A Review On The Role Of Digital Education In Higher Education

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ARTICLE INFO	ABSTRACT
	Global educational systems face ongoing and increasing demands to incorporate contemporary communication and information technologies into their teaching methods in order to provide students with the necessary knowledge and skills for the 21st century. The use of computers and computer-mediated communication and information are becoming more and more integrated into educational curriculum development. Technological innovations are often seen as mere instruments used to augment the process of teaching and learning. The study attempts to identify the role of digital education in higher education and to find the relationship between both. The study is done using secondary data. After exploring multiple studies, the findings of the paper suggest that it becomes evident that digital education has a significant role in student engagement, learning outcomes, and overall educational experiences. The review offers valuable insights for educators, policymakers, and institutions to effectively integrate digital education and meet the evolving needs of higher education in the digital era. **Keywords:** Digital Education, Higher Education, Literature Review.

1. Introduction

"Online education is like a rising tide; it's going to lift all boats."– Anant Agarwal
The use of digital technology extends the potential for acquiring knowledge. By using digital technology, the process of learning may be revolutionized into a more dynamic and tailored experience. Digital transformation is widely recognized as a significant trend in both the educational and the public sector (Kümmel, et.al., 2020). Several colleges and institutions have formulated digitalization strategies and introduced novel services to cater to both their conventional and non-conventional target groups (McDonald & Glover, 2016). Digital learning strategies are recognized as a means to enhance teaching quality, advance evidence-based teaching, facilitate interdisciplinary education, and introduce practical innovations into classrooms. Nevertheless, digitalization and digital initiatives often focus only on converting lecture material into digital format and providing online access to educational modules (Sandkuhl& Lehmann, 2017).
Digitalization in higher education is the use of digital technology and applications to enhance learning, teaching, and academic activities inside tertiary educational institutions (Ellis, et.al., 2016). It includes a wide variety of uses, such as online classes, virtual classrooms, multimedia materials, educational programs, and collaborative platforms. Digital education utilizes technology to optimize the educational process by making learning materials more readily available, engaging, and adaptable (Kompen, et.al., 2019). It often entails the utilization of Learning Management Systems (LMS), online classes, e-books, modeling, and other digital tools to enhance or replace conventional classroom approaches. It provides a flexible and technologically advanced educational setting that caters to various learning preferences, encourages cooperation, and equips students with the necessary abilities and proficiencies required in the era of digitalization (Salmi, 2001).
Digital education has become more popular as a revolutionary method of teaching and learning. It surpasses the limitations of conventional classrooms, allowing students to connect with information in engaging and

individualized manners (Sahakian & Seyfang, 2018). Cooperative arrangements in digital education facilitate innovation, the exchange of information, and the pooling of resources among educational institutions, instructors, researchers, and technology vendors. Collaborations of this kind have the potential to greatly augment the efficacy of digital educational endeavors and promote student academic performance (Tubagus et.al., 2023).

The use of digital tools in learning has led to the increasing popularity of digital education as an effective learning strategy in academic contexts (Mothibi, 2015). Digital education encompasses the use of "ICT (information and communication technology)" to enhance and facilitate the process of teaching and learning (Chan, et.al., 2006). Digital education is the use and implementation of ICT (information and communication technologies) across many platforms such as "websites, personal computers (PCs), tablet PCs, mobile phones, learning management systems (LMS), televisions (TVs), radios, and other mediums" to enhance the quality of teaching and learning methods. Digital education is a comprehensive term used to include the areas of e-learning, web-based teaching, and technological advancements (Oye, Salleh &Iahad, 2010).

"The digitalisation of higher education is currently a highly dynamic field. Many universities need to check whether existing e-learning strategies are still compatible with newer strategic definitions within the university. Alternatively, universities are beginning to develop comprehensive strategies for digitization that may augment or replace existing strategies regarding e-learning."
- Arnold, P., et.al., (2015)

The COVID-19 epidemic has significantly disrupted the methods and processes of teaching and learning (Johnson, et.al. 2016). To begin with, in response to the COVID-19 pandemic, traditional in-person classes had to be replaced by home-based learning (HBL). HBL requires that educational activities be conducted on online platforms (Cooke, 2014). Therefore, it is necessary to reconsider the design of examinations at the subject level while maintaining the essential objective of assessment, in accordance with the outcome-based curriculum implemented across the institution. HBL facilitated the use of technology-enhanced ways to leverage the potential of re-designing assessments (Boey, et.al., 2023).

The optimum utilization of digital educational settings in higher learning is a significant area of study, including both scientific and practical approaches. Education in digital learning environments is distinguished by the availability of learning resources that can be accessed at any time and from any place, as well as by widespread access to these materials. Furthermore, digital learning environments provide educational possibilities for learners of all kinds and offer teaching that is improved by digital means. Scholars from several academic fields have been endeavoring to determine the key characteristics that contribute to successful learning using digital media in higher education for almost twenty years. The basic goal of higher education is to cultivate students' capacity for exceptional achievements and assist them in using their knowledge to tackle forthcoming obstacles in their careers.

The present review paper is structured into six parts. The first part has provided an overview of the role of digital education in higher education, its definitions, and its importance. The succeeding section outlines the objectives of the present review paper. The third part is dedicated to the research methodology, which outlines the study's complete approach and the methods that are used for data collection. Next, the fourth part of the paper provides a discussion of the objectives of the present review paper as outlined by previous authors. The fifth part provides a concise summary of the main outcomes and significant aspects of the research, serving as the conclusion. Lastly, the sixth part provides an opportunity to conduct further exploration. In addition, it provides recommendations for possible modifications or areas of further research that might improve the study's overall credibility and contribute to the progress of knowledge in the subject.

2. Objectives
a. To know the impact of digital education on student learning outcomes in higher education.
b. To understand the effectiveness of digital tools and platforms in facilitating interactive and collaborative learning.
c. To look at the challenges and opportunities associated with the integration of digital education in higher education institutions.

3. Methodology

A comprehensive review of "The Role of Digital Education in Higher Education" is a descriptive study that aims to understand the concept of digital education and higher education and to find the relationship between both. The study is executed using secondary data. The author consistently prioritized the objectives of the research and carefully chose the necessary data to fulfill those objectives. The primary sources of secondary data included studies, publications, newspapers, and contemporary academic working papers. The study's scope includes critical evaluations of the writers' contributions to the comprehension of these two concepts, namely Digital Education and Higher Education.

4. Discussion

It is worth mentioning that there were varied perspectives on digital transformation within higher education institutions, and there is still no consensus on how to describe it. In addition, Gama, J. A. P. (2018) suggested that digital education in higher education institutions aligns with technological advancements. The digital technological process involves various components such as individuals, groups, frameworks, and the competitive landscape. From an educational perspective, digital technology has been recognized for its ability to integrate digital tools into teaching and learning processes (Elena, 2017).

a. Impact of digital education on student learning outcomes in higher education

Many developed nations use highly interactive digital education at many academic institutions, which directly improves students' performance. In the modern day, technology has developed into tools that eliminate physical barriers and enable students to study at any time and place without the need for a direct connection with the teacher or lecturer. In light of this context, digital education facilitates convenient access to efficient education and development, hence boosting students' academic proficiency (Nurdiana, et.al., 2023). The findings of Wekerle's (2022) study revealed that the introduction of digital devices in the classroom led to increased participation of students in both constructive as well as passive and active activities, as compared to conditions where no technologies were used. Moreover, the involvement of students in dynamic, productive, and collaborative activities was shown to have a significant correlation with academic achievements. The use of digital technology has emerged as a global policy priority across all educational sectors (Bresinsky& von Reusner, 2018).

The COVID-19 epidemic has accelerated educational institutions' efforts to restructure their teaching methods and use novel digital learning technology. While the use of digital technologies in higher education, particularly nursing, is seen as a contemporary and inventive approach to teaching and learning, there is doubt over the actual efficacy of these technologies in attaining favorable learning outcomes (Sormunen, et.al., 2022). The proliferation of online courses, including massive open online courses (MOOCs), has led to a rise in the number of higher education institutions offering such programs (Cormier and Siemens 2010). When students engage in online learning and use learning management systems (LMSs), mobile devices, and social media, their digital activities are recorded and monitored (Long and Siemens 2011). Although there has been significant progress in exploring learning situations, particularly with the advancement of digital learning, it might be beneficial to include holistic perspectives on learning situations also (McClelland, 2001). One specific approach currently being used is the integration of web-based learning technologies to supplement conventional education. Heeger (2010) states that digital education allows a large number of higher education students to enroll in the same programs simultaneously.

Contemporary educational institutions have evolved to include not just learning but also reasonable instruction, which has led to the inevitable centralization of these tasks onto university campuses. Holley (2012) found that students' academic performance and the quality of instruction may both be enhanced via the use of digital education platforms. Higher education students who have shown exceptional use of digital education typically do substantially better than students who depend heavily on face-to-face communications and physical interactions with their professors (Soleimanpoor et al. 2010). Digital education is increasingly being utilized as a learning technique in teaching, skills training, development, and numerous professional tasks. This is evident from the significant advancements in online technology. However, several educational and corporate training institutions are currently making substantial progress in adopting interactive digital education methodologies to successfully improve the overall performance of college students and employees (Alenezi, 2023).

b. Effectiveness of digital tools and platforms in facilitating interactive and collaborative learning

The global discussion revolves around the implementation of sustainable development and the integration of digitalization in higher education. By integrating digitalization, it is possible to significantly increase the number of students having access to Education for Sustainable Development (ESD) (Ahel &Lingenau, 2020). In the current period when sustainability is of utmost importance in business, the extensive utilization of information technology in the education sector has transformed the level of collaboration achieved between instructors and students (Brahimi and Sarirete, 2015). In contemporary culture, with the widespread use of sophisticated mobile devices, the Internet has transcended the limitations of space and time, transforming it into an all-encompassing instrument for learning. The primary concerns in contemporary information technology-integrated education are the creation of instructional activities for digital education and the adaptable utilization of digital tools (Lin, et.al., 2017).

Today's higher education students are immersed in a world of digital technology, to have them the title of "digital natives." Higher education institutions are increasingly adopting digital resources like virtual learning environments (VLE) and social media (SM) to cater to the needs of today's students. There is less knowledge about the influence of these digital technologies on students' higher education results (Lacka& Wong, 2021). Virtual Learning Environments (VLEs), also known as Learning Management Systems, have long been employed to facilitate and enhance the process of teaching and learning. While individuals who grew up with

digital technology are familiar with using virtual learning environments (VLEs), they also anticipate the integration of social media (SM) into the higher education (HE) environment (Kaplan & Haenlein, 2016). Social media refers to a group of digital applications that are built on the concepts and technology of Web 2.0. SM, unlike VLE, was not specifically designed for instructional reasons, which raises doubts about its appropriateness in higher education.

In their study, Sanchez-Sepulveda, et.al., (2019) suggested including virtual reality (VR) into the curriculum of urban educational courses. In response to the evolving educational landscape, both the government and industry have made significant investments in the research and development of digital teaching platforms (Shin, et.al., 2011). Various digital teaching platforms have been created, encompassing both software and hardware components. These platforms offer a wide range of digital educational materials. Schools have enthusiastically adopted these platforms in their instruction, with the aim of enhancing students' learning outcomes (Burnett, et.al., 2007). The global trend of using computer networks to access shared educational materials is helping to reduce the educational disparity between urban and rural areas. The objective of digital teaching is to engage students in active participation throughout learning activities in order to attain the desired learning outcome (Pai & Tu, 2011).

Bill Gates stated at the "Association of Community College Trustees' leadership meeting in Seattle" "(www.gatesfoundation.org)"that the utilization of extensive online education programs with personalized instruction might eventually enhance student learning results(Allen & Seaman, 2014). Education extends beyond the boundaries of the classroom and encompasses the broader community. In this setting, learners have the opportunity to engage in collaborative learning through communities of interest, customize courses to suit their individual needs, and actively contribute to the generation and distribution of knowledge (Cohen, et.al., 2007).
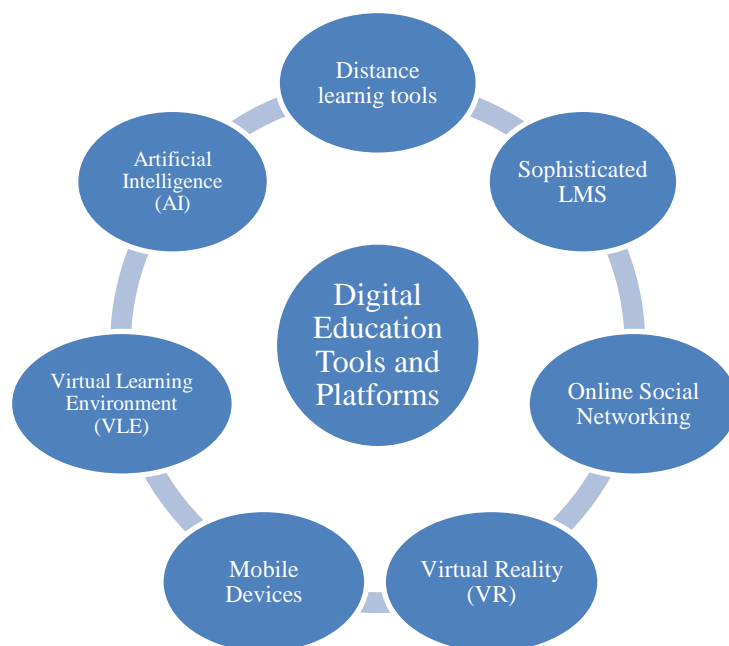

Figure: Digital Education Tools and Platforms

Source: Self-developed figure based on literature review

c. Challenges and opportunities associated with the integration of digital education in higher education institutions

The advent of technological advancements has not only yielded advantages for businesses but also for Higher Education Institutions (HEIs), which have experienced a record-breaking increase in demand for higher education. As a result, more students have begun enrolling in courses, with some preferring distance education. The Internet has become an essential and irreplaceable instrument for the diffusion of knowledge in both educational and corporate contexts (Ribiero, 2002). The Internet is a technological advancement that has the capacity to revolutionize the methods by which society gathers and accesses information. Additionally, it has the potential to reshape and reorganize conventional approaches to higher education, specifically in terms of how course materials are delivered and how students interact with them. The utilization of the Internet for the implementation of digital learning programs has sparked anticipation among both commercial customers and higher education institutions (O'Donoghue, et.al., 2001).

Universities have been faced with the formidable task of adapting and restructuring themselves to prepare for the integration of digital learning in their educational institutions. Institutional leaders additionally faced the challenge of aligning their institutional goals with the demands and expectations of the digital learning era

(Mapuva, 2009). Certainly, the advent of digital learning has made it possible for educational institutions to broaden their geographical reach, attract new students who are interested in enrolling, and position themselves as suppliers of education on a worldwide scale.

Education has been significantly influenced by the digital revolution. The adoption of technology in education has progressed gradually and varied, mostly influenced by the inclination and expertise of teaching professionals (Núñez-Canal, et.al., 2022). The COVID-19 epidemic has led to a significant increase in the influence of digital technologies across all educational levels. The digital connective technologies in the 21st century, including "distance learning tools, sophisticated learning management systems, online social networking tools, virtual and augmented reality, Open Educational Resources (OER), and MOOCs", are considered tools that provide equal educational opportunities, access to quality educational content, and support for lifelong learning (Şendağ& Gedik, 2015). On the other hand, the technologies that are often seen as solutions can also bring about additional problems (Karip, 2013).

The fundamental reasons for these innovations to pose additional challenges are the absence of effective policies and planning, inadequate allocation of resources, an abundance of qualified staff for instructional design and technical assistance, and the need for frequent and rapid updates (Glenn, 2008). HEIs are hesitant to consider the collaboration of these innovations due to concerns about potential distractions, plagiarism, and cheating. Given the importance of digital innovations in addressing the challenges faced by HEIs in the 21st century, it is crucial to thoroughly analyze the potential challenges and develop strategies to overcome them in the educational landscape (Saykili, 2019).
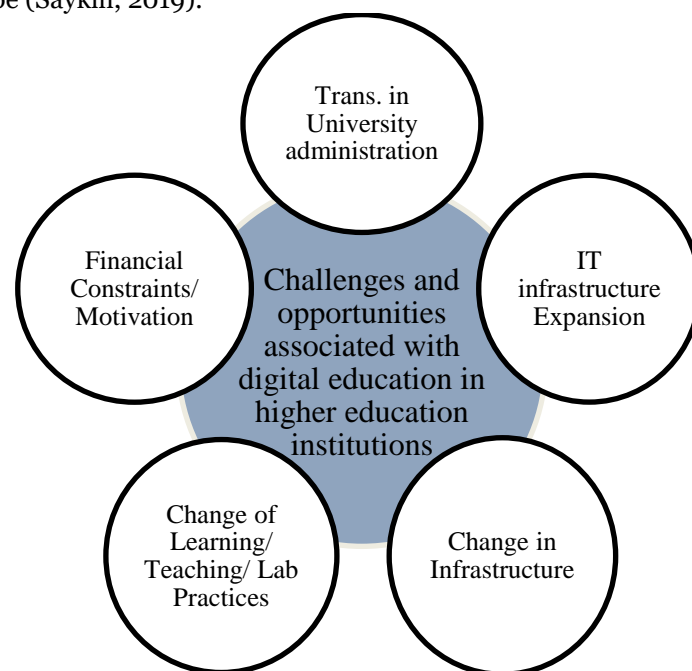

Figure: Challenges and opportunities associated with digital education in higher education institutions

Source: Adapted from Timotheou, S., et.al., (2023)

5. Conclusion

Ultimately, the review emphasizes the significant role of digital education in higher education, shedding light on its diverse contributions and implications. The integration of digital tools and technologies has revolutionized traditional educational paradigms, creating a learning environment that is more accessible, flexible, and interactive. After exploring multiple studies, it becomes evident that digital education has a significant role in student engagement, learning outcomes, and overall educational experiences. In addition, the review highlights the importance of digital education in addressing various challenges, such as geographical limitations and diverse learning requirements, to foster inclusivity in higher education. In addition, the study highlights the importance of strategic implementation, faculty development, and infrastructure support in order to fully capitalize on the advantages of digital education. While recognizing the numerous benefits, the review also emphasizes the obstacles, such as the digital divide, technological infrastructure, and evolving pedagogical strategies. The review offers valuable insights for educators, policymakers, and institutions to effectively integrate digital education and meet the evolving needs of higher education in the digital era.

6. Future Scope

The future scope of research on the role of digital education in higher education involves investigating emerging technologies, inventive teaching methods, and their dynamic influence on learning achievements. Further investigations might explore the efficacy of creating digital tools, customized learning experiences, and the

application of AI in educational systems. It will be vital to comprehend the impact of digital education on various student groups, tackle the problem of equal accessibility, and investigate adaptive learning methods. In addition, further studies may focus on longitudinal studies to evaluate the long-lasting effects of digital education and contribute to evidence-based approaches for its ongoing enhancement and incorporation into higher education systems. The study highlights the significant impact of digital education in higher education, underlining the need to carefully plan and execute strategies to improve accessibility, engagement, and learning outcomes.

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