving their websites. Many studies found in the literature evaluated the usability of university websites by employing different usability evaluation methods, such as questionnaires[3]–[6]and heuristic evaluation. Some studies employed two or more evaluation methods [7][8].

This study investigates various usability problems found in university websites and extracts their proposed solutions from existing literature. The paper also aims to understand university websites' specific characteristics and usability aspects. The rest of this paper is organized as follows. Section 2 provides a background of usability evaluation approaches, and we present the methodology used in this study in Section 3. Section 4 presents issues and challenges followed by proposed solutions in Section 5. Finally, Section 6 concludes the paper.

II. BACKGROUND DISCUSSION

Usability evaluation methods mainly aim to identify usability problems on systems evaluated. According to Nielsen[9], usability problems can be defined as the user interface aspects that may have any negative effect on the user. It may negatively affect usability factors, such as ease of understanding, learning, usage, and user satisfaction. Many research studies evaluated the usability of university sites by employing different usability evaluation methods. As a result, various usability problems were detected through experiments.

Several studies[3]–[6][10]–[12] involved users in the usability testing of university sites by using questionnaires, user testing, or/and other methods. Those studies assessed university sites usability' from the students' point of view. For example, Christoun et al. [4] investigated student satisfaction with the usability, aesthetics, content, and technology of a college's site of one of southeastern Massachusetts' public institutions of higher education. Hasan [3] also evaluated the usability of nine Jordanian university sites, while [5]

investigated the usability of the Benue State University Website in Nigeria. Jabar et al. [6] measured the usability of the top three Malaysian university websites from students' perspectives. The study [11] used user testing and interviews to assess the effect of the information architecture of Dalhousie University's Website, including how information is categorized, labeled, and presented and how navigation and access are facilitated. Furthermore, Kasli and Avcikurt [12] evaluated 132 educational websites in Turkey using website evaluation forms and interviews.

Other studies employed heuristic evaluation or other expert-based methods to identify university site usability problems. Kostaras and Xenos [13], for example, evaluated the usability of the new site of Hellenic Open University. Similarly, Astani and Elhindi [14] selected the top 50 universities in the U.S to rate by two experts based on the design characteristics of sites. Furthermore, Hasan [7][8][15] investigated the usability of university sites in Jordan using heuristic evaluation based on the set of heuristics proposed by Hasan [16]. Nizamani et al. [17] tested the usability of the top 10 universities of Pakistan by utilizing guideline scoring.

In order to sufficiently identify usability problems on university sites, some studies utilized a combination of two or more approaches. Qasim et al. [18] used questionnaires and heuristic evaluation to assess university sites' usability in Pakistan. The study [19] combined heuristic evaluation and performance measurement to assess the usability of the Hellenic Open University(HOU) Website. Pierce [20] also evaluated the usability of the Harvard University site by heuristic evaluation and user testing. Furthermore, Majrashi and Hamilton [21] used several methods, including usability testing, heuristic evaluation, experts review, and competitive analysis. They evaluated the usability of the Jazan University site in Saudi Arabia and the RMIT University site in Australia. Also, the study investigated the design and content of eight university sites worldwide to identify the necessary content and essential features that should be included in each university site. Erickson et al. [22] evaluated the accessibility and usability of university sites using accessibility and usability evaluation methods.

Some studies found in the literature utilized automated evaluation tools. Al-Ananbeh et al. [23] employed HTML ToolBox, SEO PageRank, and PageRank Checker to evaluate eighty sites for universities in the Arab countries automatically. Islam and Tsuji [24] also combined automated tools and questionnaires to test the usability of some academic sites in Bangladesh. The literature outlined above proved the usefulness of usability evaluation methods regarding their ability to detect various usability problems on university sites. The identified problems were collected and analyzed to provide valuable sources, including the different types of usability problems that could be found on any university site, along with the solutions.

III. METHODOLOGY

In order to get an insight into the usability issues faced by users of university websites, we performed an extensive review of the literature. The goal is to analyze scientific studies related to university site usability', focusing on issues

and solutions. We formulated the following research question for our study:

- What are the common usability issues found in university websites and how to resolve those?

To address the research question above, we have completed an extensive literature review. The phases of the study are shown concisely in Figure. 1.

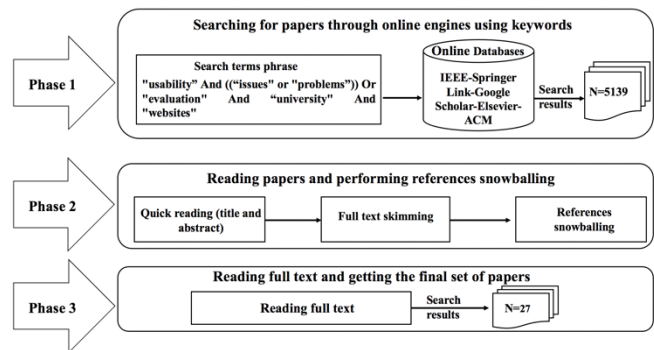


Figure 1. Phases of the Study

In this study, we considered only studies that achieved the following inclusion and exclusion criteria:

- We included studies that discuss university websites' usability or conduct experiments to evaluate university websites' usability worldwide by utilizing different usability evaluation methods and identifying usability problems or providing solutions.
- We excluded studies that have no relation to university websites or those concerned with systems relevant to university websites (e.g., e-learning and e-library).

The methodology phases are explained below:

Phase one: We identified the main search terms: usability, usability issues, usability problems, usability evaluation, and university websites. And then searched through digital databases: Google Scholar, IEEE, Elsevier, ACM, and Springer link using keywords. We focused on highly relevant papers and restrained the search to human-computer interaction/computer science studies if the search engines supported it. As a result, we obtained 5139 papers from the five digital library databases (Google Scholar -1840, IEEE -1480, Elsevier -159, ACM -1452, and Springer link -208).

Phase Two: We performed a quick reading for the title and abstract of all collected papers to do a preliminary paper classification (relevant, irrelevant, and need further reading). And then, we skimmed papers that needed further reading by reading relevant sections (e.g., the introduction and conclusion). Finally, we performed snowballing on the selected relevant papers, scanning their reference lists to identify additional relevant studies that we did not include. The studies were included or excluded based on the identified criteria.

Phase Three: We read the whole text of the papers and identified the final set of papers, which was 27 papers. And then, we explored papers thoroughly to extract relevant information.

IV. USABILITY ISSUES AND CHALLENGES

Usability issues mostly lead to a delay in accomplishing users' tasks or preventing achieving their goals, which frustrate them. Some reviewed studies have provided more detailed descriptions of detected usability problems. After the literature survey on usability issues, we collected and classified ninety-two specific usability issues into seventeen categories. Each category of the seventeen categories and relevant usability problems are explained below:

A. Design Issues

Twelve usability problems are relevant to four major design issues: overall web pages design, inconsistency of fonts and images, appearance issues regarding links and elements, and overcrowded elements and information.

- Overall web pages design: Inconsistency of design and layout of web pages color (e.g., an inappropriate combination of background and font colors)[5][7][8]; inconsistency of the interface language (i.e., some pages on the English interface displayed Arabic or English content)[7][8]; inconsistency of the content (e.g., content differed between English and foreign language interfaces)[7][8]; inappropriate page heading[7][8]; inappropriate design of the main menu (e.g., the menu items unseen or could not be selected)[7][8]; unappealing aesthetic features[6].
- Inconsistency of fonts and images: inconsistency in font case (capital and small), size, style (regular and bold), and color[3], [5]–[8], inappropriate number, size, or quality of images[7][8][24], and broken images[5][7].
- Appearance issues regarding links and elements: misleading links (e.g., elements looked like links, but no action is performed when clicked)[21], and inconsistency or incorrect alignment of the headers and content (center, right, or left) [7][8][21].
- An overcrowded element and information (e.g., unnecessary elements and information and an overcrowded advertisement) [6][21].

B. Navigation Issues

- Users get lost within the website pages [5][21].
- Difficulty finding or using a site map (e.g., the site map is not linked to all the website pages) [21].
- Links Errors: broken links [5][7][10]; under construction and maintenance pages [21]; dead node pages (orphan page) [7][8][21]; links not opening the destination pages [7][8]; misleading links [7][8]; and links causing the menu to disappear [7][8].
- Global navigation issues: it is a common navigation pattern located on the top of every page. This section is reserved for links of top-level categories, logos, search bars, and other important elements. This pattern issues include the following: the global navigation disappearance (e.g., university logo, home page link, and other navigation options are disappeared, do not work properly, or does not exist at all) [7][8][21]; poor or inconsistent design of global

navigation [21]; elements of global navigation issues (e.g., primary users sections have not included as categories in the global navigation) [21].

- Lack of Navigation Patterns (e.g., breadcrumbs)[21].

C. Ease of Use Issues

- Difficulty in interaction with a website [3][7][18].
- Lack of support in more than one language [3][7].
- Lack of considering the usage for blind and other disabled individuals (e.g., use of an inappropriate color like green which is not suitable for color blinds)[25].

D. Visibility of System Status Issues

Invisibility may cause some issues, mainly if the process consumes time. Users have to be informed about the progress of any processed process, their current location on the website, and where they go next. The category includes the following: the invisibility of search query (e.g., status progress of submitted search) [21]; the invisibility of other processes status (e.g., the progress of downloading files or submitting forms)[21]; and invisibility of selected icons and links status (e.g., icon and link are not highlighted when they selected) [13][24][25].

E. Load Time Issues

The load time of websites should be reasonable. Some websites were evaluated and found to be too slow [5].

F. Compatibility Issues

- Browsers Incompatibility [5][24].
- Devices Incompatibility (e.g., lack of following the platform guidelines for mobile version) [21][23].

G. Content Issues

The most important component of a university website is information content.

- Inadequate Information [5][8][17][20][26].
- Empty Pages [7][8].
- Old Information [7][8][17][26].
- Inappropriate content (e.g., repeated or very concise content) [7][8].
- Information Classification issues (e.g., the contents were not classified by headings and sub-headings)[21].
- Labels of Links and Button issues (e.g., button and link labels did not start with action words) [21].
- Content Errors (e.g., punctuation or grammatical errors) [7][8].
- Lack of Technical Information (e.g., information regarding the file types that will open through links)[8].

H. Search Issues

Earlier studies showed that the most preferred features on educational websites from the user's perspective are useful navigational support and effective search tools [7]. The category comprises the usability issues encountered by users during their search for information.

- Ineffectiveness of search tools [4][7][8][11][17][26].
- Limitation of search scope [21].
- Intolerance of Errors (e.g., misspellings) [21].
- Lack of refining and filtering mechanism [17][21].
- Lack of research suggestions [21].
- Lack of search scope customization [21].
- Lack of support features (e.g., autocomplete) [21].

I. User Support Issues

For users to accomplish their tasks and look for information needed in the website, it is necessary to provide good support for the users to achieve tasks quickly and easily.

- Lack of Help and Documentation (e.g., lack of hints to help navigate or to complete tasks, and lack of tutorials, services documenting, and the FAQ) [12][18][17][21].
- Lack of support for login and authentication processes [21].
- Lack of support for services (e.g., services guide) [12][20][21].
- Lack of Search Support [20][21].
- Lack of helpful error messages [21].
- Use of technical language in error messages (e.g., using “attribute” term rather than “field” term) [21].

J. Information Architecture Issues

The organization and classification of the website's content and pages must be easy for accessing and finding information.

- Labeling issues (e.g., not self-explanatory, perplexed, or generalized labels) [5][11][21].
- Hierarchy issues [11][21].
- Organization system issues (e.g., deep hierarchy) [11][21].

K. Data Entry Forms Issues

- Form Fields and Text Area Problems (e.g., lack of form features that help users input the proper data like default values)[21][27].
- Form button problems: lack of following the standards in labeling and positioning of buttons (e.g., use the label “OK” for the submitting button rather than “Submit” label, buttons are not located based on the natural reading order of the website audience, or two buttons have the same function, but they are located in different places)[21].
- Form Feedback problems (e.g., providing feedback without full description of what is happening, using poor language (like "adding process is done"), or using inappropriate color for a particular message)[21].
- Label alignment problems (e.g., labels are far from the fields) [21].
- Unhelpful error messages [21].
- Form functionality issues (e.g., difficulties regarding correcting errors when submitting an incomplete form or with non-expected data entry, and synchronously validation of the form before being submitted)[21].

L. Accessibility Issues

Among the users of university websites, there are a rising number of disabled users, such as individuals with visual impairments and individuals with reading-related and learning disabilities. As such, it became necessary for the designers of university websites to consider the specific needs of such users and make modifications needed to ensure web content accessibility for all users as possible.

- Accessibility issues regarding performing tasks (e.g., tasks cannot be completed using only the keyboard)[21][22].
- Accessibility issues regarding design (e.g., poor contrast between text and background and lack of meaningful alternate text for inaccessible graphics) [21][22].
- Forms accessibility issues (e.g., labels of form fields do not match the visible text for that element when read by the screen reader) [22].
- Accessibility issues regarding navigation (e.g., lack of helpful skip navigation links)[22].

M. Familiarity Issues

Information presentation has to be in a logical order and follow real-world convention.

- Matching the real-world convention issues (e.g., registration instructions are displayed at the end of the registration task rather than at the top of tasks to read them first)[21].
- Using unfamiliar terminology (e.g., using unfamiliar words to typical users, such as operational rules term, bursar, and provost[21], and lack providing a reference for the user that contains such terminologies) [20].
- Form issues (e.g., inappropriate or illogical structure and elements alignment) [21].

N. User Control and Freedom Issues

While conducting the tasks on university websites, sometimes users face critical situations, such as making mistakes in previous stages or facing some difficulties. They need some way of going back or undoing[21].

- Lack of ways to undo actions (e.g., cancel button or back button not existing) [21].
- Lack of navigation options (e.g., lack of link of the main page of the category, lack of link of "Back to the top" on the pages that have a too long amount of information[13][19][21], and indirect navigating ways through key topics in the site)[20].

O. Consistency Issues

This category is nearly overlapped with all aspects, such as design, navigation, and content, whereby consistency is pivotal for all aspects of a website's usability.

- Unexpected placement of elements (e.g., sign out was not in expected place) [21].
- Navigation Inconsistency (e.g., inconstant navigation bar and different format of menus on the page) [13][20][21].

- Content Inconsistency (e.g., forms buttons labeled inappropriate or very ambiguous names[13], and blank front pages of some categories)[19][21].
- Design Inconsistency (e.g., inconsistent design of website pages in the form of colors, fonts, and languages[3][13][19][21].
- Search Facility Inconsistency (e.g., a search box is not in its standard location)[21].

P. Prevention of Error Issues

Users can not always avoid errors while using the sites; therefore, preventing errors upfront from occurring is a good feature for websites [21].

- Lack of preventing errors of forms (e.g., lack of hints clarifying the required data format and permitted length, lack of showing the mandatory fields up front, lack of submission confirmation of critical form)[21].
- Content ambiguity or presentation errors[20](e.g., a single command has different jobs, and a single animation image leads to navigate to two different pages)[21].
- Links errors issues (e.g., invalid and unimplemented links) [21].
- Search facility errors[13][19].

Q. Memorability Issues

- Memorization of Information (e.g., need to memorize courses ID when students attempt to enroll in courses or read multiple pages when looking for information relevant to a particular topic)[21].
- Memorization of task's Instructions[21].
- Memorization of navigational paths deep (e.g., menu with 6 levels deep[13][19][20].

V. OBSERVATION AND PROPOSED SOLUTIONS

This section presents guidelines for designers of university sites to achieve the advantages of usable websites. An essential component of a university site is information. The university sites usually provide information and services for students and staff. Information should be accurate, updated, and consistent. Accessing information should also be quick and easy for students. Logically organize information (e.g., courses classification by degree, school, and campus[21]), follow real-world conventions, and avoid deep hierarchy. Terminology and links labels should be self-explanatory, accurately describe the relevant contents, and be familiar in an academic environment. The site should provide information regarding the file types that open through links (e.g., DOC and PDF files)[8]. Students and staff should be able to contact via contact services (e.g., email and contact forms). Access and search tools should be well worked. The search facility has to offer refining and filtering mechanisms, alternative search suggestions, support features (e.g., autocomplete), customizing search scope, and the search scope should include the entire university site [21]. The university site should support the native of most students and other commonly used languages (e.g., English language).

Since the university sites are too large and have many branches, using navigation patterns, such as breadcrumbs is very useful. Navigation options should be consistent, implemented correctly, and placed obviously on all site pages. Include global navigation in the most frequently visited site's pages and use other navigation patterns (e.g., breadcrumbs) for other pages[21]. The University logo should be linked with the 'Home Page' and be placed in the global navigation area. The global navigation has to include the main content categories (e.g., students, staff, research, and program and courses)[21]. All links should open intended and expected pages. Design site map and a site index (A-Z) appropriately. The site should provide information about under construction and maintenance pages, or redirect users to alternative pages that provide the same information or services[21].

It is necessary to provide good support for students and staff to achieve tasks quickly and easily (e.g., Online enrolment). Provide assistance on pages with high error occurrences[21]. Make users feel in control in many situations. Offer multiple navigation options and help students undo some entries or exit from situations like the cancel button or back button. Provide helpful error messages in familiar terminology to help them recognize, diagnose, and recover. Provide immediate feedback in plain language and use an appropriate color after clicking the link or button (e.g., the color green indicates a successful process)[21]. The site should offer features that help students and staff input the correct data in the form fields (e.g., input hints and default values). The site must prevent potential errors in links (e.g., invalid links and unimplemented links), content (e.g., a single command has different jobs), and forms (e.g., errors of data entering). Students should not have to remember information. System usage instructions should be simple, easy, and visible[28][29]. The site should provide FAQ and documentation (e.g., documentation of student and staff services[21]) obviously and easily. Users should always know the progress of any query or process that is processed (e.g., downloading files or submitting forms), their current location on the site, and where they go next. The site must be accessible for diverse user groups, including disabled. Pages must work or display appropriately under different browsers and devices. Test the sites through common web browsers[23][28] by employing tools (e.g., Browser Shots)[24].

The site design component should reflect its intended function[28]. Make sure menu items and all content of pages should be aligned correctly based on the interface language. The load time of the site's pages should be reasonable. Display what the student need when and where they need it[21]. Do not burden frequently refreshed pages with many multimedia elements[28]. The site must follow navigation standards, forms, and search facilities (e.g., the search box placed in the expected place). Students and staff resources and other elements should be placed in the standard location to make the site easy to learn and remember.

VI. CONCLUSION

Using any system by actual users reveals some potential weaknesses that suggest usability problems. Users' preferences may affect and cause the classification of some

issues as problems while they might never bother the other users. However, it still should be considered as a usability issue if there is an expectation that these issues may bother some actual users during their system usage[30]. Several literature reviews have been conducted on university site usability evaluation, but not many have focused on usability issues and solutions. Those studies discussed specific aspects, such as objectives, methods, and common usability attributes used. This research addressed a gap noted in the literature concerning the lack of a comprehensive source that cataloged different types of usability problems detected in university sites. We have identified and analyzed ninety-two different usability issues mentioned in earlier studies. We classified them into seventeen categories based on usability aspects violations. We also found an agreement among most of the reviewed studies as they mainly focused on some standard usability features, such as design, navigation, and content. This observation may indicate the importance of these features for the usability of university sites.

Our study could be a valuable source for developers and researchers interested in university site usability. The developers could focus on these features to investigate and improve the usability of educational sites. In future work, we intend to develop a new set of usability heuristics that could be used as a comprehensive and reliable instrument for evaluating the usability of university sites. We are planning to have a follow-up empirical study to update the usability problems list and identify the severity and frequency of those problems. We hope that this study will contribute to a recommendation for improving university site usability.

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