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EVALUATING THE EFFECTIVENESS OF ONLINE LEARNING AND TEACHING: A STUDY FOCUSED ON UNDERGRADUATES AT THE UNIVERSITY OF MORATUWA, SRI LANKA

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Introduction

The COVID-19 pandemic led to an unprecedented shift from traditional classroom settings to online learning environments worldwide. This transition emphasized the importance of online learning not only as a response to emergencies but as a crucial mode of education that could shape the future of learning. Online platforms offer opportunities for flexibility, accessibility, and personalized learning experiences, making them increasingly relevant in modern education. However, this rapid transition, particularly in developing countries like Sri Lanka, posed significant challenges and raised critical questions regarding the effectiveness of online education. This study focuses on the University of Moratuwa (UOM), one of Sri Lanka's leading technical universities, and seeks to evaluate the effectiveness of online learning both during the pandemic and in the broader context of ongoing online educational practices. The study primarily aims to assess student engagement, learning outcomes, and the challenges encountered by students during this period.

The sudden switch to online learning in Sri Lanka highlighted both the resilience and the challenges of the educational system. Unlike courses initially designed for online platforms, the rapid adaptation of face-to-face courses to virtual environments presented a steep learning curve for both students and educators. The need for a sustainable online learning framework became evident, as this shift revealed underlying issues like technological barriers, student isolation, and the complexity of fostering engagement in a virtual space. This study addresses the research gap by analyzing the experiences within a developing country context, offering insights that are crucial for improving online education globally while proposing strategies for its effective integration into future educational models.

The study investigates the effectiveness of online learning and teaching techniques and technologies at UOM, focusing particularly on

the experiences of undergraduate students. It aims to (1) assess online learning engagement from the perspectives of students, (2) evaluate student learning outcomes in comparison to traditional face-to-face learning, and (3) identify the type of courses that can be effectively delivered in a hybrid learning environment and the challenges faced by students. Additionally, the study seeks to propose strategies to overcome these challenges.

The study involves undergraduate students at UOM as primary participants. Data was collected through online surveys to gather comprehensive insights into the experiences and perspectives of the participants regarding online education since the pandemic. This study is geographically confined to Sri Lanka, specifically addressing the practices and challenges within the educational landscape of the country.

Methodology

The research employs a mixed-methods approach, incorporating both quantitative and qualitative techniques. Primary data was collected through online surveys targeting undergraduates from the intake 2020 at UOM, who primarily engaged with online learning platforms due to the COVID-19 pandemic. The undergraduate population at UOM spans multiple faculties, with a particular emphasis on STEM fields such as Engineering, Architecture, and Information Technology (IT), making it an ideal context for evaluating the effectiveness of online learning in disciplines that typically require hands-on learning experiences.

A pilot study was initially conducted with 15 participants to obtain an understanding of the effectiveness and reliability of the questionnaire. Then, a sample size of 340 participants was determined using Slovin's formula (Almeda et al., 2010) to ensure a 95% confidence level. The sample was stratified across five major faculties as shown in Figure 1. The key variables in this study include student engagement, learning outcomes, and technological access. Engagement was measured using a 5-point Likert scale, learning outcomes were self-reported based on academic performance and course objectives, and technological access was evaluated through questions on device and internet availability.

The selection of the intake 2020 as the target population is particularly relevant to the study, as online learning posed challenges during the pandemic, especially in fields like Engineering and IT, where the technical and practical nature of the courses required hands-on experiences. The data was analyzed using exploratory data analysis and hypothesis testing to examine the relationships between variables such as student engagement, learning outcomes, and technological access.

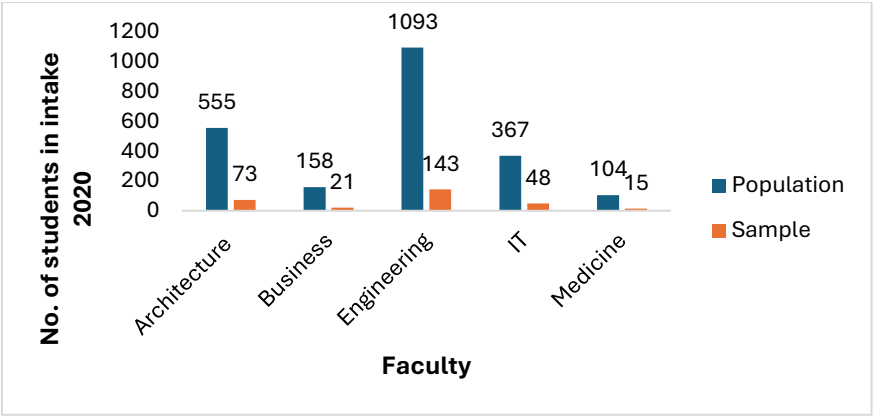

Figure 1: Target Population and Sample Composition of Faculties at UOM.

Results and Discussion

The study identified several key insights into online learning engagement and outcomes. Overall, 64.4% of students reported low engagement in online classes. However, the findings also revealed several factors that positively influence the students' virtual learning experience. Specifically, 62% of students highlighted the importance of clarity of course content, 63% valued the use of high-quality technological tools, and 54% favored flexible assignment deadlines as important for improving their engagement. As illustrated in Figure 2, direct contact with lecturers, using additional online resources, and collaboration with classmates were crucial for seeking clarification in an online environment, while regular feedback, live virtual lectures, and online discussion forums were identified as beneficial features for increasing engagement.

While online learning offers flexibility and accessibility, 62% of students observed a noticeable difference in comprehension between online and face-to-face settings. Specifically, 44% of students felt that face-to-face courses better supported the development of critical thinking skills, while 33% noted some improvement in understanding through online learning. The results suggest that face-to-face instruction provides more robust opportunities for engagement and deeper cognitive development, reinforcing the need to integrate interactive and collaborative elements into online learning to improve outcomes.

As illustrated in Figure 3, peer assessments and group projects were deemed the most effective methods for evaluating understanding, emphasizing the value of collaborative and interactive learning.

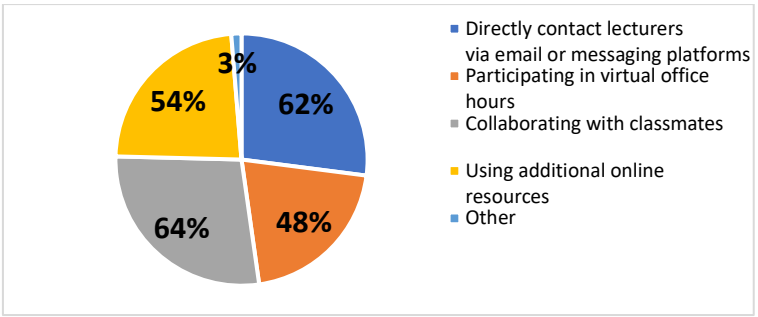

Figure 2: Methods Used for Clarification.

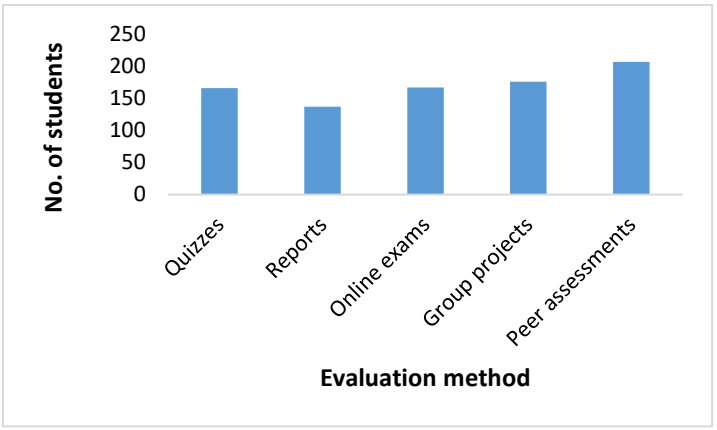

Figure 3: Online Evaluation Methods.

Hypothesis testing confirmed the significance of factors influencing student engagement and learning outcomes. Ordinal logistic regression and the Kruskal-Wallis test indicated that higher technical proficiency significantly impacted engagement, with p-values below 0.05, meaning students with better technical skills were more engaged in online learning. Additionally, Spearman's rank correlation (rho = 0.3323, p-value < 0.05) showed a moderate positive relationship between participation frequency and engagement, suggesting that students who attended classes more frequently were more engaged. These findings highlight the importance of both technical skills and regular participation in fostering higher engagement levels.

The study showed that students faced several challenges in online learning, with internet connectivity issues and unreliable technology platforms being the most significant (refer to Figure 3). Additionally, the lack of face-to-face interaction with peers and instructors led to feelings of isolation, making it harder to stay motivated and engaged. Notably, 75% of students reported experiencing isolation, while 56% faced difficulties due to the limited opportunities for hands-on experiences.

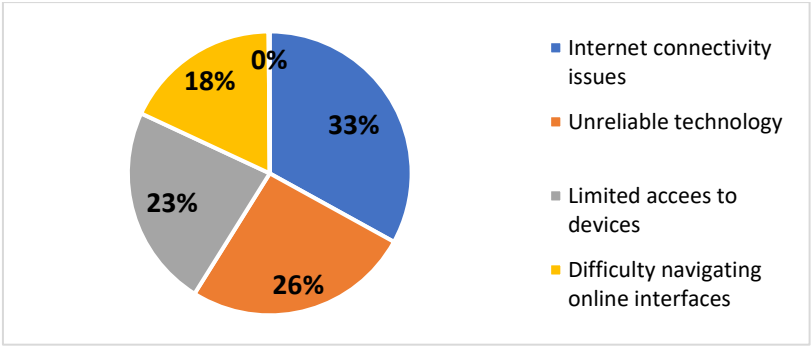

Figure 4: Challenges Faced by Students.

For hybrid learning, the availability of resources and technology, the nature of course content, and instructor expertise were key factors in deciding whether a course should be delivered in a hybrid format. Lastly, 49% of students reported no improvement in academic performance with online learning, while 33% noted some improvement.

The results underscore the need for well-structured online courses that incorporate interactive and collaborative elements to enhance student engagement and learning outcomes. The study also highlights the potential benefits of a hybrid learning model, which combines the strengths of both online and face-to-face formats. Such a model could address the challenges identified, particularly those related to technical limitations and the need for social interaction.

The study also found that certain courses, particularly those requiring laboratory work or practical demonstrations, are better suited for face-to-face or hybrid formats, while theoretical courses and those involving group projects can benefit from online or hybrid delivery. Key factors in deciding the course format include resource availability, course content, and instructor expertise.

Conclusion

The study highlights valuable insights into the effectiveness of online learning for students at UOM, since the COVID-19 pandemic, emphasizing the differences between online and face-to-face education. It is important to note that these insights are based on the suggestions and experiences shared by the students, and there has been no scientific validation to support the effectiveness of the proposed solutions. Although factors such as clear course content, quality technology, and flexible course structures have improved online engagement, challenges like technical issues and a lack of social interaction have hindered motivation and student participation. The study suggests that a hybrid learning model that integrates both online and face-to-face elements, could address these challenges and optimize learning outcomes. By improving infrastructure, communication, and interactivity, educational

institutions can create a more effective and resilient learning environment in online learning education.

Keywords: Online Learning and Teaching, Hybrid Learning, Student Engagement, Learning Outcomes, COVID-19 Pandemic, Technical Proficiency

References

Agarwal, S., & Kaushik, J. (2020). Student's perception of online learning during the COVID pandemic. The Indian Journal of Pediatrics, 87, 554-554.

Almeda, J. V., Capistrano, T. G., & Sarte, G. M. (2010). Elementary statistics. University of the Philippines Press.

Dumford, A., & Miller, A. (2018). Online learning in higher education: exploring advantages and disadvantages for engagement. Journal of computing in higher education, 30(3), 452-465.

Hettiarachchi, S., Damayanthi, B., Heenkenda, S., Dissanayake, D., Ranagalage, M., & Ananda, L. (2021). Student satisfaction with online learning during the COVID-19 pandemic: a study at state universities in Sri Lanka. Sustainability, 13(21), 11749.

Irawan, A. W., Dwisona , D., & Lestari, M. (2020). Psychological impacts of students on online learning during the pandemic COVID-19. KONSELI: Journal Bimbingan dan Konseling (E-Journal), 7(1), 53-60.

Khashunika, J., Yatigammana, M., & Lakmal, K. (2021). Challenges and opportunities in online education in Sri Lanka during the Covid-19 pandemic: Evidence from the University of Kelaniya. International Journal of Educational Research & Social Sciences, 2(4), 832-849.

Mukhtar, K., Javed, K., Mahwish, A., & Ahsan, S. (2020). Limitations and Recommendations for online learning during the COVID-19 pandemic era. Pakistan journal of medical sciences, 36(COVID19-S4), S27.

Rahayu, R. P., & Wirza, Y. (2020). Teachers' perception of online learning during the pandemic COVID-19. Journal penelitian pendidikan, 20(3), 392-406.

Zhang, M., Bender, D., & Lyon, C. (2021). Online learning during COVID-19 produced equivalent or better student course performance as compared with pre-pandemic: empirical evidence from a school-wide comparative study. BMC Medical Education (21), 1-11.