User Testing for Moodle Application

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Abstract

This study has conducted a user testing based on the student’s and lecturer’s experience using the Moodle application. The main focus is the Moodle application as an e-learning platform in a local college. A user testing method was used to identify problems and possible solutions that could best improve the current Moodle application. The data gathering technique employed was focus group interviews. The findings from the analysed results show that the usability issue encountered by both users that holds the highest average mean was the layout design. The results also prove that the current Moodle application needs to be amended for its interface. The recommendations for interface design were furthered discussed and described, together with the adaptive user interface techniques that can best implement the interface.

Keywords: usability testing, adaptive user interface, learning management system, e-learning, user-centred design

1. Introduction

As technology grows rapidly, global educations institute have produced different virtual learning environments for students. This mode of learning has become in demand by other institutions to enhance their student’s learning process.

Despite the widespread use of e-learning systems in higher education, little research and improvement has examined the usability of the e-learning platform [1]. Usability is an essential part of an effective learning process; especially in e-learning applications. From the feedback of students, most e-learning application designs are messy, with unnecessary and redundant symbols and icons. In addition, many usability issues have been raised, in terms of the accessibility of web content, an overload of information in web pages, and navigation problems. Squires and Preece[2] argue that researchers have not sufficiently considered the implications of usability features of an educational application, in order to achieve educational goals.

A widely used LMS in universities and other institutes is Moodle (Modular object–oriented dynamic learning environment), which is a fully featured package, incorporating several resources, such as assignment, chat, forum, glossary, quiz, survey, poll, wiki, and more [7]. Several studies have been conducted on the usability issues of the Moodle system, and the following questions have been identified[3]:

- Is Moodle too complicated for novice users?
- Is there a usability problem with Moodle?
- Is the user satisfied while using the system?

The main objective of this study is to identify usability problems of the current Moodle application and eliciting user’s requirement. The entire user testing process focused on the
analysis phase of the user-centred design. This paper is organized as follows. Section 2 contains a background research on e-learning applications, usability, user-centred design, and data collection methods. In Section 3, the usability testing method was described and analysis and findings were explained in detail. For the last section, the conclusion and recommendation on using adaptive interface techniques were described.

2. Related Studies

E-learning provides various tools and advanced functions for users. However, these tools and advanced applications can create new challenges that instructors and learners must confront and overcome. According to Ssemugabi [4], most of the challenges associated with e-learning are due to the technical limitations of computers and the internet, and these challenges have to be minimized.

Common problems encountered by e-learners comprises of the following: lack of technical expertise where instructors do not have the technical skills to develop and utilize multimedia software, inaccessibility of web content because of the limitations on obtaining advance technology in certain countries and difficulties in understanding and control the web navigation [5].

The creation of the World Wide Web (WWW) has expanded learning opportunities for online learning and distance education, and virtual schools have been implemented as a new learning environment. In addition, the evolution of web 2.0 has affected information and knowledge transfer, enabling users to deliver content, share information, creating access channels, and support collaboration with others in social networks. It is clear that these technologies provide great benefits for education, but we should also consider future prospects. The future of educational computing is no longer focused on how this technology is being implemented in education, but “how these technologies are being used effectively and efficiently, and how they help students learning, in a learner-centred environment [6].”

Some researchers have referred to these new forms of education mode as Learning Management Systems (LMS), which incorporate other learning technologies to enhance learning in a variety of environments. A widely used LMS in universities and other institutes is Moodle (Modular object–oriented dynamic learning environment. According to Tereza et al., [8], Moodle is open source software that gives support to different educational levels, which is under continuous review and feature-enhancement. It was designed to help educators create and manage a quality online learning environment for students.

In order for the Moodle application to provide a better learning environment and experience, design becomes an important aspect that needs to be taken into consideration. Several universities that have adopted the Moodle application have customized its design to fulfil user adaptive learning. However, the frustration of users who were struggling to understand the instructions or the correct method of using the system was still rising. This produces usability issues on the learning management system. Usability is the fundamental requirement for an application that is concerned with making an application easy to learn and use, and it becomes an important facet in website development, as users expect to immediately understand operations from the interface; without undertaking any specialized training. According to Bevan [9], the International Standards Organization (ISO) provides the definition of usability as “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction, in a specified context of use.” Usability primarily focuses on whether a system is easy to learn and use, whereas usability evaluation is concerned with gathering information about the usability or potential usability of a system, in order to assess it or improve its interface by identifying problems and
suggesting improvements [10]. Previous research indicates that redesigning an application’s user interface from the feedback of interaction measurement between users and applications can substantially improve usability [11].

Jamil [12] has conducted a comparison and evaluation on two different LMS: Moodle and Ilias. They assigning users to play in different roles such as system administrator, author and tutor and discover both systems have good features, good usability issue as well as its own weaknesses. Kakasevski et al., [13] employed heuristic evaluation, questionnaires and task driven techniques on evaluating Moodle and they generate quantitative and qualitative data along with expert opinion to provide good recommendation for all users of the system. Martin et al., [14] employed heuristic evaluation on three different LMS by comparing the 3 platforms from user’s experience perspective. Even though numerous researches have conducted LMS usability evaluation, however, these researches do not fulfil the aspect of user needs. They did not based on user perspective in analysing needs. As a result, to solve the usability problem, efforts involving users during the analysis process are important as they help to identify the user’s needs. User Centred Design (UCD) is a design framework that involves users during the design process, and then uses the findings to make application design decisions. According to William [15], the UCD process is comprised of three phases; 1) an early focus on users and tasks, 2) an iterative design to include user input, and 3) an evaluation of the new prototype or applications. Users and their needs are identified during the early phase. Next, the design process involves brainstorming and conceptualizing, based on the research that was completed earlier. Finally, the design is evaluated against the user’s involvement and revised based on the results of the evaluation [15]. The researcher can obtain data directly from users through various empirical methods of observation and interviews. These empirical methods (in the UCD) are comprised of contextual inquiry, focus group, log file analysis, task analysis, usability testing, expert review, guided walkthroughs, and heuristic evaluation. Questionnaires and interviews are an effective method of determining the user’s point of view, by directly questioning their experience of using the system. Therefore, in this study, the main data collection method of focus group interviews was used to evaluate the usability issues of Moodle.

3. Method

User testing was used to evaluate current Moodle applications, where data was gathered from focus group interviews. Invitations were sent to both lecturers and students from the New Era College. Five students and lecturers volunteered to participate in these interviews. Focus groups interviews were divided into two groups; both of which consisted of five users of the same category, but with different education fields. The total numbers of participants for the user testing process in this study are five lecturers and five students. Lecturer’s ages ranged from 26 to 42 and students ranged from 18 to 23.

3.1. User Testing through Focus Group Interview

The purpose of the focus group interviews was to collect data and user’s opinions on the usability of Moodle application interfaces. The questionnaire was designed by referring to previous research and studies conducted on Human Computer Interaction (HCI). The questionnaires were all in open-ended formats, so as to allow users to express a variety of opinions and ideas, instead of being bound to given choices.

3.1.1. Procedure: The focus group interviews took one and a half hours to complete and were conducted as follows:
1. The objectives of the user testing were explained.
2. The researcher served as the facilitator by asking questions according to the questionnaire.
3. Feedback and responses were recorded on paper with the help of two assistant moderators.
4. The problems and requirements, which were specified by the users during the interview sessions, were written on a white board.
5. A brainstorming session began.
6. A wide range of solutions to problems were collected, followed by an evaluation of the best design or action.

3.2. Analysis and Results

The analysis and findings were divided into two sections: Lecturer and Student. Data collected from the focus group interviews, was analysed by the researcher. User requirements and brainstorming ideas were documented in the form of a detailed diagram. The focus group interviews used a clustering technique to identify data; since it is fast and simple to review and identify similar problems, needs, or requirements, between the different types of users. Needs and requirements were documented using respondent template, whereby each member’s opinions, statements, and suggestions, were clearly identified. The template was organized based on the level of respondent and dissension of each member’s response to a particular issue. The collected data was analysed and categorized into four elements to determine the factors that contribute to a usability problem. These four element factors included layout, functionality, navigability, and timely. Table 1 show each question categorized under respective element factors.

<table>
<thead>
<tr>
<th>Element factors</th>
<th>Respective question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layout</td>
<td>Q1, Q3, Q8 and Q10</td>
</tr>
<tr>
<td>Functionality</td>
<td>Q2, Q4 and Q5</td>
</tr>
<tr>
<td>Navigability</td>
<td>Q6</td>
</tr>
<tr>
<td>Timely</td>
<td>Q7 and Q9</td>
</tr>
</tbody>
</table>

Layout refers to how well the visual display of the menus, text and graphics being arranged. The functionality were denotes to whether the functions and features perform effectively. Navigability refers to the website’s navigation that should provide clear instructions for users to access the information and timely meaning on how well the users able to access the information efficiently.

3.2.1. Analysis of Lecturers’ Group: The data gathered was analysed according to the level of respondent among lecturers that shows in Table 2. The following problems and requirements were identified.

Pertaining to question 1, all five focus group members experienced confusion on how to operate Moodle applications without referring to the manual provided. Four out of five focus group members agreed that the interfaces of the Moodle application were unattractive and uninteresting. Three members reported struggling to understand the whole operation process. For question 2, three members agreed that the resources were accessible and functioning at all times, whereas two disagreed with this statement, but did not provide any supporting facts. For question 3, three out of five indicated that they had a hard time understanding the
structure, icons, and their uses. For question 4, the majority of members agreed that they were able to search for information easily and that no other related problems occurred. For question 5, three members reported that they were confused with the Moodle editing option and that their main concerns were “add a resource” and “add an activity,” as they did not understand the difference between them. Duplicate functions also appeared in different places on the same webpage, which contributed to the confusion of what to do next in the system. For question 6, the main problem declared by the focus group members was the various options provided within the “add a resource” categories, which did not provide further descriptions; thus making it unclear for users to operate. For question 7, four out of five members considered Moodle to be effective, since they frequently used the application. For question 8, all five members disliked Moodle for its user interface; where they felt that it was not user friendly. They indicated that the icons were unattractive and users needed to spend quite an amount of time explore all of the features. However, all members declared that they were able to get used to the Moodle interface within one, or at most, two weeks. For the last question, all five focus group members suggested that the Moodle user interface should be improved to become more user friendly. Three members provided extra suggestions on automating the features of “turn editing on” by detecting the user’s status as being either a lecturer or a student. Four out of five focus group members believed that customized icons are a good solution to making it more understandable for users, with the remaining one member not providing any response to this question.

Table 2. Respondent for Q1 – Q10 (Lecturers)

<table>
<thead>
<tr>
<th>Problem and requirement</th>
<th>Agree with statement</th>
<th>Disagree with statement</th>
<th>Did not specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1. First impression of Moodle were confusing on working procedure and unattractive interface</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Q2. Resources accessible and functioning properly</td>
<td>3</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Q3. Problem experienced when using Moodle</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Q4. Search information easily</td>
<td>4</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Q5. Confused what to do next in the system</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Q6. Directories and categories clear to the user</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q7. Effectiveness on performing or completing task</td>
<td>4</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Q8. Moodle interface complicated, not user friendly and not attractive</td>
<td>4</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Q9. Fast adaptation with Moodle interface</td>
<td>3</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Q10. Automate features and customize background design</td>
<td>4</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>
3.2.1.1 Results: The data collected was divided into the four element factors of layout, functionality, navigability, and timely. Figure 1 shows the average mean for each corresponding element factor.

According to the chart in Figure 1, the average rating for each element shows that lecturers tend to agree that layout contributes most to Moodle usability issues. These findings reveal that layout was the major concern, and the majority of lecturers clarified that they were confused by the icons and thought that the design was poor. Next highest was functionality, with a mean score of 3.2, followed by 3.12 for timely. Some lecturers stated that they needed some time to adapt to the interface, as well the functions of the Moodle application. However, navigability held the lowest mean value, indicating that navigation was not a major usability problem that was identified by the lecturers.

![Mean for each element factor](image)

**Figure 1. Chart Shows the Average Mean for each Element Factor**

3.2.2 Analysis of Students’ Users: In terms of student perspectives, the analyzed results in Table 3 identified the following problems and requirements.

For question 1, four out of five students agreed that the interface design of the Moodle application was too simple. For question 2, the majority of students experienced that they were unable to access the Moodle application from off-campus. Students raised several problems using Moodle, including accessibility from off-campus, duplicate information appearing before and after the login page, and navigation problems. However, the majority of students agreed that they were able to search for information easily. For question 5, three of the students declared that they were confused with subject selection, where duplicate subjects with different semester numbers appeared. For question 6, two out of five students agreed that the directions were clear. They indicated that they needed some time to understand the navigation process. For question 7, three students agreed that they were able to complete their tasks faster, once they were used to the interface. For question 8, all five students agreed, and provided supporting statements, that they felt that the interface design was too simple and information was overloaded; with three criticizing the navigation layout confusion. All students managed to get familiar with the Moodle interface in a short period of time. By the end of the focus group interviews, all five members agreed to the changes needed for the interface and to minimize information on one page. Four members believed that changing the
navigation layout was the most crucial step needed for users to use this application effectively and efficiency.

Table 3. Respondent for Q1 – Q10 (Students)

<table>
<thead>
<tr>
<th>Problem and requirement</th>
<th>Agree with statement</th>
<th>Disagree with statement</th>
<th>Did not specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1. First impression of Moodle too simple</td>
<td>4</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Q2. Resources accessible and functioning properly</td>
<td>4</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Q3. Problem experienced when using Moodle</td>
<td>4</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Q4. Search information easily</td>
<td>-</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Q5. Confused what to do next in the system</td>
<td>3</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Q6. Directories and categories clear to the user</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q7. Effectiveness on performing or completing task</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q8. Moodle interface too simple, information overload and confusing navigation layout</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Q9. Fast adaptation with Moodle interface</td>
<td>3</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Q10. Changing layout and interface and minimize information to improve Moodle interface</td>
<td>4</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

3.2.2.1. Results: The average mean for each element factor are shown in the following chart. The chart divides the collected data into four element factors.

![Mean for each element factor](image)

**Figure 2. The Bar Chart Shows the Average Mean for each Element Factor**
As the chart shows, the layout factor holds the highest mean value of 4.2 over five. This means that the majority of students agree that the main problem with using Moodle was the layout’s design. Students stated that the layout design, including navigation, icons, and symbols was poor and inconsistent, and that there was information overflow on the login page. Students provide further statements on the requirement for a redesign of the interface to improve interactivity. The second highest mean value was functionality (at 3.44 over 5). During the focus group interviews, students declared some confusion over subject selection, which is a part of the function provided for students selecting courses. However, students were fast to adapt to the interface and they found no problem completing their task. This shows in the timely mean value of 2.95 being the lowest.

4. Discussion

The requirement priority is classified based on the level of respondent from the diagram. From the matrix diagram, the most frequent occurring problems identified by users were selected to begin the brainstorming solution. The solutions that were generated pertaining to the identified problem were classified as follows:

From the lecturer’s perspective, users required features or icons to have the following:

- Feedback on redesigning the user interface and reduced duplicate icons, features or symbols.
- Provide descriptions for icons, symbols or features.
- Make the editing option switch automatically, whenever the user logged in as a lecture.

From the student’s perspective:

- Redesign the user interface and reduce duplicate icons.
- Restructure the navigation layout to have consistent colours and layouts.
- Reduce overload information by grouping related information, and removing world news and guidelines.

These were mostly displayed on the login and home page views by students and lecturers. In addition, students also requested background colour customization; where they would be able to customize the background colour on the course subject page.

5. Conclusion and Recommendations

From the brainstorming solutions and results described, several ideas generated from both users shows interest in personalizing the user interface. Users expected to have more interaction using the learning management system, in order to carry out tasks easily and effectively. It is obvious that user interface changes the layout and elements, based on user control or context, are required to ease communication between software and users. Novice users will also have less confusion accessing the entire system. Therefore, an adaptive user interface is suitable in designing the upcoming Moodle prototype. An adaptive user interface has emerged in personalized user interfaces to improve the ability of an application to serve the user’s needs.

In order to implement an adaptive user interface into Moodle applications, two major techniques can be used, which are adaptive presentation and adaptive navigation. These two techniques can be used to enhance the usability of a variety of applications. In this research, adaptive presentation will be used to implement the improved prototype; whereby the contents that is not relevant to the user’s level of knowledge is hidden on the page. However, additional explanations that are required by lecturers can be shown for user’s preferences. For example, if the user is a novice lecturer or tutor, the user interface can show the editing
options page and display more descriptions on how to use features and functions. However, if the user is a student, the editing options and descriptions will be hidden. Besides, an adaptive interface can be adapted to load in a dynamic and fully automated way, such as automating the editing option provided for lecturers. The application presents suggestions on the login page to identify whether the user is a lecture or a student, and if it is a lecturer (with the correct username and password), the application will automate the editing option by displaying the editing page.

In addition, adaptive user interface can be adapted to fulfil both lecturer and student’s further requirements. For example, students will be able to customize background colours to increase their feeling of control and create interest in exploring Moodle applications. Therefore, an adaptive user interface is the most suitable technique to apply in the new prototype.

Acknowledgement

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References
