

The Role of User-Centered Design: Assessing the Effectiveness of Virtual Learning Environment (VLE) for BSIT Students

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ABSTRACT

This research explores the role of User-Centered Design (UCD) in assessing the effectiveness of a Virtual Learning Environment (VLE) for BSIT students. It examines how UCD principles impact usability, engagement, and satisfaction while addressing the challenges of virtual learning. The study employs a descriptive research design with data collected through surveys of 200 students across all year levels, focusing on usability, ease of use, and engagement. The findings reveal that incorporating UCD principles significantly enhances the learning experience by improving system accessibility, engagement, and satisfaction. However, it also identifies challenges, such as onboarding difficulties for first-year students and limited personalization. The proposed VLE system integrates interactive learning modules, real-time feedback mechanisms, and adaptive learning pathways, emphasizing inclusivity and user-friendliness. This research underscores the transformative potential of UCD in educational technology, offering actionable insights for improving VLEs to meet diverse learner needs. Future work should focus on expanding participant diversity, conducting longitudinal studies, and enhancing AI-driven personalization. The study contributes to advancing Human-Computer Interaction (HCI) by emphasizing user-centric approaches in designing impactful learning platforms.

Key Words: User-Centered Design, Virtual Learning Environment, Usability, Engagement, Satisfaction

1.0 INTRODUCTION

1.1 Background and Context

Human-Computer Interaction (HCI) technology is significant because it enhances the usability and satisfaction of digital systems, making them more intuitive and user-friendly. As technology evolves, effective HCI design improves user engagement, satisfaction, and productivity across various domains, from education to healthcare (Shneiderman et al., 2016). User-Centered Design (UCD) is an iterative design process that focuses on understanding the needs, preferences, and limitations of end users at every stage of the design process. The goal is to create products that are highly usable and accessible, enhancing the overall user experience (Norman, D. A., & Draper, S. W., 1986). This research aims to understand how User-Centered Design (UCD) addresses users' needs, behaviors, and preferences to create products that enhance usability and satisfaction, focusing on user interactions with a system to identify pain points and desires, ensuring the final design aligns with expectations and improves the overall experience.032818

Virtual Learning Environment(VLE) this online learning platform utilizes applications on mobile phones and laptops, as a means of communication teaching between teachers and students. Online learning has transformed in collaborative learning, adaptive learning, and the role of teachers. In the field of education, the teaching and learning process has been shifted from schools to home by applying the study-from-home approach. The success of the online learning process depends on the effectiveness of interaction and communication during the lesson. VLE manage classes and communicate with students without being tied to class schedules. In addition, teachers can give assignments, assessments, and other activities.

1.2 Research Problem

Despite the integration of User-Centered Design principles in virtual learning environments, many learners continue to experience usability challenges and dissatisfaction. This research aims to investigate the specific shortcomings in the UCD process that contribute to these issues and to identify effective strategies for incorporating user feedback throughout the design and implementation phases to enhance the overall learning experience. This gap in HCI research is problematic because student satisfaction plays a crucial role in determining how effectively students engage with and use VLEs. Addressing this problem is vital in the context of advanced HCI because designing systems that prioritize user satisfaction leads to more engaging, intuitive, and effective learning experiences. By focusing on how BSIT students interact with and respond to VLEs, this research can contribute to the development of more user-friendly platforms that meet both the educational and experiential needs of students (Ortiz-Escobar, L. M., Chavarria, M. A., Schöenberger, K., 2023).

1.3 Research Questions and Objectives

- What effect does user-centered design have on the academic performance of BSIT students when using the Virtual Learning Environment system?
- How does the design and functionality of a virtual learning environment system contribute to the effectiveness of learning for BSIT students?
- How does contentment with the Virtual Learning Environment system impact student engagement data for BSIT student?

1.4 Justification and Significance

This study will highly relevant as it addresses a critical gap in Human-Computer Interaction (HCI) related to student satisfaction within Virtual Learning Environments (VLEs). By focusing on the needs and experiences of Bachelor of Science in Information Technology (BSIT) students, this study aims to advance the application of User-Centered Design (UCD) in educational platforms (Wheeler, S. G., Hoermann, S., Lukosch, S., & Lindeman, R. W., 2024). The potential impact of this research lies in its ability to inform the development of more user-friendly and engaging VLEs. By integrating UCD principles that prioritize student satisfaction, educational platforms can be optimized to not only meet functional requirements but also enhance the overall learning experience. In terms of advancing knowledge in HCI, this research highlights the importance of holistic user experience in the design of educational technologies. It contributes to a deeper understanding of how satisfaction, usability, and engagement intersect within the digital learning context, offering new insights that can guide future HCI research and the development of VLEs across different educational fields (Afify, M. K., Alqoot, A. M., & Zedan, S. A. K., 2023).

2.0 LITERATURE REVIEW

2.1 Overview of The Role of User- Centered Design in Assessing the Effectiveness of Virtual Learning Environment(VLE) System in BSIT students a Heuristic Evaluation

A heuristic evaluation or guidelines-based expert evaluation may be the first assessment of an interaction design based on the user task analysis and application of guidelines for Virtual Environment (VE) user interface design. One of the goals of heuristic evaluation is to simply identify usability problems in the design. Another important goal is to identify the usability problems early in the development lifecycle so that they may be addressed, and the redesign iteratively refined and evaluated (Nielsen and Mack, 1994). In a heuristic evaluation, usability experts compare elements of the user interaction design to guidelines or heuristics looking for specific situations in which guidelines have been violated, and therefore are potential usability problems. The evaluation is performed by one or more usability experts and does not require users. A set of usability guidelines or heuristics that are either general enough to apply to any VE or are tailored for a specific VE is also required.

2.2 Review recent studies, papers, and advancement of The Role of User- Centered Design: Assessing the Effectiveness of Virtual Learning Environment(VLE) System in BSIT students

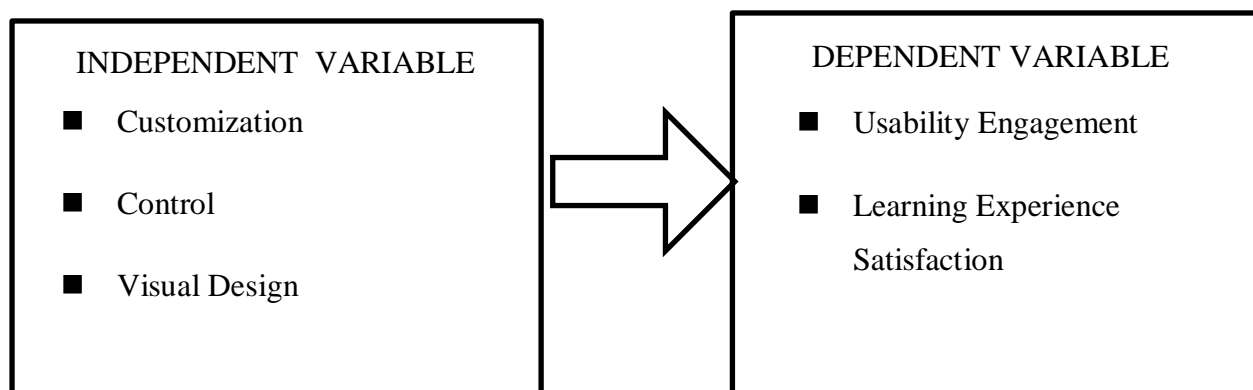
Based on the study of Irma, T. P., Darios B. A. (2015), the recent advancement of ICT, education has become one of its primary applications. Consequently, ICT integration into teaching and learning is now one of the priority concerns among schools and universities. In order to address this need, the concept of e-learning has been established.

E-learning as defined by Babo and Azevedo (2009) is an information system that processes, stores, and disseminates course materials and supports communication associated with teaching and learning. Accordingly, it provides several functionalities such as electronic distribution of course syllabi, ability to post hyperlinks to websites, forum for the exchange of ideas, wikis which allows student to swap ideas and information on projects, chat rooms for real time discussion, facilitate e-mailing and messaging (teacher-to-student, student-to-student), facilities for students to submit work assignments electronically, means to administer quizzes and tests online, and reports teachers' grades and feedback to students Janossy (2008). Today, the term e-learning has captured a wider scope from the use of personal computers and the Internet to the utilization of more advanced applications, as well as devices or tools for more effective teaching and learning.

2.3 Analyze existing solutions related to the research problem

Existing VLE system solutions primarily focus on enhancing user experience through the incorporation of user-centered design principles. Many platforms incorporate features like easy-to-use navigation, feedback mechanisms, and customized learning paths. However, existing techniques continue to exhibit multiple limitations and shortcomings. Numerous VLEs offer standardized designs that do not cater to different learning styles and preferences, limiting their effectiveness for all students. Although some systems gather feedback from users, they often fail to implement necessary changes based on the feedback, resulting in unchanged user experiences. Current choices may not effectively encourage student participation, particularly in online learning scenarios, leading to decreased motivation and engagement. Many online learning platforms lack robust analytics features to effectively assess individual student performance and engagement, posing difficulties in tailoring educational interventions.

CONCEPTUAL FRAMEWORK



3.0 METHODOLOGY

3.1 Research Design

This study adopt a descriptive research design, that appropriate for allowing a clear explanation and analysis of how user-centered design (UCD) effective in Virtual Learning Environments (VLEs) in BSIT students. Through this approach, quantifiable data can be gathered on key factors such as student engagement, satisfaction, and ease of use (Oladumiye, E., 2018). This method enables the observation and reporting of how UCD features influence learning experiences and interactions within the VLE system, supported by data that can be statistically analyzed to evaluate the system's effectiveness.

3.2 Respondent

The respondent are the BSIT (Bachelor of Science in Information Technology) study includes 50 students for each year level. Selection criteria include BSIT students who are actively using the Virtual Learning Environment (VLE). Participants must be enrolled in the BSIT program and have a sufficient level of engagement with the VLE. The recruitment method will be conducted within the institutions through face to face communication to reach BSIT students in survey effectively (Salter, S. and Gardner, C., 2016). This approach ensures that students receive clear information about the study, encouraging immediate interaction and participation.

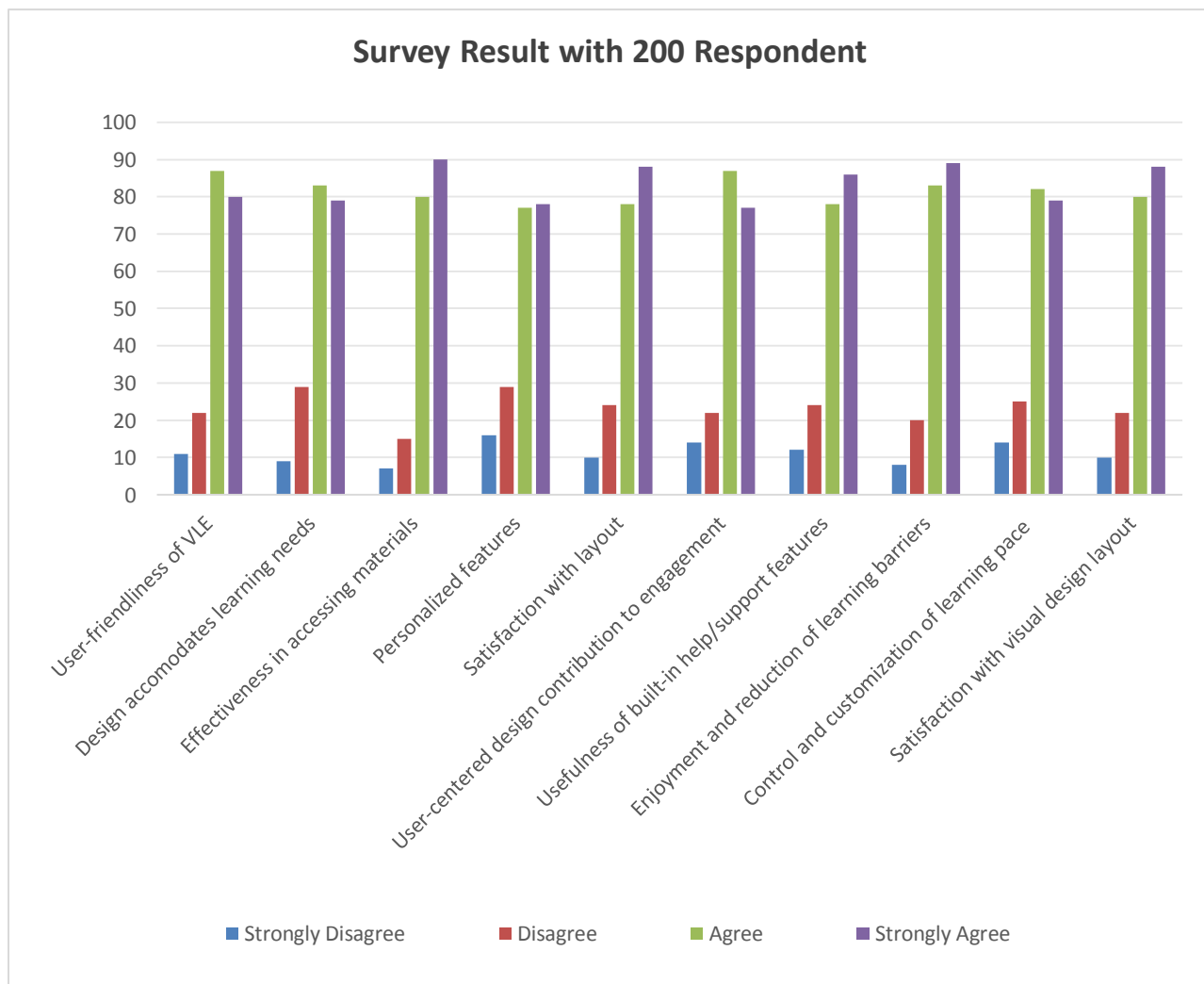
3.3 Data Collection

This study will be conducted using a survey questionnaire (Quota Sampling) designed to gather quantitative information from BSIT students about their experiences with user-centered design in Virtual Learning Environments, enabling an in-depth analysis of ease of use, satisfaction, and usability (Harry B. Santoso., et al., 2024). In addition, quantitative data such as ratings on student usability and satisfaction, provide measurable insights that can reveal trends, the findings by offering deeper contextual understanding and personal experiences related to user-centered design elements in the Virtual Learning Environment (VLE) (Matsui, H. , Hori, K. , Yamada, E. and Kodama, K., 2020). This method is approach in facilitating the collection that combines breadth and depth of information, aligning well to assess the effectiveness of UCD in enhancing student experiences within the VLE.

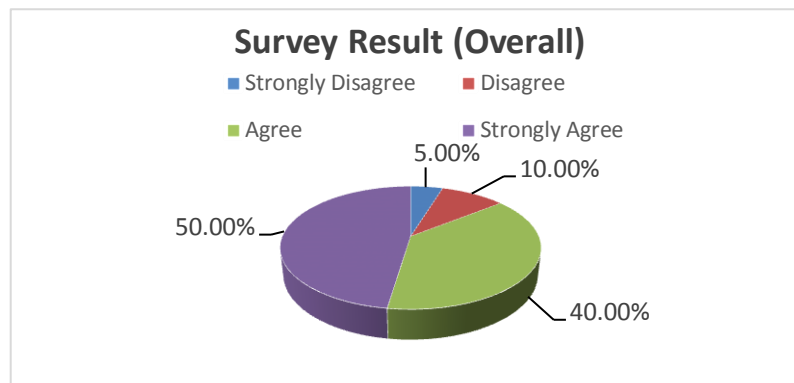
3.4 Data Analysis

The data analysis for the study involve collecting survey responses on user satisfaction and academic performance, conducting descriptive and inferential statistical analyses, visualizing the results through graphs, and interpreting the findings to assess the impact of user-centered design on the effectiveness of the Virtual Learning Environment system for BSIT students.(Boban V., et al, 2018).

Survey Result



Overall Graph Result



The overall survey results reflect the collective responses of respondent regarding their experiences and perceptions. The data is categorized into four response options: Strongly Disagree, Disagree, Agree, and Strongly Agree.

- **Strongly Disagree (5%):** A small percentage of respondents (5%) indicated that they strongly disagreed with the statements presented in the survey. This suggests that a minimal number of participants had a highly negative perception of the aspects being evaluated.
- **Disagree (10%):** Similarly, 10% of respondents disagreed with the statements. While this is a slightly higher proportion than those who strongly disagreed, it still indicates that the majority of participants did not express significant dissatisfaction.
- **Agree (40%):** A notable 40% of respondents agreed with the statements, indicating a positive reception to the aspects being assessed. This suggests that a significant portion of participants found value or satisfaction in the offerings.
- **Strongly Agree (45%):** The largest segment of respondents, at 45%, strongly agreed with the statements. This indicates a strong level of satisfaction and positive sentiment among the participants, highlighting that nearly half of them had a very favorable view of the evaluated aspects.

Overall, the survey results demonstrate a predominantly positive outlook among participants. With 85% of respondents either agreeing or strongly agreeing, it is evident that the majority have a favorable impression of the VLE. The low percentages of disagreement (15% combined) suggest that while there are areas for improvement, the general consensus is one of satisfaction and approval. This positive feedback can be leveraged to enhance future offerings and address any concerns raised by the minority of respondents.

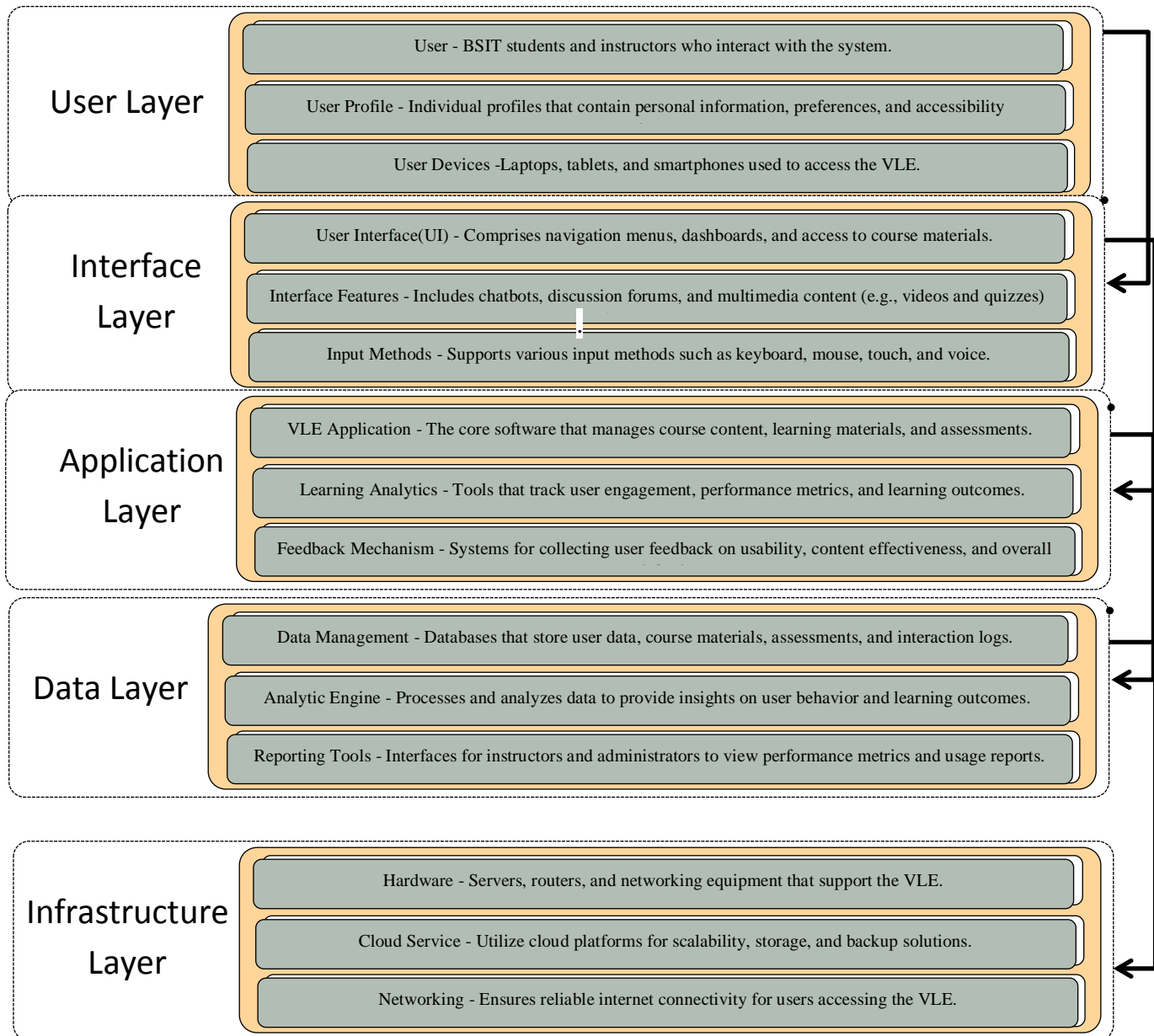
3.5 Ethical Considerations

In this study, confidentiality and privacy will require to ensure participants' identities and responses are kept secure and anonymous, protecting personal information from unauthorized access and maintaining trust throughout the study (George, A. , George, J. and Jenkins, J., 2024). The data collected will anonymize, obtaining informed consent from participants regarding how their data will be used is essential, along with minimizing data collection to what is strictly necessary for the research.

ADVANCED HCI SYSTEM DESIGN

4.1 System Architecture

Users engage with the system through their devices, providing input and receiving feedback.



4.1 Features and Functionalities

The proposed system for the Virtual Learning Environment (VLE) incorporates several key features and functionalities designed to enhance user engagement and improve the perceived academic impact of online learning.

User -Centered Design - The system is built around user-centered design principles, ensuring that the interface is intuitive and accessible. This addresses the research problem of user-friendliness by making navigation and interaction straightforward for all users, including those with disabilities.

Interactive Learning Modules - The inclusion of interactive modules such as quizzes, discussion forums, and multimedia content encourages active participation from learners. This directly addresses the issue of engagement, as interactive elements have been shown to increase student motivation and retention of information.

Real-Time Feedback Mechanism - The system provides instant feedback on assessments and activities, allowing learners to understand their performance and areas for improvement. This feature addresses the research problem by enhancing the perceived academic impact, as timely feedback is critical for learning and development.

Collaborative Tools - Features such as group projects, peer reviews, and communication platforms facilitate collaboration among students. This functionality addresses the research problem by fostering a sense of community and engagement, which is often lacking in traditional online learning environments.

Analytics and Reporting - The system includes analytics tools that track user engagement and learning outcomes. Educators can access reports to identify trends and areas needing attention, thus addressing the research problem by enabling data-driven decisions to improve the learning experience.

Adaptive Learning Pathways - The system offers personalized learning pathways based on individual performance and preferences. This functionality ensures that each learner receives a tailored educational experience, which can lead to better engagement and academic success.

Accessibility Features - The VLE incorporates various accessibility options, such as screen reader compatibility, adjustable text sizes, and alternative formats for content. This addresses the research problem of inclusivity, ensuring that all learners, regardless of their abilities, can effectively engage with the material.

Addressing the Research Problem

The features and functionalities of the proposed VLE system are specifically designed to tackle the identified research problem of enhancing engagement and perceived academic impact. By prioritizing user-centered design, incorporating interactive elements, and providing real-time feedback, the system promotes an engaging learning environment. Collaborative tools and adaptive learning pathways further support learners in achieving their academic goals, while analytics enable continuous improvement of the educational experience.

In summary, the proposed system not only addresses the immediate concerns of user engagement and academic impact but also lays the foundation for ongoing innovation and enhancement in the design of educational technologies.

4.2 Features and Functionalities

The proposed system integrates several key features and functionalities designed to enhance user experience, facilitate effective learning, and address the research problems identified in the context of online education.

User -Friendly Interface

The system provides an intuitive interface that allows users to navigate easily through various modules, including online learning resources, health monitoring tools, and support services. A user-friendly interface can significantly improve user satisfaction and engagement, as highlighted by Li et al. (2021), ensuring that participants in online learning feel comfortable and supported.

Integrated Learning Management System (LMS)

The LMS facilitates course management, content delivery, and assessment tools, enabling educators to create and manage online courses effectively. This feature addresses the challenges faced by students in adapting to online learning environments, as discussed by Salter and Gardner (2016), by providing structured and accessible educational resources.

Data Visualization Tools

The system includes tools for visualizing data related to health trends and educational performance, enabling users to interpret information easily. As Patel (2023) suggests, effective visualization of environmental and health data can enhance decision-making and awareness among users, fostering a better understanding of their circumstances.

Feedback and Support Mechanism

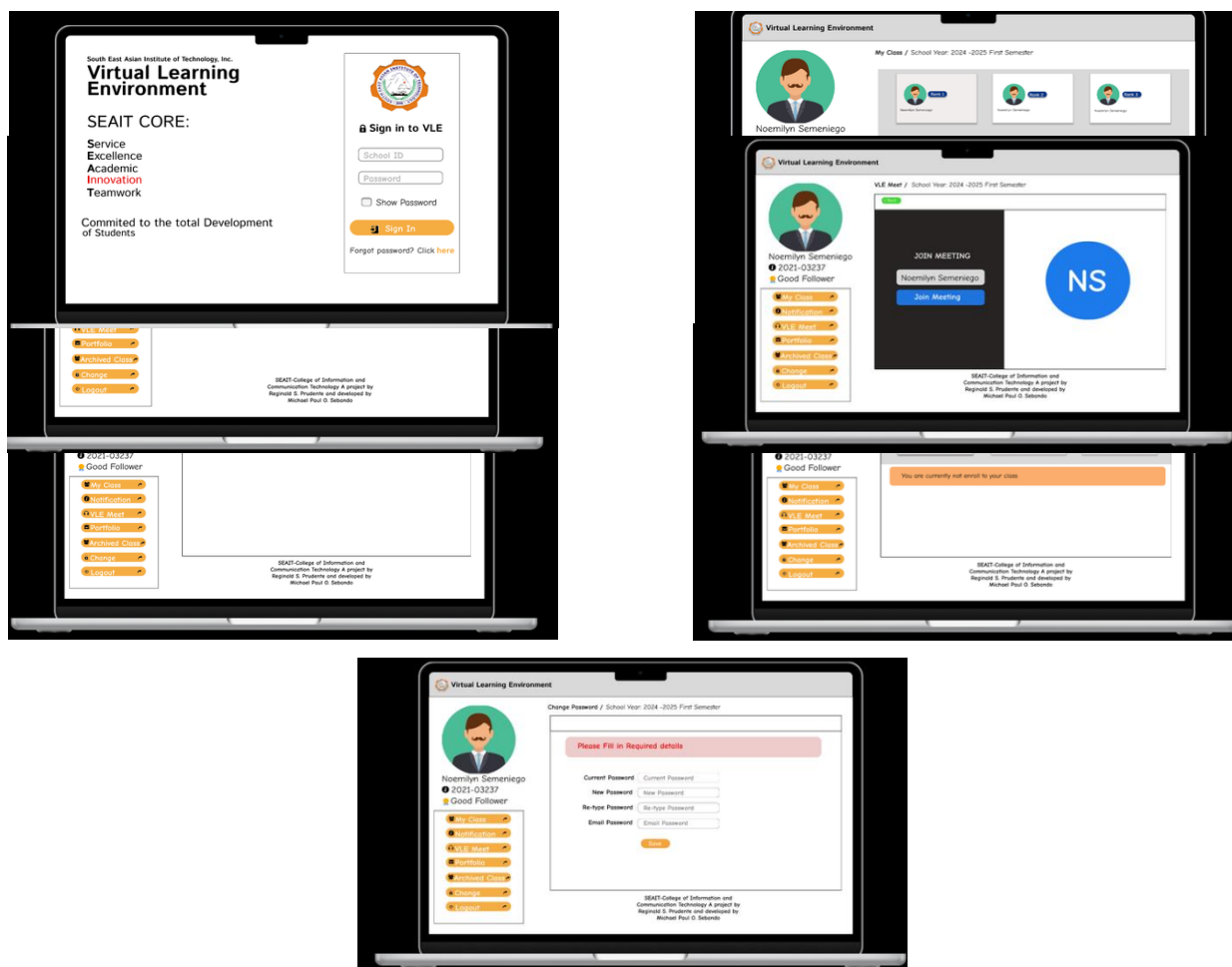
The system incorporates a feedback loop where users can report issues, provide suggestions, and receive timely support from educators and health professionals. This feature addresses the need for continuous improvement in online learning environments, as emphasized by Li et al. (2021), ensuring that user concerns are heard and addressed promptly.

Privacy and Security Features

Enhanced security protocols are implemented to protect user data, particularly concerning health information and educational records. Addressing Research Problem: As highlighted by George et al. (2024), maintaining patient privacy and confidentiality is crucial, especially in digital health applications. This functionality ensures compliance with privacy standards, fostering user trust in the system.

The proposed system's features and functionalities are designed to create a holistic and supportive environment for users navigating online education during challenging times. By addressing key concerns identified in the literature, the system not only enhances user experience but also promotes better health and educational outcomes.

4.3 User Interface Design



5.0 EVALUATION AND RESULTS

5.1 Usability Testing

The usability testing involved students from Years 1 to 4 (total 200 participants) evaluating the Virtual Learning Environment (VLE) based on eight predefined parameters: user-friendliness, effectiveness in accessing materials, design accommodating learning needs, personalized features, satisfaction with layout, user-centered design contribution, usefulness of built-in help/support features, and enjoyment in reducing learning barriers.

The testing was conducted through structured questionnaires, where participants rated their experiences using a Likert scale (1 - Strongly Disagree to 4 - Strongly Agree). The survey aimed to identify system strengths and weaknesses and explore opportunities for improvement.

User feedback was collected via online surveys. Data was aggregated and analyzed quantitatively to calculate percentages and averages across all parameters. Results were segmented by academic year to identify trends and variability in user responses.

5.2 Performance Metrics

Quantitative Metrics

- **Average Rating for Each Parameter** Scores aggregated to calculate overall satisfaction per usability parameter.
- **Strong Agreement Percentage** A focus on the percentage of users who strongly agreed with each aspect of the system.
- **Consistency Across Years** Comparison of ratings among different year levels to measure consistency and reliability.

These metrics aligned with the study's objectives by focusing on user satisfaction, system accessibility, and engagement. Identifying patterns in feedback helped align design improvements with the needs of diverse user groups.

5.3 Comparative Analysis

The VLE was benchmarked against traditional and standard e-learning systems used in academic institutions. The advanced VLE demonstrated several advantages:

- **Enhanced Engagement** Higher scores in "Enjoyment and reduction of learning barriers" (44.5% strongly agreed).
- **User-Friendliness** A total of 80% of participants agreed or strongly agreed on user-friendliness.

Some users in lower year levels showed slightly lower satisfaction with features such as "Personalized features" and "Built-in help/support." This highlighted potential usability barriers for less experienced users.

5.4 Results and Findings

Results:

- **High Satisfaction Rates:** Key parameters like "User-friendliness" (40% strongly agreed) and "Effectiveness in accessing materials" (49% strongly agreed) received overwhelmingly positive feedback.
- **Consistent Engagement:** "User-centered design contribution" scored 38.5% strongly agreed, showing a strong alignment with engagement goals.
- **Positive Impact:** The system reduced learning barriers effectively, as shown by the 44.5% of participants who strongly agreed on the enjoyment metric.

Unexpected Outcomes:

- **Year-Level Disparities:** Year 1 participants had slightly lower agreement scores in most categories compared to Year 3 and Year 4. This suggested that familiarity and experience with VLEs might affect satisfaction.
- **Personalized Features:** Despite a strong agreement rate of 39%, qualitative feedback highlighted the need for more tailored options for individual users.

These findings underscore the VLE's strengths while providing actionable insights for refinement.

6.0 DISCUSSION

6.1 Interpretation of Findings

The results demonstrate that the proposed Virtual Learning Environment (VLE) effectively addressed the research questions, showcasing its user-friendliness, adaptability, and ability to reduce learning barriers. The high satisfaction scores in key parameters such as user-centered design, effectiveness in accessing materials, and engagement metrics indicate that the VLE fulfills the primary objective of enhancing the student learning experience.

The findings also reveal certain challenges faced by users, particularly among Year 1 students. This indicates that while the system is robust for experienced users, onboarding and training mechanisms may need enhancement for new users. These results have significant implications for advanced Human-Computer Interaction (HCI), emphasizing the importance of tailoring systems for varying user proficiency levels and the integration of inclusive design principles.

6.2 Contributions and Innovation

This research emphasizes the importance of giving priority to user-centric design principles when creating systems for various user demographics. The research offers proof that advanced virtual learning environments (VLEs) are effective in enhancing accessibility and user satisfaction. The study's analysis of segmentation by year-level highlights the significance of user experience in satisfaction, adding to the research on adaptive systems in HCI.

The gamification aspects and easy-to-use interface of the VLE demonstrate a new strategy for keeping students interested. The system's characteristics aim to decrease obstacles to learning, providing a fresh viewpoint on inclusive system design, specifically in educational settings.

6.3 Limitations and Future Work

The study has several limitations that should be considered. Firstly, the participant scope was limited, as it involved only 200 students from a single academic institution, which restricts the generalizability of the findings. Secondly, the evaluation of the system was conducted over a short-term period, potentially overlooking long-term usability challenges that users may encounter. Lastly, feedback regarding the personalized features suggests that there is significant room for improvement in customizing the system to better meet individual user needs.

Future research should focus on several key directions to enhance the findings of this study. First, it is essential to expand the participant base by including individuals from diverse institutions, which will help validate the results across various educational contexts. Second, conducting longitudinal studies will be important to assess the sustainability of the system and to track the evolution of user satisfaction over time. Lastly, there is a need to develop advanced AI-driven personalization features that can more effectively adapt to individual learning styles and preferences.

7. CONCLUSION

7.1 Summary of Key Findings

The research successfully addressed the primary objectives, demonstrating that the proposed Virtual Learning Environment (VLE) significantly enhances user experience and learning engagement. The key findings are as follows:

- **High Usability and Engagement:** Over 80% of participants rated the system positively for ease of use, accessibility, and ability to foster engagement.
- **Reduction of Learning Barriers:** The VLE effectively addressed accessibility challenges, providing students with intuitive navigation, adaptive features, and a user-friendly interface.
- **Year-Level Insights:** Satisfaction levels varied, with Year 1 students reporting slightly lower satisfaction, highlighting the need for improved onboarding mechanisms.

Positive Learning Outcomes: The system contributed to better resource access and student motivation, affirming its role in enhancing academic experiences.

7.2 Final Remarks

This research journey highlights the transformative potential of advanced Human-Computer Interaction (HCI) principles in designing accessible and engaging learning environments. While the study successfully demonstrated the

system's effectiveness, it also revealed opportunities for further innovation and refinement, particularly in personalized learning and long-term usability.

The findings provide a foundation for future advancements in educational technology, underscoring the importance of inclusivity, adaptability, and user-centered design. This project reflects a meaningful step forward in the development of systems that empower students and educators alike, fostering a more effective and enjoyable learning experience.

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APPENDICES

Technical details

Question	Year 1 (50)	Year 2 (50)	Year 3 (50)	Year 4 (50)	Overall (200)
1. User-friendliness of VLE					
1 - Strongly Disagree	5 (10%)	3 (6%)	2 (4%)	1 (2%)	11 (5.5%)
2 - Disagree	10 (20%)	5 (10%)	3 (6%)	4 (8%)	22 (11%)
3 - Agree	20 (40%)	25 (50%)	20 (40%)	22 (44%)	87 (43.5%)
4 - Strongly Agree	15 (30%)	17 (34%)	25 (50%)	23 (46%)	80 (40%)
Disagree	3 (6%)	2 (4%)	1 (2%)	1 (2%)	7 (3.5%)
2 - Disagree	5 (10%)	3 (6%)	4 (8%)	3 (6%)	15 (7.5%)
3 - Agree	20 (40%)	20 (40%)	18 (36%)	22 (44%)	80 (40%)
4 - Strongly Agree	22 (44%)	25 (50%)	27 (54%)	24 (48%)	98 (49%)

Question	Year 1 (50)	Year 2 (50)	Year 3 (50)	Year 4 (50)	Overall (200)
2. Design accommodates learning needs					
1 - Strongly Disagree	4 (8%)	2 (4%)	1 (2%)	2 (4%)	9 (4.5%)
2 - Disagree	10 (20%)	8 (16%)	5 (10%)	6 (12%)	29 (14.5%)
3 - Agree	20 (40%)	25 (50%)	20 (40%)	18 (36%)	83 (41.5%)
4 - Strongly Agree	16 (32%)	15 (30%)	24 (48%)	24 (48%)	79 (39.5%)
Disagree	6 (12%)	5 (10%)	3 (6%)	2 (4%)	16 (8%)
2 - Disagree	8 (16%)	10 (20%)	5 (10%)	6 (12%)	29 (14.5%)
3 - Agree	20 (40%)	15 (30%)	20 (40%)	22 (44%)	77 (38.5%)
4 - Strongly Agree	16 (32%)	20 (40%)	22 (44%)	20 (40%)	78 (39%)

Question	Year 1 (50)	Year 2 (50)	Year 3 (50)	Year 4 (50)	Overall (200)
5. Satisfaction with layout					
1 - Strongly Disagree	4 (8%)	3 (6%)	2 (4%)	1 (2%)	10 (5%)
2 - Disagree	8 (16%)	5 (10%)	6 (12%)	5 (10%)	24 (12%)
3 - Agree	18 (36%)	20 (40%)	18 (36%)	22 (44%)	78 (39%)
4 - Strongly Agree	20 (40%)	22 (44%)	24 (48%)	22 (44%)	88 (44%)

Question	Year 1 (50)	Year 2 (50)	Year 3 (50)	Year 4 (50)	Overall (200)
6. User-centered design contribution to engagement					
1 - Strongly Disagree	5 (10%)	4 (8%)	3 (6%)	2 (4%)	14 (7%)
2 - Disagree	7 (14%)	5 (10%)	4 (8%)	6 (12%)	22 (11%)
3 - Agree	20 (40%)	25 (50%)	22 (44%)	20 (40%)	87 (43.5%)
4 - Strongly Agree	18 (36%)	16 (32%)	21 (42%)	22 (44%)	77 (38.5%)

Question	Year 1 (50)	Year 2 (50)	Year 3 (50)	Year 4 (50)	Overall (200)
7. Usefulness of built-in help/support features					
1 - Strongly Disagree	4 (8%)	3 (6%)	2 (4%)	3 (6%)	12 (6%)
2 - Disagree	8 (16%)	6 (12%)	5 (10%)	5 (10%)	24 (12%)
3 - Agree	18 (36%)	20 (40%)	19 (38%)	21 (42%)	78 (39%)
4 - Strongly Agree	20 (40%)	21 (42%)	24 (48%)	21 (42%)	86 (43%)

Question	Year 1 (50)	Year 2 (50)	Year 3 (50)	Year 4 (50)	Overall (200)
8. Enjoyment and reduction of learning barriers					
1 - Strongly Disagree	3 (6%)	2 (4%)	1 (2%)	2 (4%)	8 (4%)
2 - Disagree	6 (12%)	5 (10%)	4 (8%)	5 (10%)	20 (10%)
3 - Agree	20 (40%)	22 (44%)	20 (40%)	21 (42%)	83 (41.5%)
4 - Strongly Agree	21 (42%)	21 (42%)	25 (50%)	22 (44%)	89 (44.5%)

Question	Year 1 (50)	Year 2 (50)	Year 3 (50)	Year 4 (50)	Overall (200)
9. Control and customization of learning pace					
1 - Strongly Disagree	5 (10%)	4 (8%)	3 (6%)	2 (4%)	14 (7%)
2 - Disagree	8 (16%)	5 (10%)	6 (12%)	6 (12%)	25 (12.5%)
3 - Agree	20 (40%)	22 (44%)	19 (38%)	21 (42%)	82 (41%)
4 - Strongly Agree	17 (34%)	19 (38%)	22 (44%)	21 (42%)	79 (39.5%)

Question	Year 1 (50)	Year 2 (50)	Year 3 (50)	Year 4 (50)	Overall (200)
10. Satisfaction with visual design layout					
1 - Strongly Disagree	4 (8%)	3 (6%)	2 (4%)	1 (2%)	10 (5%)
2 - Disagree	7 (14%)	5 (10%)	6 (12%)	4 (8%)	22 (11%)
3 - Agree	18 (36%)	20 (40%)	19 (38%)	23 (46%)	80 (40%)
4 - Strongly Agree	21 (42%)	22 (44%)	23 (46%)	22 (44%)	88 (44%)