



RESEARCH PAPER

Perceived Usability of a Moodle-Based Learning Management System in Higher Education

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ABSTRACT

The study aimed to evaluate the perceived usability of key characteristics of a Moodle-based LMS. Usability testing improves user satisfaction, lowers development costs, and increases system quality, and it has a direct impact on learning outcomes in educational settings. Methodologically, the Baloch Learning Management System was created, featuring an 'Introduction to Computer' course for thirty undergraduate students at the University of Turbat, Pakistan. The USE questionnaire categorized into 'Usefulness,' 'Satisfaction,' and 'Ease of Use' domains, guides data collection. Data was analyzed through descriptive statistical methods. Results reveal overwhelmingly positive perceptions, with 77.33% affirming usefulness, 88.00% expressing satisfaction, and 79.05% finding the LMS easy to use. These findings contribute to the ongoing discourse on usability and provide actionable insights for educational institutions seeking to enhance Moodle-based LMS design and implementation. The study suggests prioritizing user-friendly interfaces, clear instructions, and efficient navigation to enhance user experience, and ongoing training programs to enhance LMS capabilities.

KEYWORDS Learning Management System, LMS Usability, Moodle, Perceived Usability, Usability Evaluation

Introduction

Learning management systems are information and communication technologies that assimilate various features to enhance learning. Various commercial and open-source learning management systems provide services for creating and sharing course resources and building communications among users. An LMS is easily learnable and useable. The online nature of an LMS makes it more useful for education. Information in an LMS efficiently flows among teachers and learners. Learner progression is assessed through built-in statistical analyses (Goyal & Tambe, 2015). An LMS enables to management of learning resources and activities, it also enables to assessment of progress and provides reports. Learning management systems are used by educational institutions around the world to help organize important course contents in hybrid or fully online courses and blended courses. An LMS platform offers all the components of a standard class, including class resources, assignments, and the opportunity for learners and instructors to collaborate.

Moodle, developed by Martin Dougiamas is one of the most widely used open-source LMSs, the basic principle of Moodle is to provide the teachers the maximum control over the learning process. Teachers create courses in Moodle and manage and control them. Moodle provides a flexible learning environment that develops students'

self-regulating capabilities and boosts them to attain their targets by themselves. It also provides a joint learning atmosphere where students learn by sharing knowledge through discussions with others. Due to its diverse features, the Moodle learning management system is being used to an increasing extent by many institutions worldwide for the cause of research and learning improvement. Common usage of Moodle includes online and offline learning, active learning, online exams, and online grading.

In today's higher education system, Learning Management Systems are vital for effective teaching and learning. However, choosing the right system and creating user-friendly interfaces are real challenges. Understanding how users interact with these systems is crucial for solving this problem. The goal is to determine the nuanced qualities that truly matter, provide insights to assist educational institutions in making educated decisions, and create user-friendly solutions (DEVECI & ERCIS, 2016). Therefore, this study evaluates the usability of key characteristics of a Moodle-based LMS as perceived by the users.

Literature Review

Usability Evaluation

Usability is the measurement of a system, product, or service used by specific users to accomplish particular goals in a specific context effectively, efficiently, and satisfactorily. It also refers to "the design characteristics, competencies, and activities that contribute to the overall usability of a system (Anon, 2018). Usability assessment is essential because it facilitates human-centered system utilization by increasing user satisfaction, lowering development costs, and reducing unfavorable perceptions of the system. Usability testing is vital for any software system, including learning management systems used in educational contexts, because the quality of the LMS directly affects the quality of learning (Ahmed, Naz, et al., 2023; Senol et al., 2014).

Usability Evaluation Tools

There have been several methodologies and survey tools proposed and employed to assess the usability of technology items based on user perceptions.

The QUIS (Questionnaire for User Interaction Satisfaction) (Norman et al., 1995) developed by a multidisciplinary team at the University of Maryland serves as a comprehensive user evaluation instrument for analyzing interactive computer systems. This questionnaire breaks down usability metrics into a variety of distinct elements. The SUMI (Software Usability Measurement Inventory) (Kirakowski & Corbett, 1993) is a well-established questionnaire for assessing software quality from the perspectives of end users. It contains up to 50 statements based on ISO 9241's definition of usability. Although it provides a comprehensive report and is available in a variety of languages, the user must purchase it to obtain the desired output. Lewis developed the CSUQ (Computer System Usability Questionnaire) (Lewis, 1995), which is publicly available via a public license tool. It has outstanding reliability. The coefficient alpha usually surpasses 0.90, but it lacks a standard (Faria et al., 2016). The SUS (System Usability Scale), developed by Brooke in 1996, is one of the most often used usability measurements (Brooke, 1996). The SUS requires little effort to collect and analyze data. The SUS is a short questionnaire consisting of ten items with the choice to respond on a five-point Likert scale. The SUS statements provide a comprehensive perspective of the subjective assessment of usability and a final single score on an easily understandable scale. SUS is

a real and reliable statistic for measuring usability (Orfanou et al., 2015). Since it only considers one dimension. As a result, a more comprehensive assessment of usability necessitates the inclusion of additional attributes (Hariyanto et al., 2020).

The USE Questionnaire, developed by Lund in 2001, initially focused on three important dimensions of usability: usefulness, satisfaction, and ease of use. It discovered a significant relationship between Usefulness and Ease of Use, implying those improvements in one dimension influence the other, ultimately influencing user satisfaction (Lund, 2001). The questionnaire, known for its ease of use, has been widely used by researchers, and it comes with the added benefit of a public domain license. Despite its ongoing improvement, the questionnaire has proved its effectiveness and accessibility in numerous research studies (Hariyanto et al., 2020).

Material and Methods

To achieve the research's objectives, a Moodle-based LMS named the Baloch Learning Management System was designed in the first stage.

Course Design

Courses must be designed and presented in an order that meets students' needs and perceptions unless students will be less motivated to the courses. Therefore, many practices have been applied in the educational system to satisfy the students (Horvat et al., 2015). To motivate students towards the Moodle learning environment, courses need to be well designed, and easily navigable with personalized learning resources and activities which are accessible to the students anytime and anyplace.

In the subsequent step, a course called 'Introduction to Computer' was set up for Baloch LMS, along with its content.



Figure 1 Course Contents in the Baloch LMS.

Participants

A targeted sample of thirty (30) undergraduate students from the University of Turbat's Computer Science Department was selected to perform the study. This representation is justified for a usability study as a usability study with only 5 users can reveal 80% of issues in a system (BARNUM, 2008). However, better results of usability analysis are achieved with a minimum of 15 users (Faulkner, 2004). The used system

MoodleCloud had a storage limit of 200 MBs. As a result, a Dropbox account was integrated. This external collaboration easily handled the storage limits, providing an efficient way to store large video files and other key resources required for the research study.

All participants reported having access to a computer or smartphone with Internet access. None of them had prior experience with a Learning Management System.

Table 1
Demographics of the Respondents

| Variable | Category | Frequency | Percentage |
|-------------|---------------|-----------|------------|
| Gender | Male | 28 | 93.33 |
| | Female | 02 | 6.67 |
| Age | 18-22 | 30 | 100 |
| Study Level | Undergraduate | 30 | 100 |

The statistics represent the demographic profile of the participants. The majority of participants (93.33 percent) were male, females, on the other hand, account for only 6.67 percent of total responders. This gender imbalance reflects lower enrolment of females than males in higher education. Cultural barriers such as commute restrictions, mixed-gender workplaces, and traditional gender norms, as well as familial pressures, economic problems, such as financial restraints and transportation issues, and gender discrimination largely contribute to female's lower enrollment in higher education in Pakistan (Afridi, 2018). In terms of age, all participants were between the ages of 18 and 22, and the complete sample consisted of undergraduate students because the educational level was targeted for the study.

The sample enrolled in the course through the learning management system. Given their lack of knowledge, participants were given instructions on how to use the LMS in the next phase.

They were required to accomplish the following tasks;

- i) Log in to the Baloch LMS using their email and the default password.
- ii) Access the Introduction to Computing course.
- iii) Review the announcements.
- iv) Use the resources offered (books, Wikipedia, videos, and PPT files).
- v) Participate in the available activities (forum, glossary, and chat).
- vi) Log out of the LMS. (Ahmed, Chandio, et al., 2023)

Instrument and Data Collection

A well-structured instrument based on the USE questionnaire. The first section of the instrument covered information for filling the questionnaire, the second section consisted of demographic information, and the third section comprised 17 Likert-style statements with 3 scales i.e. 1=Disagree, 2= Neutral, and 3=Agree. The statements were grouped into 'Usefulness' 'Satisfaction' and 'Ease of Use' domains of the USE questionnaire. The first five statements were to assess the usefulness of the Baloch LMS, the next five statements were to estimate how students are satisfied with the Baloch LMS and the last seven statements were to measure how students perceive the LMS as easy to use.

Data Analysis

The data collected in this study underwent a thorough analysis of descriptive statistical methods. The aim was to present a comprehensive understanding of the gathered information.

Results and Discussions

This study used a conventional usability instrument and methodology to examine the perceived usability of a Moodle-based learning management system. The usability dimensions were categorized as usefulness, satisfaction, and ease of use.

Table 2
Descriptive Statistics of Usefulness Domain

| Statement | Agree | Neutral | Disagree |
|--|--------|---------|----------|
| 1. This LMS helps me be more effective. | 80.00% | 20.00% | 0% |
| 2. This LMS helps me be more productive. | 80.00% | 20.00% | 0% |
| 3. This LMS gives me control over the learning activities. | 93.33% | 6.67% | 0% |
| 4. This LMS saves my time. | 40.00% | 26.67% | 33.33% |
| 5. This LMS is useful. | 93.33% | 6.67% | 0% |

The feedback from participants regarding the Usefulness of the Baloch LMS demonstrates a positive picture. A significant 80% of users believe that the LMS significantly improves their effectiveness and productivity. Even more impressive is the overwhelming 93.33% who strongly believe that the system gives them control over their learning activities, showcasing a real sense of empowerment among users. However, when it comes to the aspect of time-saving, opinions are more diverse, with 40% acknowledging its time-saving benefits, 33.33% expressing disagreement, and 26.67% remaining neutral. Despite this variety in responses, the overall response remains largely positive, highlighted by the remarkable 93.33% agreement that the Baloch LMS is useful.

Table 3
Descriptive Statistics of the Satisfaction Domain

| Statement | Agree | Neutral | Disagree |
|---|--------|---------|----------|
| 1. I am satisfied with this LMS. | 93.33% | 6.67% | 0% |
| 2. I would recommend this LMS to other friends. | 93.33% | 6.67% | 0% |
| 3. This LMS is fun to use. | 86.67% | 13.33% | 0% |
| 4. This LMS is wonderful. | 80.00% | 20.00% | 0% |
| 5. It is pleasant to use this LMS | 86.67% | 13.33% | 0% |

The assessment of participants' feedback on the Baloch LMS Satisfaction domain portrays a highly favorable picture. An outstanding 93.33% express satisfaction with the LMS, providing a robust endorsement of the system. Similarly, 93.33% of users express advocacy of the platform to recommend the LMS to other users. In addition, 86.67% of users perceive the LMS as enjoyable to use, 80.00% perceive it as wonderful, and 86.67% perceive it as pleasant to use.

Table 4
Descriptive Statistics of Ease-of-Use Domain

| Statement | Agree | Neutral | Disagree |
|--|--------|---------|----------|
| 1. This LMS is easy to use. | 80.00% | 20.00% | 0% |
| 2. This LMS is user-friendly. | 73.33% | 20.00% | 6.67% |
| 3. This LMS requires the few steps possible to accomplish my learning tasks. | 80.00% | 20.00% | 0% |

| | | | |
|---|--------|--------|----|
| 4. This LMS is flexible. | 73.33% | 26.67% | 0% |
| 5. I can use this LMS without written instructions. | 66.67% | 33.33% | 0% |
| 6. I don't notice any inconsistencies as I use it. | 80.00% | 20.00% | 0% |
| 7. I can use this LMS successfully every time. | 100% | 0% | 0% |

The assessment of participants' feedback on the Baloch LMS Ease of Use presents valuable insights. An overwhelming 80.00% of participants perceive its easy nature. A majority, 73.33% acknowledge its user-friendly nature. Additionally, 80.00% of participants state that it requires the fewest steps to accomplish learning tasks. Similarly, a considerable 73.33% perceive it as flexible to fulfill diverse user needs. Moreover, 66.67% of users feel confident in using the LMS without written instructions. A significant, 80.00% report no noticeable inconsistencies in using the LMS. Remarkably, a cohesive 100 percent indicated confidence in using the LMS each time.

These positive findings within the Ease-of-Use domain align seamlessly with the positive trends in the Satisfaction and Usefulness domains.

Table 5
Descriptive Statistics of Usability Dimensions

| Usability Domain | Agree | Neutral | Disagree |
|------------------|---------|---------|----------|
| Usefulness | 77.33 % | 16.00 % | 6.67 % |
| Satisfaction | 88.00 % | 12.00 % | 0.00 % |
| Ease of Use | 79.05 % | 20.00 % | 0.95 % |

The Descriptive Statistics within the Usability dimensions reveal a comprehensive and positive assessment of participants' experiences with the Baloch LMS.

In terms of Usefulness, a significant 77.33% of users agree that the Baloch LMS enhances their effectiveness and productivity. The Satisfaction dimension reflects a remarkable 88.00% agreement, underscoring a high level of contentment among users. In the Ease of Use dimension, the overall agreement stands at 79.05%, demonstrating that users overwhelmingly perceive the Baloch LMS as easy to navigate and user-friendly.

These collective positive findings across the Usability domains signify a well-rounded and effective learning experience with the Baloch LMS. The system not only fulfills its intended purpose of enhancing learning effectiveness but also provides a satisfying and user-friendly environment.

Conclusion

In the educational landscape, Moodle, a robust open-source Learning Management System, stands out for allowing instructors significant control over the learning process. Its versatility fosters collaborative and self-regulated learning, gaining it widespread acclaim. This study, set inside academic discourse, focuses on the complexities of usability within a Moodle-based LMS, addressing the important problems of selecting and creating user-friendly interfaces for higher education. The goal was to identify the critical attributes that are important, providing significant insights to assist educational institutions in making informed decisions and developing solutions that align with the varying needs of learners. The focus was on understanding the system's usefulness, satisfaction, and ease of use.

The results of the usability analysis present a predominantly positive picture. Users are highly satisfied (88.00 percent) and believe the LMS is a useful tool (77.33 percent), highlighting its beneficial impact on productivity. Furthermore, a significant

majority (79.05 percent) find the LMS simple to use, emphasizing its user-friendly interface. These findings highlight the Baloch LMS' achievement in meeting user needs and providing a happy learning environment.

Understanding user perceptions of the Moodle-based LMS reveals the aspects that contribute to a positive user experience. The insights gathered can be used to shape policy about creating, implementing, and improving Learning Management Systems to create more effective and user-friendly instructional solutions.

Recommendations

Drawing from empirical insights, it is advisable to prioritize user-friendly interfaces, clear instructions, technical support for effective use, and efficient navigation when designing and implementing an LMS, to enhance the user experience. Additionally, ongoing training programs for both educators and students could maximize the LMS capabilities and further improve its effectiveness.

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