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COMPARATIVE ANALYSIS OF STUDENT ENGAGEMENT AND COMPREHENSION IN ONLINE LEARNING PLATFORMS

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Abstract
Online learning has become increasingly prevalent, especially after the COVID-19 pandemic. However, ensuring student engagement and comprehension in these environments remains a challenge. This research investigates the difference in students' engagement and comprehension of online learning platforms. A total of 159 undergraduate and postgraduate students from the two public tertiary institutions in Edo State, Nigeria, participated in the study. The samples completed a self-report measure assessing behavioral, emotional, and cognitive engagement and learning comprehension in the online platform. A significant difference was observed in undergraduates' and postgraduates' comprehension of engagement in online learning platforms. The study concluded that cognitive engagement has a more significant effect on learning comprehension for postgraduate students. In contrast, behavioral engagement has a more significant effect on learning comprehension for undergraduate students. The findings provide insights into best practices for educators and instructional designers to improve online learning experiences.

Keywords: online learning, undergraduates, postgraduate, engagement, comprehension

Introduction

Education fosters critical thinking, creativity, and problem-solving skills, vital in addressing complex challenges in the modern world. In essence, education is the key to unlocking human potential and driving progress in any society (Chankseliani et al., 2021; Udofia & Gberevbie, 2019; Vorontsova et al., 2020), including socio-economic empowerment and poverty reduction (Ubogu & Veronica, 2018). It is inevitable for any country (Sriyakul et al., 2020). Sustainable national development and its relationship with education have attracted research attention for many years (Boyi, 2013; Nwogu, 2013; Ugbogbo et al., 2013). Undoubtedly, education has allowed nations to attain their desired objective. Hence, education remains part of the developmental goals of every country.

The demand for education in Africa has increased (Kabir & Kadage, 2017). The educational delivery method in developing countries, including Nigeria, is the traditional face-to-face delivery in a defined school environment characterized by teacher-students or instructors-learner physical interaction (Ajadi et al., 2008; Oyeleke et al., 2015). The conventional teaching method places the burden of promoting learning fully on the teacher (Osinubi, 2014), thereby limiting the learning potential of the learner and creating knowledge gaps. However, There has been an increasing commitment to update the delivery of education in Nigeria in the last few decades (Adewumi et al., 2012; Irele, 2021). The educational system encounters numerous challenges in the total integration of learners due to a lack of proper digital learning and knowledge preservation tools (Gumel et al., 2019). The recognition of the importance of digital education in providing learners with the most up-to-date knowledge has prompted educational institutions and governments to adopt digital learning methods to provide more flexibility and individualization in learning. The traditional model has faced numerous challenges, especially in terms of inclusivity due to the lack of proper digital learning and knowledge preservation tools.

In past years, global trends in technological development have brought about innovations in educational paradigms (Zhang et al., 2020). Technology provides a viable alternative to face-to-face or conventional teaching-learning in schools (Ebelogu et al., 2021). The rapid evolution of the internet and wireless communication technology has resulted in various interactive multimedia networks and learning applications such as virtual classrooms, instant messaging, and web-based learning.

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Online learning describes learning that can occur functionally and effectively without a conventional classroom environment. It has reshaped education in many ways (Mulenga & Marbán, 2020). Thus, the construct refers to the process of integrating digital media into learning. Accordingly, Anttila et al. (2012) described digital learning as a tool designed to improve digital teaching materials for web-based learning activities (Hockly, 2012). Although digital learning cannot substitute conventional teaching, it provides the best teaching effect and improved learning.

Computer devices have become the driving force in delivering instruction in today's education in Nigeria (Oguzor, 2011). Research shows that using computer devices and other digital innovations, including computer games, androids, podcasts, blogs, wikis, e-learning applications, and other classroom technologies in teaching and learning, is vital in influencing and shaping learner's performance and promotes schoolwork engagement (Al-Jaberi, 2018; Alam et al., 2021; Franklin & Nahari, 2018; Mohammadyari & Singh, 2015; Moon & Ke, 2020; Mulqueeny et al., 2015; Owino, 2010; Ramdani et al., 2021; Rasheed et al., 2020; Shahabadi & Uplane, 2015; Suresh et al., 2018; Yang et al., 2021; Zahir et al., 2018; Zulkiply & Aziz, 2019). This is particularly important as the world is rapidly transforming into a technologically intensive community, and the work environment is expansively acknowledging digital knowledge and skills.

Empirical investigations have explored the association between digital learning and performance outcomes. For instance, Zwart et al. (2020) investigated the effects of digital learning materials (DLMs) on nursing students' mathematics learning. The study utilized a pre-test/post-test control group method, and the result found that the mathematics learning of students undergoing DLM training improved significantly. Chen (2017) explored the effect of digital game-based instruction on students' learning motivation and achievement using 326 students from Taiwan universities as the research participants. The researcher found that game-based instruction positively influenced learning achievement. Little (2015) examined the effect of digital game-based learning on student engagement and academic achievement using 34 students enrolled in rural public schools. The study adopted an experimental pretest-posttest design with switching replications. Consequently, the researcher observed that the digital game was as effective as the lab activity on teachers' reported student engagement and academic achievement.

Other researchers have found the trend to be effective in improving communication skills (Kyaw et al., 2019), thinking style (Liu & Hsueh, 2016), social skills (McNaughton et al., 2018), and business ethics (Magrizos, 2020). Generally, digital learning is essential in reducing student's anxiety and improving their learning achievements (Thongkoo, 2019). Conversely, research notes that the proliferation of digital technologies in classrooms has fashioned digital distractions among learners recently (Awofala et al., 2020; Gök, 2015), suggesting that digital learning may dampen motivation and attitudes relating to academics.

Student engagement is a multifaceted concept encompassing the level of interest, curiosity, and involvement a student shows in their learning and school activities. It is essential in academic development and overall student well-being. Students actively engaged in their online courses show higher levels of comprehension. Increased engagement strengthens students' bonds with the subject matter, which facilitates comprehension and memory. Students are encouraged to actively participate through features like discussion boards, live Q&A sessions, and interactive games, which improves their conceptual understanding.

The present study's primary purpose is to explore the difference between undergraduates' and postgraduate's online engagement (behavioral, emotional, and cognitive engagement) and learning comprehension.

Hypothesis

There will be a difference in learning comprehension between undergraduates and postgraduates regarding online engagement.

Method

The present research adopted a cross-sectional survey design. The study's population comprised undergraduate students (*n=93*) and postgraduate students (*n=66*) from three public tertiary institutions in Edo State, Nigeria. The gender distribution of the students was quite balanced, with 56.48% females and 43.52% males. The respondents were between the ages of 21 and 47. The study was conducted between July and October 2024.

Measure

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The participants completed a self-report measure of online engagement designed to assess behavioral, emotional, and cognitive engagement domains. Behavioral engagement (BE) was assessed through a 10-point scale of students' participation in online learning. Six items measuring online learning motivation were used to determine emotional engagement (EE). Cognitive engagement (CE) was ascertained using three items defining cognitive dimensions. Five items were designed to measure learning comprehension. The reliability of the scale was obtained following a pilot study. Observation of Cronbach's alpha coefficients revealed acceptable levels of internal consistency reliability of the instrument, which exceeded the cutoff rules-of-the-thumb of .70 as recommended for study purposes (Kaplan & Saccuzzo, 2013).

Result

Tables 1 and 2 present the results of the linear regression analysis conducted to analyze whether the students' engagement in online learning predicted their academic comprehension.

Table 1 shows students' engagement in online learning and learning comprehension among undergraduates.

Undergraduates (N = 93)

Variable	B	SEB	β	t	F	R2
BE	4.98	0.11	0.44	11.14	58.29	0.54
EE	3.72	0.09	0.35	7.78	38.90	0.31
CE	2.02	0.10	0.22	3.25	18.14	0.16

Table 2 shows students' engagement in online learning and learning comprehension among postgraduates.

Postgraduates (N = 66)

Variable	B	SEB	β	t	F	R2
BE	4.24	0.11	0.37	8.11	51.29	0.35
EE	3.33	0.09	0.30	6.12	34.73	0.30
CE	3.94	0.10	0.34	7.73	41.29	0.34

Note. BE Behavioral Engagement; EE = Emotional Engagement; CE Cognitive Engagement; B = Unstandardized regression coefficient; SEB = Standardized error of the Coefficient; β = Standardized coefficient; R^2 = Coefficient of determination. *P<.000.

The Tables above summarize the effect of student engagement in online scores and the learning comprehension of the undergraduate and postgraduate students positively (β ranged from 0.22 to 0.44, t ranged from 3.25 to 11.14). There was observable difference between undergraduate students' results and postgraduate students' results. 38% of the total variance of the academic outcomes scores for postgraduate students can be explained by the CE scores (R2 = 0.34). In comparison, only 18% of the total variance of the academic outcomes scores for under- graduate students can be explained by the CE scores (R2 = 0.16). Thus, cognitive engagement has a more significant effect on academic comprehension for postgraduate students. 59% of the total variance of the academic outcomes scores for undergraduate students can be explained by the BE scores (R2 = 0.54). In comparison, only 38% of the total variance of the academic outcomes scores for postgraduate students can be explained by the BE scores (R2 = 0.35). Thus, behavioral engagement has a more significant effect on undergraduate students' academic outcomes than postgraduate students.

Discussion

This research paper explores assessing and evaluating student engagement and comprehension in online learning platforms. The study's findings showed the effect of student engagement in online scores and the learning comprehension of the undergraduate and postgraduate students positively (β ranged from 0.22 to 0.44, t ranged from 3.25 to 11.14). A difference was revealed between undergraduate and postgraduate students' results. 38% of the total variance of the academic outcomes scores for postgraduate students can be explained by the CE scores (R2 = 0.34), while only 18% of the total variance of the academic outcomes scores for under- graduate students can be explained by the CE scores (R2 = 0.16). Thus, cognitive engagement has a more significant effect on academic comprehension for postgraduate students. 59% of the total variance of the academic outcomes scores for undergraduate students can be explained by the BE scores (R2 = 0.54). In comparison, only 38% of the total variance of the academic outcomes scores for postgraduate students can be explained by the BE scores (R2 = 0.35). Thus, behavioral engagement has a more significant effect on undergraduate students' academic outcomes than postgraduate students.

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Conclusion

The findings of the current study have several important implications for educators when implementing online learning platforms. Based on the comparison of each factor influencing the fundamental moderating factors, it gives educators the basis for developing the learning context, learning strategy, lecture organization, and assessment method, which enhance the effectiveness of students' online learning comprehension. As behavioral engagement has a more significant effect on academic outcomes for students at lower levels of education, additional efforts should be made to increase their motivation for online learning by, for example, adding interactive technologies and developing more learning activities such as virtual games. Indeed, this study has its limitations. For example, participants were only drawn from a limited context, limiting generalization. However, the findings contribute to the literature by suggesting the importance of comparing students' engagement and comprehension in online learning platforms.

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