User Interface Redesign of the Learning Management System (LMS) of Arellano University Using Human-Computer Interaction (HCI) Principles.

Marc Christan D. Lira[1], John Volter N. Barcial[2], John Rick A. Valle[3], Dr. Erlito M. Albina[4]

[1,2,3]School of Computer Studies Arellano University, JAS Campus, Pasay City, Philippines

[4]School of Computer Studies Arellano – Jose Abad Santos Campus

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ABSTRACT

This study focuses on redesigning Arellano University's Learning Management System (LMS) using Human-Computer Interaction (HCI) principles to improve usability, navigation, accessibility, and user experience. The study used a descriptive research design and gathered data from 50 respondents through a Google Form questionnaire. The results show that the proposed LMS UI design received a positive evaluation with an overall weighted mean of 3.71, interpreted as Strongly Agree. The findings show that the proposed redesign can improve the LMS and make it easier and more pleasant to use.

Keywords - Learning Management System (LMS), Human-Computer Interaction (HCI), User Interface Redesign, Usability, User Experience (UX)

INTRODUCTION

Education is a systematic process of accumulating knowledge and developing skills and values, and it is a significant aspect of an individual's personal growth and betterment. Teacher-centered instruction is the primary characteristic of traditional teaching in the Philippines, wherein the instructor was the main facilitator of knowledge transfer through lectures, visual aids, PowerPoints, chalk, and boards.

However, when COVID-19 hit the Philippines, this traditional teaching method faced a severe disruption and underwent a sudden digital transformation. The Department of Education prohibited face-to-face classes, forcing instructors to shift to Emergency Remote Teaching modalities. As a result, the Learning Management System (LMS) became the backbone of remote education. One such institution is Arellano University, which launched its own Pegasus Learning Management System in 2020.

However, the LMS could be improved by transforming the portal into an intuitive, accessible, and user-centric platform. Applying Human-Computer Interaction (HCI) principles will eliminate weak points such as complex navigation and visual crowding. This study aimed to redesign Arellano University's Learning Management System using HCI principles.

REVIEW RELATED LITERATURE

Learning Management Systems (LMS) still have critical usability issues and function-based problems in this application. Studies emphasize the importance of usability evaluation, heuristic evaluation, usability testing, and the System Usability Scale (SUS) to find usability problems and improve the LMS interface and user experience [1], [12]. Lehong, Biljon, and Sanders also cover validated usability guidelines that help evaluate LMS functionality through Heuristic Evaluation (HE), considering teachers' perspectives [10]. Furthermore, successful LMS use depends on technology, computer skills, training, and organizational support, while, addressing the needs of students and other users.

Traditional teaching methods in the country often fail to maximize technology. The traditional teacher-centered approach was changed temporarily, and remote learning was prioritized and standardized. Different e-learning platforms became available and widespread, giving rise to learning Human-Computer Interaction as students spent more time on screens [15] [16].

The user interface (UI) of an LMS affects the user experience (UX). Interface design can influence how users interact with the system and whether they continue using it. Studies focus on redesigning the interface to improve the user experience, make learning more efficient, and cater to the needs of students [2], [3]. The design should also be managed according to the perspectives, preferences, and behavior of students so they can navigate it more freely [7], [11].

Human-Computer Interaction (HCI) focuses on understanding users, identifying their needs, and designing solutions that improve the usability and functionality of the LMS interface [19].The study of Ayomide and Adekanbi Oluwatomiwa showed that HCI elements can improve the learning experience, performance of users, and their desire to navigate the system [13] . Applying HCI principles in redesigning the LMS can improve the usability and experience of students and create an easy-to-use, efficient, and student-focused system [18], [20].

Traditional teaching methods have an insufficient maximization of technology, and an HCD-based redesign can realign technology features to improve usability, efficiency, and users' experiences [9].

The studies identified problems in communication, collaboration, usability, task flow, navigation, and visual design in LMS. Redesigning LMS features and user interfaces can make the system efficient and easy to use [4], [5]. Accessibility and user-centered design principles are also important when developing or redesigning the LMS interface [3].The Canvas LMS redesign used usability heuristics and Web Content Accessibility Guidelines (WCAG) to simplify instructional text, reorganize content, incorporate relevant visuals, and eliminate distractions [8].

Several studies suggested redesigning the LMS by resolving its current limitations, weak points, usability, and functionality instead of creating a brand new LMS [6] [14]. Studies also found that LMS use can affect students' learning outcomes, communication, engagement, and academic performance [17], [22], [23] Students have different levels of understanding and opinions about LMS functions such as communication, teamwork, course delivery, and content development [24]. Other factors, including learning materials, computer skills, enjoyment, ease of use, and expected performance, can also affect students' intention to continue using an LMS [25].

Previous studies have discussed usability, user interface, user experience, HCI principles, navigation, accessibility, LMS features, and LMS redesign. However, studies still show different usability issues, function-based problems, and limitations in LMS. Therefore, this study focuses on redesigning the LMS user interface using HCI principles based on students' needs to improve usability, accessibility, navigation, functionality, and user experience.

METHODOLOGY

This chapter discusses the methods and procedures used in the study. This chapter presents the research design, research locale, participants, research instrument, data-gathering procedure, data analysis, and ethical considerations. The study will gather feedback from students using a Google Form questionnaire regarding their experience with the UI redesign of the Learning Management System (LMS).

A. Research Design

The research will use a descriptive research design to gather the data. The collected data will be use to describe the experiences of the students about the proposed UI design of Learning Management System (LMS). The data will be collected through google form questionnaire focusing on usability, navigation, interface design, accessibility, and mobile adaptability of the LMS. The result will be use to evaluate the propose design of LMS and find the areas that can still be improve.

B. Research Locale

This research will be conducted at Arellano University Jose Abad Santos Campus. The research will focus on students and faculty members who use the Learning Management System. The location is selected because the study focuses on redesigning the ui of the Learning Management System used by the students.

C. Research Participants

This research will involve 50 randomly selected respondents from Arellano University Jose Abad Santos Campus. These respondents were selected because they use the university Learning Management System and can provide relevant feedback on its interface, navigation, accessibility, and usability.

D. Research Instrument

The instrument used to gather data is a Google Form questionnaire. The questionnaire will gather students' feedback on their experience with the existing Learning Management System. The questionnaire will include questions on usability, navigation, visual design, accessibility, and overall experience using the LMS.

E. Data Gathering Procedures

The researcher will first prepare the Google Form questionnaire to identify the existing problem. The questionnaire will be reviewed before distributing to the respondents.

After finalizing the questionnaire, the researcher will distribute the Google Form link to 50 randomly selected respondents from Arellano University Jose Abad Santos Campus. The respondents will be informed of the objective of the research on the Learning Management System.

After the respondents have finished answering the questionnaire, the researcher will collect the data from the Google Forms. The gathered data will be evaluated to determine respondents' feedback on the proposed LMS design, especially usability, navigation, interface design, and accessibility.

The results will serve as a basis for evaluating the proposed LMS redesign and identifying areas that may still need improvement.

F. Data Analysis

The data collected through Google Forms will be classified and systematized using the Likert scale frequency, percentage, and weighted mean to summarize the responses of the participants.

Scale	Interpretation
4	Strongly Agree
3	Agree
2	Disagree
1	Strongly Disagree

Frequency and percentage will summarize the distribution of responses, while the weighted mean will determine the overall level of agreement for each statement. The results will help identify which aspects of the LMS received higher or lower evaluations and which areas require improvement.

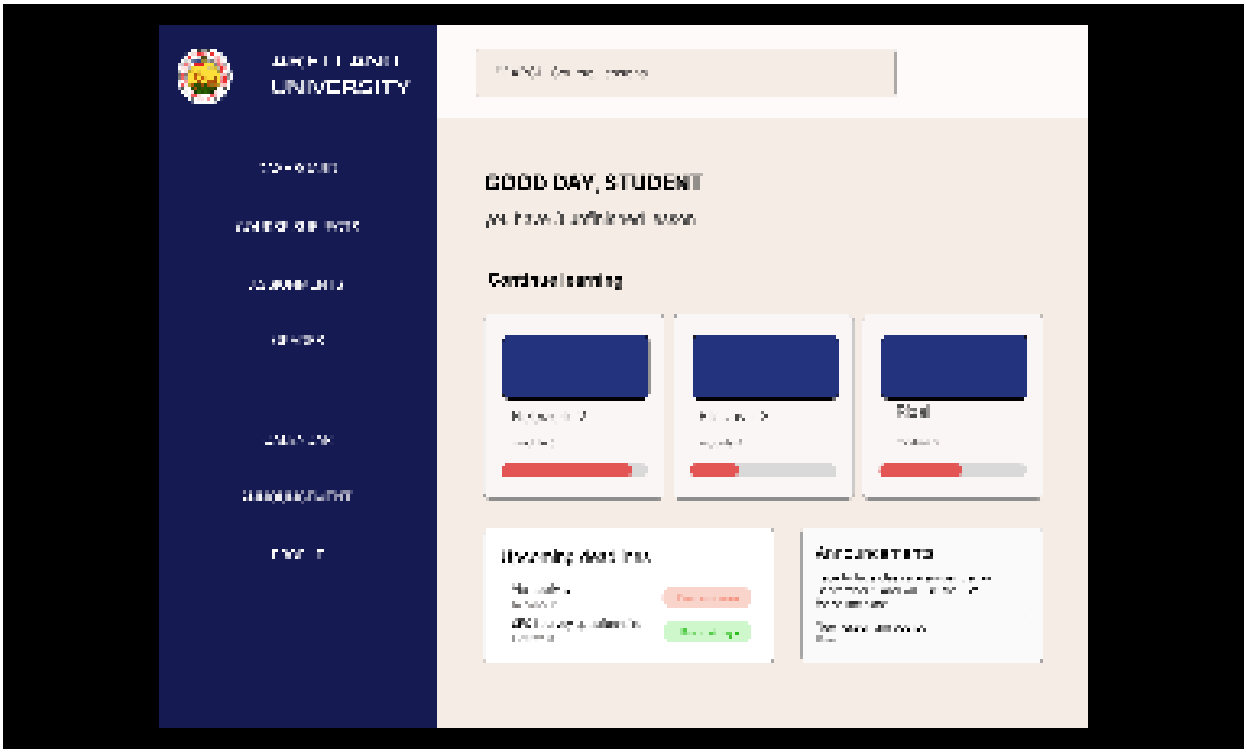
G. Ethical Consideration

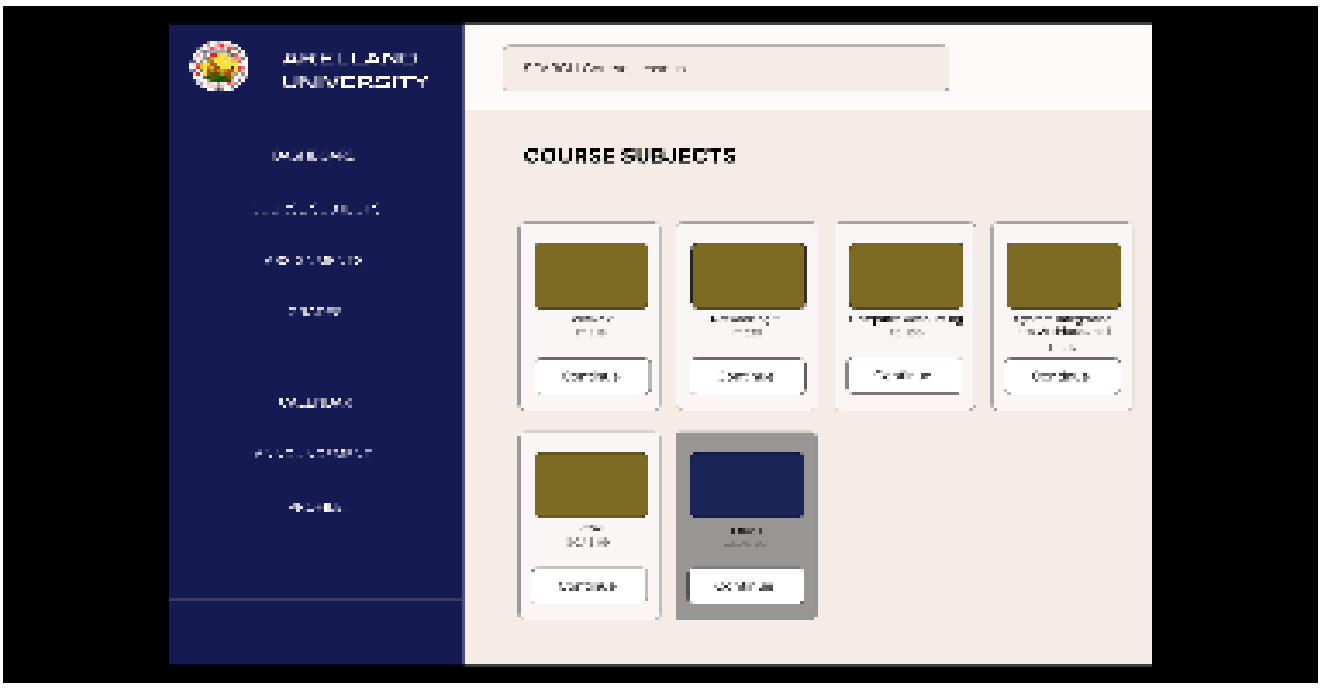
The researcher will inform the participants of the purpose of the study before they answer the google form questionnaire. Participation will be voluntary, and participants may choose whether to participate. The

information that is gathered in Google Forms will be used only for the purpose of the study. The researchers will also maintain respondents' privacy and will not disclose personal information unnecessarily.

H. System Story Board

The system storyboard shows how the student will use the proposed LMS interface. The student first opens the LMS and sees the dashboard where the unfinished lessons, upcoming deadlines, and announcements are shown. The student can select the Course Subjects to see the available subjects and continue their lessons. The student can also check their assignments, grades, calendar, and announcements using the navigation menu. This system was made to improve the usability, navigation, accessibility, and overall user experience of the LMS.





RESULTS AND DISCUSSION

This part presents the interpretation of the gathered data from the 50 respondents on the proposed design of LMS. The survey result are organized according to respondent profile, usability, navigation, interface and visual design, accessibility, functionality, and overall user experience. The questionnaire used a four-point Likert scale: 4 – Strongly agree, 3 agree, 2 disagree, and 1 strongly disagree, and frequency, percentage, and weighted mean were used to summarize the responses.

Group	Count	Percentage
College Students	34	68%
High School Students	10	20%
Faculty member	6	12%
Total	50	100%

In Table I, the 50 respondents are composed of 34 college students (68%), 10 high school students (20%), and 6 faculty members (12%). The College students represented the largest group of respondents.

Course/Strand	Frequency	Percentage
NURSING	7	14%
CITE	8	16%
CAS	7	14%
BSBA	4	8%
STEM	3	6%
BSHM	3	6%
MEDTECH	2	4%
BSED	1	2%
GAS	9	18%
N/A	6	12%

In table II it shows that GAS (18%) has the largest respondent and followed by CITE (16%) and the NURSING and CAS at 14% each. The remaining participants were distributed across BSBA, STEM, BSHM, MEDTECH, and BSED, while 12% were marked N/A.

Criterion	Weighted Mean	Interpretation
Usability	3.71	Strongly Agree
Navigation	3.72	Strongly Agree
Interface and Visual Design	3.67	Strongly Agree
Accessibility	3.74	Strongly Agree
Functionality	3.72	Strongly Agree
Overall User Experience	3.72	Strongly Agree
Overall Mean	3.71	Strongly Agree

Table III presents the weighted mean score for each criterion of the proposed LMS interface. The results show that the respondents gave positive evaluations, with average ratings of 3.67 to 3.74, and these are interpreted as Strongly Agree. Accessibility received the highest score (3.74), followed by Navigation, Functionality, and Overall User Experience (3.72). Usability scored 3.71, while Interface and Visual Design scored 3.67. The overall weighted mean of 3.71 shows that the respondents have a favorable evaluation of the proposed LMS ui design.

Useful Feature Comments	Mentions
Easy navigation / ease of navigation	10
Organized or clean layout	5
Easy access to subjects/courses	5
Assignments/activities	4
Calendar	3
General usefulness of all features	3

In Table IV, for the open-ended question "What feature of the proposed redesigned LMS interface do you find most useful? Why?", easy navigation was the most commonly mentioned useful feature, with 10 respondents highlighting it. Other mentioned features included the organized and clean layout and easy access to subjects or courses, with 5 responses each. Assignments and activities were mentioned by 4 respondents, while the calendar and overall usefulness received 3 responses each. These findings show that respondents particularly valued features that make the LMS easier to navigate, organized, and convenient to use.

DISCUSSION OF OVERALL FINDINGS

This research focuses on redesigning the LMS interface using Human-Computer Interaction (HCI) principles to address navigation complexity and visual crowding. Respondents rated the proposed interface on all six criteria, with an overall score of 3.71, suggesting they liked the redesign. This aligns with studies showing that applying HCI principles in LMS redesign can improve usability and user experience. The results show that the layout is working well, but the colors and visual styling can still be improved, especially the text contrast and error recovery features.

Accessibility has the highest score (3.74), which supports the literature stating that accessibility and user-centered design principles are important in LMS redesign. It shows that users' needs are different across LMS functions, which agrees with the findings that students have different opinions about the LMS functions [24].

CONCLUSION

This study found that Human-Computer Interaction (HCI) principles strongly affect how satisfied and comfortable users are with Arellano University's Learning Management System interface. Simple navigation, an organized layout, clear accessibility, and reliable functions make the system easier and more pleasant to use. However, the interface can still be improved by increasing text contrast and providing an Undo option for accidental actions to make it more accessible and user-friendly.

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