JOURNAL OF BUSINESS AND SOCIAL SCIENCES
Vol.2024:29

Enhancing Creative Content in Education Delivery Utilising Multimedia Applications

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Abstract

The shift to online education due to the Covid-19 pandemic has transformed the delivery of educational content, a practice that continues in most higher education institutions. This study investigates how multimedia applications can improve the way innovative information is delivered in the classroom. To get information about their online learning experiences, 120 university students participated in online surveys and interviews using a quantitative methods approach. The study investigates the difficulties students encounter in reaching successful learning objectives and how these difficulties relate to the information learned through online means, as opposed to in-person lectures. Results show that students' focus and participation in online classrooms are greatly impacted by technological obstacles, such as subpar gadgets and erratic internet connections. These observations highlight the necessity of utilising multimedia applications and addressing technology constraints in order to enhance the educational process and close the gap between traditional classroom settings and online learning environments. This research outcome strongly addresses the targets within Sustainable Development Goals 12 (SDG 12).

Keywords

Creative content, online education delivery, multimedia applications, technological constraints

Introduction

The shift to online education due to the Covid-19 pandemic has transformed the delivery of educational content, a practice that continues in most higher education institutions, and seemingly increasing over the years. Most universities regresses on different digital platforms for online learning. Most of these platforms are based on commercialised learning management system (LMS) such as *Blackboard*, *Canvas*, *Google Classroom* among many others in communicating through a virtual meeting session. As the features available in any LMS is limited, the quality of online learning is often affected. While online classes offer flexibility, they often come with challenges that hinder effective learning, particularly classes that involve specified softwares in executing tasks. Addressing these challenges requires a combination of customised technology and innovative approaches to knowledge delivery.

Submission: 1 December 2024; **Acceptance:** 26 December 2024

By integrating customised technology pertaining to multimedia applications, such as videos, animations, and interactive timelines, the study explores how these technologies can enhance creative content delivery, mitigate barriers, and improve educational outcomes. The research aligns with Sustainable Development Goal 12 (SDG 12) by advocating responsible consumption and production in educational practices.

Education is a field that is always changing from time to time to adapt the needs of different generations of students. Educators are always trying to find the most effective way to deliver knowledge. As this is an era which is full of new technologies, education should be improved according to the circumstances, which is delivering knowledge to the students based on their interest. According to studies conducted by Dillon and Gunawardena (1995) and Leidner and Jarvenpaa (1993), three main variables are suggested that would affect the effectiveness of online delivery. The variables are the technology, instructor characteristics and the student characteristics. From the technology perspective, it stated that students should have convenient access, and the network should require minimal time for document exchange. (Volery and Lord, 2000) Generally, the technology equipped by students at home plays a crucial role.

Online classes have become a cornerstone of education in the digital age. However, research indicates that online learning environments often fail to replicate the engagement and interactivity of traditional classrooms (Smith et al., 2022). Common challenges include limited access to suitable technology and poor internet connectivity, which directly affect students' ability to concentrate and engage with course content (Adams & Lee, 2021).

The integration of customized technology, such as user-friendly platforms and adaptive tools, has been shown to improve learning outcomes. These technologies enable personalized experiences that cater to diverse student needs, making them essential for effective online education (Kim & Wu, 2023). On the other hand, Summers, Waigandt and Whittaker conducted a study, titled "A Comparison of Student Achievement and Satisfaction in an Online Versus a Traditional Face-to-Face Statistics Class". This study shows some significant difference, despite the conviction of Russell's (1999) publication, perhaps due in part to critical factors mentioned by Phipps and Merisotis (1999) such as learning tasks, learner characteristics, student motivation, and the instructor. Although the students in the online course learned the same knowledge as well as students in the traditional classroom, the results indicated that the online course students were generally less satisfied with the course than those in the traditional classroom, despite the fact that the instructor is the same professor for both the face-to-face class and the virtual class. Specifically, online class students expressed less satisfaction than face-to-face students. (Summers, Waigandt and Whittaker, 2005).

Multimedia applications are particularly effective in visualizing complex concepts and fostering creative thinking. By using tools such as animations, interactive timelines, and multimedia content, educators can bridge the gap between theoretical knowledge and practical understanding (Chen & Park, 2021). These applications also align with the conceptual model by serving as a customized technological solution to enhance the delivery and retention of knowledge.

Methodology

This study employed a quantitative methods approach to evaluate the impact of customized technology and multimedia applications on knowledge acquisition in online classes. This study builds on the conceptual model that emphasizes the interplay between online classes, customized technology, and knowledge acquisition, as shown in Figure 1.

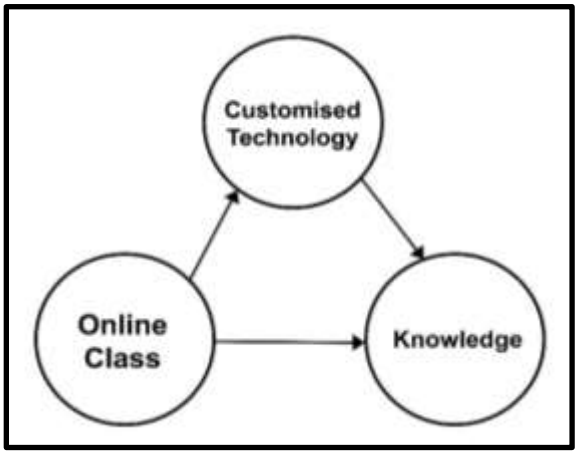

Figure 1. Conceptual Model

A total of 120 university students aged 18–25 participated in the study. Participants were selected using criterion sampling to ensure diversity in socio-economic backgrounds and educational disciplines. The participants had to fulfil specified criteria to be selected as a respondent, particularly students under the multimedia stream.

Quantitative data collection was collected through structured online questionnaires, focusing on students' perceptions of customized technology, knowledge acquisition, and the effectiveness of online classes. Data was gathered from two groups of participants which were the lecturers and students. The online survey was based on the individuals who have relevant experience, with insights into the factors affecting the present and future state of online education. The purpose of this set of questionnaires is to evaluate whether high quality equipment is needed for students to improve the quality of online classes. Besides, it also examined the relationship between switching practical class to online class and the knowledge and skills that students gain.

Quantitative data were analyzed using SPSS for descriptive and inferential statistics. The reliability test would be measured through Cronbach's Alpha value. The validity of the quantitative survey is measured through a regression test in SPSS based on Pearson's Correlation Coefficient Table. This measures the survey items, which used 6 points Likert scale range from strongly disagree to strongly agree.

Results and Discussion

This analytics starts with the reliability test, followed by the validity test. As mentioned in the previous section, the reliability test refers to the Cronbach's Alpha results. Table 1 displays the outcome of the test.

Table 1. Example of the caption for the table

Cronbach's Alpha	N of items
0.818	6

With the high value achieved, beyond the standard 0.7 cutoff point, this study progresses with the validity test, resulting in the following outcome. Table 2 shows the descriptive statistics based on the knowledge and skills that students have gained from the online class.

Table 2. Descriptive Statistic of the Knowledge and skills that students gained in Online Class

	N	Minimum	Maximum	Mean	Std. Deviation
I think that learning knowledge and skills is more easier through face-to-face class compare to online class.	100	2	6	5.01	.859
Learning software skills is more easier if there is a face-to-face explanation.	100	2	6	4.97	.784
I learn lesser knowledge and skills of my course through online class compare to face-to-face class.	100	3	6	4.99	.703
When communication is easier, students can obtain more knowledge and skills from the course through online class.	100	2	6	5.05	.821
It is challenging to learn more knowledge and skills through online class compare to face-to-face class.	100	3	6	5.05	.687
Valid N (listwise)	100				

This section achieved the research goals which is analyzing the relationship between online learning and the knowledge learned by students, showing the mean score of 5.05, indicating that respondents think it is challenging to learn more knowledge and skills through online class compared to face-to-face class.

The measures continue with the Pearson's Correlation Coefficient on two variables as documented in Table 3.

Table 3. Validity test based on Pearson's Correlation Coefficient on two variables

		Med 1	Med 2	Med 3	Med 4	Med 5	Med 6	DV 1	DV 2	DV 3	DV 4	DV 5	Total
I think that learning knowledge and software skills is more easier through face-to-face class compare to online class.	Pearson Correlation	1	.630**	.535**	.558**	.478**	.278**	.157	.304**	.362**	.188	.274**	.678**
	Sig. (2-tailed)		.000	.000	.000	.000	.005	.118	.002	.000	.061	.006	.000
	N	100	100	100	100	100	100	100	100	100	100	100	100
Learning software skills is more easier if there is a face-to-face explanation.	Pearson Correlation	.630**	1	.585**	.489**	.509**	.319**	.008	.315**	.361**	.264**	.229*	.655**
	Sig. (2-tailed)	.000		.000	.000	.000	.001	.935	.001	.000	.008	.022	.000
	N	100	100	100	100	100	100	100	100	100	100	100	100
I learn lesser knowledge and skills of my course through online class compare to face-to-face class.	Pearson Correlation	.535**	.585**	1	.438**	.461**	.331**	.137	.215*	.249*	.207*	.245*	.614**
	Sig. (2-tailed)	.000	.000		.000	.000	.001	.173	.032	.012	.039	.014	.000
	N	100	100	100	100	100	100	100	100	100	100	100	100
When communication is easier, students can obtain more knowledge and skills from the course through online class.	Pearson Correlation	.558**	.489**	.438**	1	.407**	.235*	.212*	.334**	.397**	.312**	.200*	.653**
	Sig. (2-tailed)	.000	.000	.000		.000	.019	.035	.001	.000	.002	.046	.000
	N	100	100	100	100	100	100	100	100	100	100	100	100
It is challenging to learn more knowledge and skills through online class compare to face-to-face class.	Pearson Correlation	.478**	.509**	.461**	.407**	1	.265**	.178	.240*	.315**	.354**	.239*	.617**
	Sig. (2-tailed)	.000	.000	.000	.000		.008	.077	.016	.001	.000	.017	.000
	N	100	100	100	100	100	100	100	100	100	100	100	100
Without high processing speed gadgets to learn certain software skills, it would affect students' online learning process.	Pearson Correlation	.278**	.319**	.331**	.235*	.265**	1	.529**	.394**	.409**	.488**	.238*	.651**
	Sig. (2-tailed)	.005	.001	.001	.019	.008		.000	.000	.000	.000	.017	.000
	N	100	100	100	100	100	100	100	100	100	100	100	100
When students have a high processing speed gadgets, they can learn more new knowledge and skills more easily through online class.	Pearson Correlation	.157	.008	.137	.212*	.178	.529**	1	.316**	.333**	.334**	.161	.486**
	Sig. (2-tailed)	.118	.935	.173	.035	.077	.000		.001	.001	.001	.110	.000
	N	100	100	100	100	100	100	100	100	100	100	100	100
When the laptop that students are using is laggy and make the software crash easily, it would affect students' online learning process.	Pearson Correlation	.304**	.315**	.215*	.334**	.240*	.394**	.316**	1	.725**	.685**	.299**	.697**
	Sig. (2-tailed)	.002	.001	.032	.001	.016	.000	.001		.000	.000	.002	.000
	N	100	100	100	100	100	100	100	100	100	100	100	100
A poor internet connection at home would affect students' online learning process.	Pearson Correlation	.362**	.361**	.249*	.397**	.315**	.409**	.333**	.725**	1	.695**	.470**	.763**
	Sig. (2-tailed)	.000	.000	.012	.000	.001	.000	.001	.000		.000	.000	.000
	N	100	100	100	100	100	100	100	100	100	100	100	100
Students need to have a strong internet connection to have online class and watch the video recordings smoothly.	Pearson Correlation	.188	.264**	.207*	.312**	.354**	.488**	.334**	.685**	.695**	1	.282**	.690**
	Sig. (2-tailed)	.061	.008	.039	.002	.000	.000	.001	.000	.000		.004	.000
	N	100	100	100	100	100	100	100	100	100	100	100	100
When the students' learning process is affected by technical problem, the knowledge and skills that students learn will be reduce.	Pearson Correlation	.274**	.229*	.245*	.200*	.239*	.238*	.161	.299**	.470**	.282**	1	.508**
	Sig. (2-tailed)	.006	.022	.014	.046	.017	.017	.110	.002	.000	.004		.000
	N	100	100	100	100	100	100	100	100	100	100	100	100
TotalMedDV	Pearson Correlation	.678**	.655**	.614**	.653**	.617**	.651**	.486**	.697**	.763**	.690**	.508**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
	N	100	100	100	100	100	100	100	100	100	100	100	100

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

In the validity test, there are two variables presented so two-tailed hypothesis testing is used to measure. The reason for choosing Pearson Correlation is because it is easier to measure the strength of a linear association between two variables. According to the Pearson correlation, with the sample size of 100 and the degree of freedom 98, the result shows the correlation is significant at the 0.01 level. To make sure the data is significant, the total of the Pearson Correlation Value should be greater than 0.256. The total values that are shown on the table are greater than 0.256 so it proved that the results gathered are valid and significant.

The findings reveal that while online classes provide flexibility, they also pose significant challenges. The analytics results reported about 65% of participants reported difficulties in maintaining focus due to technological disruptions, such as poor internet connectivity and substandard devices. These challenges highlight the need for customized technological solutions.

Customized technology emerged as a critical factor in improving students' online learning experiences. Participants noted that user-friendly platforms and adaptive tools, such as multimedia applications, enhanced their ability to engage with and retain course material. This finding aligns with the conceptual model, emphasizing the mediating role of technology between online classes and knowledge acquisition. Multimedia applications were particularly effective in addressing technological and engagement barriers. Over 78% of participants indicated that multimedia content, such as videos and animations, made complex concepts more accessible and engaging. These tools also supported students in achieving higher levels of knowledge retention, as reflected in post-class assessments.

The study's outcomes contribute to SDG 12 by promoting sustainable and responsible practices in educational content delivery. By leveraging multimedia applications, educators can reduce dependency on traditional, resource-intensive methods and enhance the quality of online education.

Conclusion

This study underscores the critical role of customized technology and multimedia applications in enhancing knowledge acquisition during online classes. By addressing technological barriers and integrating innovative tools, educators can create more engaging and effective learning environments.

The conceptual model highlights the interconnectedness of online classes, customized technology, and knowledge acquisition, providing a framework for improving educational practices. Future research should focus on scalable solutions to overcome technological constraints and optimize the integration of multimedia applications across diverse learning contexts.

Moreover, the alignment with SDG 12 highlights the importance of sustainable practices in education delivery. Future research could explore scalable solutions for improving technology access and integrating these applications across diverse educational settings.

Acknowledgements

This study is not supported by any grant or allocated funding.

References

Adams, T., & Lee, K. (2021). Technological challenges in online education: A global perspective. Educational Technology Research, 45(3), 211–228.

Baldwin-Evans, K. (2004). Employees and e-learning: What do the end users think? Industrial and Commercial Training, 36, 269 –274.

Chen, R., & Park, J. (2021). Time-based media in education: Bridging the engagement gap in online learning. International Journal of Educational Multimedia, 12(4), 153–172.

Fahad N., A., 2010. The Learner's Satisfaction toward Online E-Learning implemented in the College of Applied Studies and Community Service, King Saud University, Saudi Arabia: Can E-Learning Replace the Conventional System of Education?. Turkish Online Journal of Distance Education-TOJDE April 2010, Volume: 11 Number: 2 Article 2(ISSN 1302-6488), p.12 pages.

James, R. (2020). No Significant Difference Phenomenon (Book review). Retrieved 16 December 2020, from http://elibrary.lt/resursai/Uzsienio%20leidiniai/IEEE/English/2006/Volume%202/Issue%203/Jets_v2i3_24.pdf

Jett, Q. R., & George, J. M. (2003). Work interrupted: A closer look at the role of interruptions in organizational life. Academy of Management Review, 28, 494 –507.

Kim, S., & Wu, Y. (2023). Customized learning technologies: Enhancing accessibility and effectiveness. Journal of Digital Education, 29(1), 45–60.

Leidner, D.E. and Jarvenpaa, S.L. (1995), "The use of information technology to enhance management school education: a theoretical view", MIS Quarterly, Vol. 19 No 3, pp. 265-91.

Mohd, H. and Zol, B., 2016. UniMAP e-Lab for Electrical Engineering Technology: Future Online Laboratory Classes. MATEC Web of Conferences, 78, 01008 (2016), p.8 pages.

Muilenburg, L. Y., & Berge, Z. L. (2005). Student barriers to online learning: A factor analytic study. Distance Education, 26, 29 – 48.

Phipps, R., & Merisotis, J. (1999). What's the difference: A review of contemporary research on the effectiveness of distance learning in higher education. Washington, DC: Institute for Higher Education Policy

Sitzmann, T., Ely, K., Bell, B. and Bauer, K., 2010. The effects of technical difficulties on learning and attrition during online training. Journal of Experimental Psychology: Applied, 16(3), pp.281-292.

Smith, D., et al. (2022). Online learning and student engagement during the pandemic. Journal of Educational Research, 58(2), 78–95.

Summers, J., Waigandt, A. and Whittaker, T., 2005. A Comparison of Student Achievement and Satisfaction in an Online Versus a Traditional Face-to-Face Statistics Class. Innovative Higher Education, 29(3), pp.233-250.

Thomas L., R., 2001. DETA Research Center Community | No Significant Difference. [online] Detaresearch.org. Retrieved 16 December 2020, from <https://detaresearch.org/research-support/no-significant-difference/>

Tuan, N. (2015). The Effectiveness of Online Learning: Beyond No Significant Difference and Future Horizons. MERLOT Journal of Online Learning and Teaching, Vol. 11, No. 2, June 2015.

Volery, T. and Lord, D., 2000. Critical success factors in online education. International Journal of Educational Management, 14(5), pp.216-223.