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Embracing Digitalization in Higher Education: A Constructivist Perspective

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ABSTRACT

This qualitative study investigates how digital and multimodal technologies are integrated into undergraduate classes, with a foundation in constructivist learning theory. By examining the viewpoints of educators and students, we want to comprehend the reasoning for incorporating new technologies with conventional teaching approaches. Through participant observation, in-depth evaluations, and open-ended surveys, the research goes beyond theory and explores real experiences. Data triangulation provides an in-depth examination of the dynamic interplay between digitization and education. Through a thorough examination of incentives, barriers, and firsthand accounts, the research offers valuable insights into the revolutionary effects of digital technology on contemporary higher education. When combined with a constructivist perspective, the qualitative technique allows for a more in-depth examination of attitudes and behaviors, which helps to provide a more comprehensive picture of how education is changing in the digital era within a clear framework.

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1. INTRODUCTION

The higher education environment has undergone tremendous transformation due to the fast progress of digital and multimodal technology. To improve learning outcomes and experiences, there has been an increasing focus in recent years on incorporating these technologies into undergraduate courses. Digital resources, virtual classrooms, interactive multimedia tools, and online learning platforms are just a few of the elements that make up the digitalization of education. This change goes beyond just adding new resources; it also involves reconsidering conventional teaching strategies to better meet the needs and capabilities of the digital era. The concept of a digitally native generation posits significant implications for education, advocating a pedagogical shift to align with the unique learning styles of digital natives. Prensky (2021) contends for innovative teaching strategies that resonate with the fundamentally different ways in which these students absorb information.

This study, grounded in a constructivist learning theory, challenges prevailing assumptions by delving into authentic interactions between educators and students. It seeks to understand not only how technology is used but also how its influence is perceived within diverse, public higher education settings.

In contrast to assumptions, this research unfolds the practical integration of technology in teaching and learning, emphasizing the need for qualitative exploration in academic settings. Amid concerns about outdated teaching methods, the study highlights the importance of a constructivist lens to comprehend the nuanced views of both educators and learners regarding the impact of technology on education (Turgut & Aslan, 2021). Within the broader context, qualitative investigation into teenagers' real-life experiences challenges assumptions about technology use among digital natives. This study underscores the significance of considering socio-economic statuses and diverse backgrounds when assessing the impact of technology on literacy. By adopting a constructivist perspective, this research endeavors to offer a nuanced understanding of the intricate relationship between digital technology and education in higher education settings.

Constructivist learning theory provides a valuable framework for understanding and guiding the integration of technology in education. Rooted in the work of theorists such as Jean Piaget and Lev Vygotsky, constructivism posits that learning is an active, constructive process where learners build new understandings based on their experiences and prior knowledge. In a constructivist classroom, students are encouraged to engage in critical thinking, problem-solving, and collaborative learning activities that foster deeper understanding and knowledge retention (Vijayakumar-Bharathi & Pande, 2024). This theoretical perspective aligns well with the interactive and participatory nature of digital learning tools, which can support and enhance constructivist teaching practices.

Despite the potential benefits, the integration of digital technologies in higher education is not without challenges. Educators and students must navigate a range of issues, including the digital divide, varying levels of digital literacy, and the need for adequate training and support. Additionally, there are concerns about the overreliance on technology and the potential for it to overshadow fundamental educational principles, such as critical thinking and social interaction. This study seeks to explore these complexities by examining the experiences and perspectives of both educators and students regarding the integration of digital technologies in undergraduate classrooms.

The qualitative nature of this study allows for a deeper exploration of the nuanced experiences and attitudes of participants. By conducting in-depth interviews, participant observations, and open-ended surveys, this research aims to capture the real-world

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implications of digital integration in education. The constructivist framework provides a lens through which these experiences can be understood, emphasizing the importance of active learning, critical engagement, and social interaction in the digital era (Mattar, 2018). Through this comprehensive approach, the study aims to shed light on the motivations, challenges, and impacts associated with digitalizing higher education, offering valuable insights for educators, policymakers, and stakeholders.

2. LITERATURE REVIEW

Technology is the application of knowledge and processes to develop systems that are used to solve many tasks or problems and extend human capabilities. As technology has become more powerful and universal, it has given educators useful tools to support learning. Technology has improved education through online classrooms, mobile learning, smart boards, instant messaging, and texting in a significant way (Mohammed, 2020). This is evident in the communication devices used in contemporary society and most particularly in the educational sector in Nigeria. Technology is the application of knowledge and processes to develop systems that are used to solve many tasks or problems and extend human capabilities. It has advanced to a greater level and has helped education to become easily available and accessible (Bindu, 2019). This present time is known as the digital era of ICT circulation used to improve teaching and learning techniques in the classroom to give students opportunities to learn and apply the required 21st-century skills. Moreover, many people recognize ICT as the catalyst for the change in working conditions, handling and exchanging information, teaching methods, learning approaches, scientific research, and accessing information communication technologies (Amesi & Yellowe, 2020).

Similarly, the widespread use of information and communication technology (ICT) in the twenty-first century has challenged the status quo of the educational environment and caused a paradigm shift in the ways that teaching and learning are conducted. To have a successful lecturer-student connection and to maximize learning, ICT integration in teaching therefore becomes a crucial part of pedagogical procedures. It should be obvious that ICT will have an impact on the whole educational process. ICT is a paragliding word, that encompasses all technological advancements for the management and transmission of all digital data. According to Suleiman *et al.* (2020), ICT is the creation, communication, management, dissemination, and storage of information utilizing a variety of technologies.

However, digital technology in the classroom refers to various software and gadgets meant to help students with particular accessibility needs. The most effective way to reduce the number of repetitive, time-consuming duties a teacher undertakes is to use technology in the classroom. Digital technologies denote a wide range of technologies, tools services, and applications using various types of hardware and software (Rice, 2020). Explained that digital technologies are any technological device that functions through a binary computational code such as mobile phones, tablets, laptops, computers, and so on. Digital technologies are electronic tools, systems, devices, and resources that generate, store, or process data. Digital technologies provide opportunities that facilitate blended, online, and mobile learning (Tulinayo *et al*., 2018). Digital classrooms are defined as using electronic devices or platforms such as social media, multimedia, and mobile phones to teach students. With digital technology in education, today's educational landscape has altered for the better or improvements. Digital learning is a learning strategy that employs technology to fulfill the entire curriculum and allows students to learn quickly and rapidly (Turgut & Aslan, 2021). The perception of lecturers requires critical examination when referring to the use of digital technologies to facilitate the learning experience in universities.

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Adeoye and Adeoye (2017) stated that our educational system has been greatly influenced by digital technologies and that undergraduate students will find it difficult to survive in the university without basic skills and knowledge of digital technology. In a study by Sydney, it was reported that there are key benefits of using digital technologies. The benefits include efficiency, relevance, interactivity, enhanced course content, and diverse ways to learn. The use of digital technologies has interfused with all areas of teaching and learning at higher institutions. Digital technologies have brought changes in the pedagogical approach by introducing innovation into student learning. The heterogeneity of students requires different teaching methods and approaches, and only digital technologies can create some kind of individualization through the learning experience. Digital technologies foster flexible learning and teaching. Therefore, the emphasis is on powerful and flexible assessments that increase the achievement of individual learning outcomes (Munro, 2018). Digital technologies encourage learning and access to content, anytime and anywhere regardless of time and space. It also accentuates learning to be combined with fun which would make learning interesting rather than stressful.

Defining digital technology, which is a specific subset of technologies turns out to be difficult. Most contributions and articles deal with the general idea of technology in a digital context, the term digital technology is not consistently defined. Digital technologies comprise all the technologies for the creation, processing, transmission, and use of digital goods that can be summarized under the term information, communication, and media technologies (Yovanof & Hazapis, 2009). Digital technologies are any technology controlled using digital instructions, including computer hardware and software, digital media and media devices, digital toys and accessories, and contemporary and emerging communication technologies. These technologies are based on instructions given using binary (0,1) code which invariably means one or more processors are available to respond to these instructions. Digital technology in the context of Education is seen to be the use of computer and technology-assisted strategies to support learning within the schools. Approaches in this area vary widely, but generally involve technology for students where students use programs or applications designed for problem-solving or open-ended learning; or technology for teachers, such as interactive whiteboards or learning platforms. Digital technologies include various information, communication, and administration technologies and software, as well as devices such as computers, laptops, and tablets either connected to the internet or not, and mobile phones equipped with Global Positioning System (GPS) sensors of different kinds as well as whiteboards and projectors with or without interactivity. Fitzgerald *et al.* (2014) described digital technologies simply as social media, mobile, analytics, or embedded devices. Using this approach, the acronym SMAC classifies digital technologies into Social, Mobile, Analytics, and Cloud technologies.

Digital technologies are electronic tools, systems, devices, and resources that generate, store, or process data. Examples include social media, online games, multimedia, and mobile phones. Trevor (2016) stated that digital technologies refer to multi-functional devices with internet connectivity, particularly those that are handful and portable. Digital technologies present opportunities to change how students' learning can be organized. Echenique *et al.* (2015) postulated that digital technologies refer to a wide array of devices, programs, and resources that are used to store and transmit information in digital formats which includes computers, the internet, mobile phones, handheld devices, cameras, video games, social networks and blogs that are used by 'digital learners'.

The term digital technologies are used to describe the use of digital tools, knowledge, and skills to effectively find, analyze, store manipulate, create, share, and use information in a

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digital context. This includes the use of digital media tools, online tools, computer programming tools, electronic and robotic tools as well as various software applications. Digital technology is any product that can be used to create, view, distribute, modify, store, retrieve, transmit, and receive information electronically in a digital form. For example, personal computers and devices.

Perception about digital technologies can be defined as the way a lecturer comprehends and interprets the use of digital devices for instructional purposes (Durriyah & Zuhdi, 2018). Digital technologies such as laptops, palmtops, and Smartphones among others have changed the method that many lecturers approach their teaching. Lecturers are now capable of using mobile technologies to demonstrate dynamic processes in the actual period such as providing students with replications of how a practical concept in a science or technology laboratory is carried out or displaying videos and movie clips of important historical events, all of which allow the lecturer to prompt deeper thought processes of the students. There is a lot of research on the views of teachers about technology use in the classroom. According to, experienced and skilled lecturers who had little or no professional development in the use of mobile technologies during instructions would be less likely to use it for such purposes and would be less likely to see the benefits of mobile technologies for instructional usage in the classroom.

However, lecturers indicated that the more lecturers were involved in actually setting up classroom technology the more likely they were to use that technology for instruction. This is why lecturers need to receive technology skill training. This is not to say that the advancement of technology use in the lecture room changes the role of the lecturer but it enhances effectiveness in instruction and stimulates leaners participation in the teaching process.

3. METHOD

To explore the assumptions by instructors and students concerning why and how multimodal and digital technologies are incorporated into undergraduate classes, this study employed qualitative methods. For the first part of the research, participant observation was conducted. This phase of the study allowed us to begin to understand how the classes are taught and gain a rapport with students and instructors. The data was gathered via classroom observations, online observations of student blogs, as well as informal conversations with students and instructors. This information allowed us to have a better sense of how these classes were taught and provided a context for the second stage of the research, which included in-depth interviews and a blog questionnaire.

Taking a qualitative approach to include participant observation, as well as in-depth interviews has allowed us to discover and represent the realities and perceptions of those involved and being affected by this shift in pedagogy. According to the raw data collected through qualitative measurements, such as a direct quotation, can reveal respondents' emotions, thoughts, experiences, and perceptions on a particular issue. In addition to interviews, participant observation has provided us the opportunity to witness the daily operations and a first-hand look at what transpires in the classroom setting rather than just relying on informants' memories. Additionally, an online, open-ended questionnaire is conducted. Since the questionnaire is open-ended, it gave students the freedom to respond on their terms, with the possibility of bringing to light new information about their experiences that may not have been previously considered (Lederman *et al.*, 2002). Interviews and participant observation notes were transcribed in Microsoft Word and then coded using an open or inductive coding method, which allowed us to gain an understanding of the texts and identify emerging themes through this exploration. Quotations and text from

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notes were then coded into categories or themes. Among the interviews, themes were identified within the two different sets of interviews: instructor and student. Significant themes in each set of interviews were then broken down into subthemes, if necessary. Results from each category were then used in conjunction with extrapolating media and digitalization perceptions of participants, which were then compared to each other. As this paper only has limited data from the blog questionnaire, student responses were recorded and analyzed for general patterns. The survey responses were analyzed for general patterns separately. Online blog observation notes were also analyzed for general patterns and then compared to student questionnaires and interview responses. Since the data is obtained from several different methods, including the survey, as well as interviewing three different groups of participants, the triangulation of the methods employed in this research increases the validity of the data and the patterns emerging from it.

4. RESULTS AND DISCUSSION

Conducting in-depth interviews with three educational technology instructors and two students provided insights into perceptions of integrating educational technologies in classroom settings, examined through the lens of constructivist learning theory. Instructors emphasized the integral role of critical thinking skills in digital literacy and technology integration. These skills included analyzing online content for author reliability and motives, understanding media control, and evaluating the consequences of sharing data online. Despite one instructor expressing skepticism about the perceived overrating of digital integration, the discussion highlighted the enduring importance of critical thinking skills. These skills, essential for collaboration and effective strategies, were not explicitly associated with digital integration but were considered fundamental for students' overall development. The study revealed that participants' ideas about digital integration was rooted in their traditional academic and social understandings. Both students and instructors emphasized the importance of conducting oneself online according to standards and expectations, suggesting a social constructivist dimension to their views.

The expanded definition of digitalization included critical thinking about online behavior and decorum. While acknowledging the advantages of digitalization in education, the discomfort expressed by one student in writing a publicly accessible blog underscored the complexity of integrating technology. This hesitation was influenced by concerns about meeting the expectations of "real bloggers" and uncertainties about self-presentation in an unfamiliar digital space. The remaining student, motivated by writing for an audience within the class, did not fully consider the broader accessibility of their blog. These findings underscore the need to consider individual perspectives within a constructivist framework, recognizing the interconnectedness of technology, critical thinking, and social dynamics in the evolving landscape of digital integration in higher education.

4.1. Instructor insights

Three instructional technology lecturers were interviewed in-depth to get a variety of viewpoints on using digital technologies in the classroom. All of the lecturers stressed the value of critical thinking abilities as a cornerstone of digital literacy. Among these abilities was the capacity for critical analysis of internet material, identifying the credibility and intentions of content producers. They emphasized how important it is for students to comprehend who owns different media outlets and to consider the possible repercussions of disclosing personal information online. However, one teacher voiced doubts about the general excitement for digital integration, speculating that the advantages could be exaggerated. Despite this, the

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overarching discussion revealed that critical thinking remains crucial for students' development, irrespective of the extent of digital integration. These skills were seen not only as vital for navigating digital landscapes but also essential for fostering effective collaboration and strategic thinking among students.

4.2. Student perspectives

Interviews with two students revealed that their views on digital integration were deeply rooted in traditional academic and social frameworks. Both students and instructors stressed the significance of maintaining standards and expectations in online behavior, indicating a social constructivist dimension to their perspectives. One notable finding was the expanded definition of digitalization, which included critical thinking about online decorum and behavior. This perspective underscored the importance of understanding and adhering to social norms in digital spaces.

The integration of technology in education also presented certain challenges. For instance, one student expressed significant discomfort with the task of writing a publicly accessible blog. This discomfort stemmed from concerns about meeting the expectations of experienced bloggers and uncertainties about how to present themselves in an unfamiliar digital space. The student's apprehension highlighted the complexity of digital integration, as it involves not just technical skills but also social and psychological adjustments. Conversely, the other student, who was primarily motivated by the idea of writing for a class audience, did not fully consider the wider accessibility of their blog. This difference in perspective underscores the need to address individual attitudes and anxieties about public digital engagement within the educational framework.

The findings of this study suggest several important implications for the integration of digital technologies in higher education. First, there is a clear need for educational programs to prioritize the development of critical thinking skills as part of digital literacy curricula. These skills are essential for students to navigate and critically engage with the vast amount of information available online. Second, institutions must recognize and address the discomfort and apprehensions students may feel when engaging in public digital spaces. Providing adequate support and guidance can help students gain confidence and competence in these areas. Finally, incorporating a social constructivist approach to digital education can enhance the effectiveness of technology integration. By acknowledging the social aspects of online behavior and the importance of maintaining digital decorum, educators can foster a more comprehensive understanding of digital literacy that goes beyond technical skills.

5. CONCLUSION

The diverse experiences and relationships with technology among students and instructors shape their perceptions of media, impacting their willingness to utilize specific media for educational purposes and influencing their perspectives on digital education. Informed by the constructivist learning theory, this conclusion highlights the interplay between digital literacy, education, and media use, reflecting individuals' comfort levels, familiarity, and perceived expertise with digital tools. The assumption projection observed among faculty regarding digital natives' proficiency in digital tools is met with reciprocal assumptions from instructors, expecting students to possess a certain level of fluency. Recognizing the diversity of experiences among students and instructors is essential for sustaining programs integrating digital tools and literacy into teaching and learning.

Moreover, this diversity contributes to deconstructing the digital native/digital immigrant binary. Conceptions of digital education reveal that students' learning experiences share

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commonalities with previous generations, aligning with traditional notions of education and social conventions. However, the expanded definition of digitalization, encompassing interactions and behaviors in specific digital contexts, suggests a broadening of educational definitions beyond traditional text-based practices. Understanding this nuanced relationship between digital and traditional education is crucial for effective program development and fostering a constructivist approach that embraces diverse experiences and perspectives. In this evolving landscape, digital education not only connects with established educational practices but also introduces new dimensions, emphasizing the importance of context-specific interactions and behaviors in the digital realm.

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7. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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