Article

The Need of Integrating Digital Education in Higher Education: Challenges and Opportunities

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Abstract: Although it existed in a few different forms earlier, digital education is essentially a modern invention. It is the digitalization of a segment of the educational system. This article attempts to offer insightful thoughts on the future potential and difficulties of information and communication technology (ICT) and digital education as they relate to adopting the most recent technological advancements in the digital era and extensive online open courses. With the development of internet technology, we have observed a significant shift in how we communicate and collaborate among academics. The digital revolution encouraged unrestricted access to information on a global scale. Today's classrooms are equipped with a wealth of ICT tools, and almost all instructors have made significant progress in integrating digital technology to improve students' access to information and cooperative learning opportunities. The higher education system must seek to utilize the power of ICT to be competitive and provide high-quality education as a consequence of digital transformation, disruptive technological innovations, and accelerated change. To accomplish these ambitions, this paper describes some challenges that higher education encounters, as well as technological resources and methodologies they have used in the current scenario to transform higher education to adopt digital transformation. The paper aims to synthesize considerable insights that can be applied to the digitalization of higher education in the current and near future.

Keywords: higher education; digital education; technology; teaching and learning

1. Introduction

Institutions have undergone several significant changes recently due to societal and technological tendencies toward modernization. As with past industrial revolutions, the digital requires significant adaptation in every industry [1–3]. The current fundamental change in which technology is regarded as a dynamic and linked environment that encourages digital learning is related to institutions' adoption of technological advances [4]. In this manner, in addition to the learning opportunities it provides, the emphasis is more on the learners than the technology itself. In this regard, digitization is a prerequisite for higher education institutions that want to draw in more and stronger students while enhancing the quality of their courses, instructional materials, and training programs overall [5]. Additionally, it enables monitoring to find training barriers and lower the likelihood of dropping out of school. However, there is still resistance to comprehending and seizing the chance to transition to this digital environment.

As a follow-up to the Gothenburg Summit in November 2017, where the Parliament, the Council, and the Commission discussed reducing socioeconomic inequalities and building a stronger Europe through education and training, the European Commission unveiled the Digital Education Action Plan in January 2018 [6]. The action plan consists of three priorities, and each priority outlines activities and measures to help the member states

implement the action plan. In total, 11 actions need to be completed to reach an acceptable level of digitization. The top priorities are improving how digital technology is used in teaching and learning, acquiring the knowledge and abilities needed to live and work in the digital age, and enhancing education through improved data analysis and foresight.

The growing adoption of digital learning technologies continues to push education into uncharted areas [7]. While teachers must rethink what it means to provide a learning experience, higher education institutions must match their educational technology solutions to students' demands [8]. Digital learning is far superior to the conventional classroom paradigm in many ways for both teachers and students. Anytime and anywhere that is convenient for everyone can be used for teaching and learning. Digital learning does, of course, come with its own set of difficulties in addition to its benefits [7]. Many students who perform well in a traditional setting might struggle in an online setting, as many tools and digital technologies need to be learned and used by students. The new platform of education digitization might place more intense pressure on students during the educational process. This research defines digital education and discusses its context within higher education. It also highlights the challenges/barriers and opportunities of integrating digital education into higher education institutions. Moreover, technological resources and techniques can be used to achieve digital higher education.

All educators and decision-makers in higher education were closely observing the need for digital transformation in higher education, especially after the COVID-19 pandemic [3,9,10]. In this research paper, we try to investigate the main opportunities and challenges of adopting digital education. The authors believe in the important role of higher education in building and improving the knowledge economy and the workforce. The main contribution of this paper is to summarize the conclusions of several research papers in terms of the challenges and opportunities of moving to digital education. The authors believe there are still challenges in achieving the required maturity of digital transformation and digitization.

2. Digital Education

The innovative use of digital technologies and tools in education is known as digital education. Engaging learning opportunities can be created by educators by exploring the use of digital technologies. Students and teachers will both benefit from this innovative use of digital technology. Educators discover better and more advanced methods for teaching students by experimenting with new approaches. This makes learning enjoyable and encourages engagement.

The concept of teaching and learning in academia includes digital technology in a significant way [11]. Technology advancements, such as computers, cell phones, and the internet, have significantly impacted organizations and people's lives, affecting their relationship with knowledge, expertise, and methods of operation [12]. Higher education institutions provide digital computerized facilities that assist virtual organization and oversight of instruction and learning on an organizational and managerial level. Digital tools have also been used exponentially at the corporate and pedagogical levels, which has led to expectations of a transformation of education that will affect how students interact with one another and receive instruction [13]. Half of the objectives have been met. A modification in the roles of professors and students, inclusive access to higher education, and significant transformations in knowledge construction and accessibility to lectures and educational resources have all occurred [14,15].

A diverse and rapidly evolving set of resources are at the center of the shifts brought on by incorporating digital technologies in higher education teaching and learning. Web 2.0 tools and other internet-based online equipment, such as social media tools, have revolutionized education because they concurrently support students in their day-to-day social interactions and have the potential to facilitate more shared learning processes and students' autonomy in learning [16]. The period for teacher–student interaction is increasingly flexible and extends outside the classroom boundaries through engagement, material sharing,

relationships, and communication. According to Aresta et al. [17] mobile devices, including smartphones, laptops, digital book readers, and smartphone apps, have become important instruments in higher education, enabling and influencing interactions between peers, teachers, and students [11]. There are now hybrid educational scenarios that combine face-to-face, mixed, and digital learning. We are also seeing the employment of asynchronous and synchronized technologies in situations that encourage collaborative and networked learning conversations, and knowledge exchange [18]. Educational spaces have also been revamped, allowing for the replacement of physical lab experiments with simulation-based laboratory facilities or virtual and augmented reality [19]. The conventional distinctions between formal and informal learning environments, between the utilization of certain tools for learning and private use, and between student learning and time have all become hazier due to the increasing prevalence of digitalization in higher education. Education is now "all the time" because of the transformation in "time for learning" brought about by digital technology and learning environments. There are concerns about how digital technologies will revolutionize, enrich, and assist education due to their continual advancement and utilization in higher educational settings [12]. In order to better comprehend how technology has affected students' learning, it is crucial to look back. In order to map new technologies and usage patterns, publications provide actual research on the use of modern technologies to enhance higher education students on the basis of the following digital concepts.

2.1. Education, Teaching, and Technology

Even though online teaching and learning have been used for many years, the results are still lacking. Several educators have declined to use internet teaching resources because of their unconventional teaching style. Callo and Yazon [20] examined the elements influencing students' motivation to use online instructional resources. One of the major challenges is getting teachers to modify their methods or styles of instruction. Baran [21] examined successful e-learning strategies and discovered that instructors and their participating position format are crucial.

However, some learners are not accustomed to using e-learning environments for academic purposes. Numerous studies have examined the methods for offering students efficient online teaching and learning. Technology and interpersonal skills are crucial for improving student retention and satisfaction, but passion and presence are the main challenges to student engagement in online education [22]. Strategies for training include scenarios relating to practice for integrating theory and for teachers to improve their students' virtual learning experience; we propose practicing, video lectures, self-assessment activities, and exercises [23]. By implementing knowledge acquisition constructivist learning classrooms blended learning and virtual technologies higher education institutions are compelled to change their teaching methods [24]. Students must be present in person for these strategies to be implemented successfully. The main issue is that students do not participate, despite the numerous instructional strategies that have been suggested to improve students' learning. The effectiveness of the learning pedagogies depends on how enthusiastic the students are to use such web-based learning [25].

According to Zhao et al. [26], live online learning is the practice of conducting the teaching–learning process through real-time, live transmission online. Teachers must upload the lesson plans in preparation for the learning platform, offer lectures and tutorials, respond to students' questions, and allow discussions throughout the class. Although involvement and motivation are crucial for web-based learning, the scenarios are different now. Every participant must engage in online teaching and learning, particularly teachers and students. Teachers must adapt whatever their instructional methods, level of participation, or technical limitations. Institutions have assigned online educational tools, infrastructures, and technology transfer from the information technology (IT) departments to support the instruction in real-time to execute online learning. The preparation of students for a live online learning experience is yet unknown because they can access life

lessons from everywhere, making it impossible for teachers to monitor or manage. One of the necessary factors for an efficient learning process and academic success is students' preparation for live digital learning [27].

Nevertheless, unlike conventional face-to-face education, distance learning does not ensure the student's attendance, making it challenging to assess the level of student focus [28]. Students' preparation for live online learning significantly impacts their ability to participate in class and the effectiveness of live online learning. Investigating the key elements influencing students' preparation for live online learning is crucial. There has been extensive research on preparedness for online learning [29]. According to certain studies, it is the degree of independence in learning involvement, self-confidence in using information flow, and perception of the delivery by the students. A variety of factors determines learners' preparation for online learning. Walia [30] recently looked into how prepared students were for web-based learning as per their study plans and gender inequalities. The original study's seven assessment parameters were student accessibility to technology, technological proficiency, living considerations, teaching presence, efficiency expressed, relationship quality, abilities, and learning styles. In order to determine if students were prepared for online learning, Engin [31] evaluated the students' sentimental intellectual capacities. The assessments were based on five factors, and the computer self-efficacy factor was chosen to gauge students' propensity to utilize computers. Hung et al. [32], created a comparable tool to assess the readiness of teenagers for online learning based on several student characteristics. A thorough investigation was done into the instruments, variables, and criteria utilized to gauge students' preparation for the online environment [33]. Based on the investigations, up to 45 questionnaire items can be used to assess the student's readiness. It is proposed that computer abilities, internet self-efficacy, identity, ambition, interactivity, and attitudes contribute to multi-functional e-learning preparedness.

Despite the widespread usage of online learning, there is still a dearth of research on live (real-time) online instruction. In certain studies, digital teaching and proper teaching platforms for live-stream teaching were used [34]. The approaches and tactics for teaching in real-time were investigated [35]. However, these studies do not primarily concentrate on the higher education sector, where students' preparation for live online learning has not been examined. As a result, research is needed to determine if students in the higher education industry are prepared for live digital education at the degree and postgraduate levels. We expanded educators' learning attitudes to assess students' ability and willingness for live online learning using the five key factors listed below: technology willingness [36], personality related to continuing to learn, learner control, interest in learning, and online communication self-efficacy. This study refers to the simplistic factors of e-learning suitability in students' emotions [31].

2.2. The Role of ICT

Information and communication technology (ICT) is a comprehensive term that encompasses all technological advancements for managing and transmitting all digital data. Information communication technology views all current computerized development professions as helpful to individuals, organizations, and corporations. Information communication technology is challenging to represent since it is challenging to keep up with the moves that occur so quickly. Restricting, retrieving, managing, and sending computerized information are ICT issues. It can be characterized as processing and communication organizations with a focus on features that assist in instructing, learning, and exercising scope in education in many ways [37]. The rapid expansion of social networks and the development of modern technology have substantially changed how education is conducted. The ability of all stakeholders across the educational system to comprehend the strategic vision of education is now essential to the future of education and society at large [38]. ICT has long been a helpful instrument in the field of education. Sidney L. Presses created an automated testing machine in the 1920s, which marked the beginning of technology's usage in assessment [39]. Additionally, schools started using automatic

assessment technology and uniform evaluations simultaneously, making large-scale testing accessible and affordable [40].

Although we acknowledge that the use of educational technology in higher education is crucial for the growth and advancement of both instructors and learners, ICT has been embraced by higher education institutions, especially those in the West, as a way to teach learners the skills and knowledge required for the intellectual development of the 21st century [41]. ICT is currently infiltrating the educational environment and supporting the very success of education in the 21st century according to UNESCO. ICT is beneficial for administering educational institutions and coordinating and enhancing learning. A large portion of innovation and development in both developed and developing countries is driven by technologies. Therefore, all nations must work toward utilizing technological advancements. Irrespective of particular computer platforms or software frameworks, professionals (including faculty) must be equipped with solid ICT credentials to fulfill the demands of the constantly changing global context [41].

A multi-dimensional constructivist approach through distance learning has been implemented in many schools in developing and developed countries to accommodate distance age and long-term unemployed students due to the amazing usage of ICT in the education system, especially among instructors [42]. The advantages of ICT are demonstrated from various perspectives, and they have promoted the learning process. They have also made learning accessible to anyone who can create a supportive environment, encourage viable knowledge delivery, and provide prompt solutions to many questions that trouble teachers and students [41].

2.3. Digital Education Types

From a technological and scientific standpoint, the effectiveness of online education experiences in institutions is a significant learning area [43]. Learning in digital educational facilities is defined by the availability of time- and place-independent learning resources and by easy access. Additionally, digital learning environments offer education enhanced by technology and enable educational possibilities for all learners [44]. Since roughly 20 years ago, scholars from several fields have attempted to pinpoint the elements that make digital learning in higher education successful [45]. Two key goals of higher education are fostering students' capacity for excellent outcomes and assisting in using the information to encounter future problems. In order to assess learning success, studies on the use of e-learning contexts in higher education must concentrate on paying attention to academic achievement. For students to become capable and proficient participants in a knowledge-based society, it is important to enable and encourage them to use digital content for learning, transmission, collaboration, and interaction. Second, digital learning environments promise to improve the effectiveness of teaching and learning, for instance, by boosting student motivation to adjust to prior knowledge or enabling mobile and pervasive learning [46].

With the emergence of contemporary Internet users and experiences with artificial intelligence (AI), digital education is revolutionary and constantly evolving. The technology of today enables us to tailor the learning experience to our specific requirements and learning schedules. Digital education [47] can be classified as adaptive, blended, personalized, and virtual.

A learning technology called adaptive learning measures and evaluates a student's understanding of a subject by making use of the most recent developments in artificial intelligence. An adaptive learning system adjusts content delivery by analyzing student strengths and weaknesses using feedback from students. Instead of providing a one-size-fits-all learning experience, it is the provision of individualized learning experiences that take into account an individual's specific requirements by providing just-in-time feedback, pathways, and resources [48].

Blended learning has become a common educational phenomenon over the past ten years thanks to rising demand and acceptance in higher education. It is becoming

clearer that blended learning can get around some of the problems that online learning and in-person training have. Blended learning is more effective than online learning or in-person training, according to a meta-analysis of more than 1100 empirical studies published between 1996 and 2008 [49]. According to numerous studies, blended learning will soon replace the traditional approach to delivering courses in higher education [50]. Because the phrase "blended learning" has no universally agreed-upon definition, teachers have their interpretations of the term and consequently construct their programs differently. With so many blended learning designs available, choosing the best design concept has become extremely difficult, particularly for teachers who lack the essential theoretical background and hands-on expertise with blended learning, which is the case for most higher education teachers [51]. Numerous blended learning design methods have been suggested and discussed in depth in academic literature, but much less research has attempted to categorize and compare these design approaches to determine the advantages and difficulties of using each [24].

Personalized learning is a method of education that is tailored to the needs of the individual taking the individual learning path. Individual students' unique learning needs, interests, aspirations, or cultural backgrounds are the focus of a wide range of educational programs, learning experiences, instructional approaches, and academic support strategies that are referred to as personalized learning or personalization. Personalized learning aims to tailor instruction to each student's strengths, requirements, interests, and skills. Every student gets a learning plan that depends on what they know and how they learn best [52].

A virtual learning environment (VLE) is software that includes several tools and programs that facilitate online collaboration, student evaluation and feedback, uploading of academic material, and course organization. Virtual learning environments continue to be one of the most important tools for advancing pedagogical and instructional practices capable of adapting to the changing nature of education and teaching methods. During the past ten years, there has been a real effort to use virtual classrooms to assist teaching and learning in higher education. Institutional integration and students' engagement with virtual classrooms have been modest [53]. The objectives are to upkeep, achieve, augment, and improve education, learning, and evaluation. The anticipated advantages include good communication, interactive elements, cooperative pedagogical methods integration, increased asynchronous communication, international intelligence gathering, shared passions, and knowledge advancement through continuous interaction.

3. Challenges of Digital Education

The usage of this infrastructure has limits that could potentially pose obstacles to the success of any online courses, even though digital education has significant benefits and provides new opportunities for high-quality education [54]. It is crucial that instructors are informed of these potential difficulties. You can assist your students in getting the most out of each subject with a little forethought and preparation. As educators attempt to make their way through the complicated world of virtual learning, this has brought forth a new set of difficulties. Figure 1 shows a summary of these challenges.

1.　Digital literacy: Both students and teachers need to have a basic understanding of computers to function well in an internet context. The ability to effectively use technology to locate information, evaluate sources, produce content, and communicate with others is known as digital literacy. It is a set of skills used to navigate society's new technological paradigm. It is extremely beneficial to be digitally literate in order to learn effectively online. Without these advanced technologies, students cannot succeed in an online program; students or teaching assistants can convey the entire program to a halt [55].

2.　Lack of teacher–student direct interactions: It is simple to misjudge the amount of teacher contact students receive on campus. This instructional segment, which includes actual question-and-answer sitting, comes next. There is a chance for debate

right before and after learning, during office hours, and chance interactions in the hallway. These are not available for digital education [54].

3.　Need for self-discipline: Many learners find it difficult to maintain self-control in a classroom setting in higher education. For the remainder of their time, they are not continuously being checked on by their educators and parents. They do not lose their privilege to socialize if they skip class or assignments. Others need time and internal motivation to focus on the task at hand. In online courses, it is much simpler to "skip class" or miss an assignment [56].

4.　Technological obstacles: We prefer to presume that everybody has access to a laptop or desktop workstation of the most recent model. However, despite being a generation of "digital natives", not every child has had the same degree of internet access. Using mobile devices in online activity became the norm for people's habits. Even though all of their details come from their phone plan, some people have limited access to the internet or Wi-Fi [57].

5.　Meeting deadlines: Although this issue is related to the self-control component, it merits its own entry. Students can learn at their own pace using this method, which is one of its key advantages. However, the gain could also be a liability. There comes a time after the term when "their own pace" turns into "perfectionism and a mad scramble". It is important to support students in keeping up their pace before the final deadline [57].

6.　Digital education is not appropriate for practical sessions: Digital and e-learning are incongruous with assessment tasks in higher education. Although e-learning provides actual session-related knowledge and preparations, the learner does not assess their performance or experience after completing the course. It is useless to have the knowledge and move it around randomly. Instead of emphasizing the development of practical abilities, the majority of digital content suppliers chose to concentrate on theoretical knowledge development. This is understandable because theoretical lectures are far simpler to implement in an online learning environment than practical courses. Since there is no workshop or face-to-face interaction, implementing practical projects in an online course needs far more advanced planning than theoretical instruction. Several research studies highlighted that digital education is inappropriate to teach practical competencies and hands-on skills [58,59].

Figure 1. Digital education challenges.

4. Opportunities for Digital Education

Education has the greatest impact on a country's prospects for competitive nature and living thing growth. The knowledge revolution offers some outstanding opportunities in the field of education. We should prepare diverse learners separately. Parents display this instinctive wisdom by interacting with their children differently depending on their ages [60]. Academic institutions and even smaller organizational divisions can now afford incorporated digital systems, according to a source cited in [54].

Regarding digital learning, there are numerous variables. For a course to be considered an online course, it needs more than just a Zoom call. Digital learning may be beneficial for both students and teachers when done right. Students are able to learn at their own pace and benefit from both group and solitary instruction in the classroom. It is considered a great addition to developing time management skills. Students must master a variety of technical applications that go beyond what they would learn in a basic computer class due to the increasing use of technology in daily life. Figure 2 shows a summary of these opportunities.

1. Improving teaching and learning: Digital technologies will improve the educational perspective for all our children and young adults. The majority of research that looked into how digital education affects learning discovered that it enhances the importance of educational development and the evolution of high-tech abilities. The focus of education in the future is on digital technologies, which will completely replace current educational approaches [61,62]. Other sources all indicate that our pupils are already very familiar with digital technology and will assist in its increased use as part of their education [63].

2. Growing return on investment in higher education: Financial trends, especially in high industries, have contributed to a decline in jobs and new firm growth. That is why innovation is essential in a competitive and globalized worksite. The workplace's competitive nature exacerbates these patterns. Innovations and entrepreneurial skills are crucial for promoting job creation, as evidenced by the field of research and development [64].

3. Increasing parental and school engagement: According to encouraging research, using digital tools and software to communicate directly with parents would increase student adherence to teacher requirements for participation and behavior and enhance learning [64]. The K–12 teaching system may be more pertinent, interesting, and participatory for students who use technology.

4. Reducing inequality: Creating an innovation-rich curriculum would improve learning possibilities for many high-poverty, rural, urban, and marginalized students who may not have other exposure to these critical assets. The expand of ICT and global interconnection can speed up learning and education progress, reduce the digital divide, and develop knowledge-rich societies through diverse areas. Several works show how ICT can play important roles in improving economic and poverty alleviation through numerous influencing factors, such as education, the income, and ICT capabilities [65]. Moreover, other studies emphasize the benefits of utilizing ICT for learning and educational processes [66–68]. It is convincing to argue that using digital education through ICT will allow students from different areas to access and acquire information, knowledge, and content at any time. Making rich content and innovative curricula available online will eventually reduce the inequality in acquiring the needed information. On the other hand, these studies showed how digital technologies are more usable today, and how that will lead eventually to reducing the digital divide aspect in the education.

5. Anywhere and anytime: The virtual classroom is available around the clock. Time availability is another benefit of the online learning style. The ability to interact in classroom activities while juggling work, social, and study commitments is made possible through communications using online meeting systems [55]. Students today use personal technology every day to communicate, work together, interact, explore, and learn. Whether they are in a car, at home, on a train, or in the school hallways,

they remain attentive to their surroundings. Students are highly exposed to digital technology, thus, it is easier to express their aspirations on social media platforms and follow their favorite celebrities on Twitter, and to use technology in many other areas of their lives, including reading and writing.

Figure 2. Digital education opportunities.

5. Discussion

Three distinct strategies for creating learning in higher education were discovered after examining the various approaches, low-impact (adding extra exercises to an existing course), medium-impact (trying to replace activities in a multiple listing), and high-impact (creating the blended course from concept to completion) approaches. These strategies have been categorized as low-, medium-, or high-impact mixes based on possible modifications to the current teaching methodology and the student's educational experiences. Teachers' effort, technology skills, assurance, assistance, skill, and experience must increase when they move from a low to a greater-impact approach. However, there is also a growing possibility for the conventional course to be strengthened.

The outcomes of assessments are consistently significant improvements in the growth and use of digital education spaces and widespread presumptions that their progressive impression highlights the need for greater consideration of user preconceptions and more well-organized intention and implementation of digital learning. The current research work aimed to assess how using a VLE to assist in the delivery of online panels affected students' experience with teaching and learning. While studies assessing digital education frequently use a straight inquisitorial method to assess the VLE itself, findings from this study show an alternative to learner contentment with instruction and education, and are, therefore, considered to provide a more real and useful perspective on the effects of VLEs.

6. Conclusions

In order to prepare students for the rapid advancement of technology, there is an urgent need to change how education is taught in schools. Despite this, many countries' curricula are currently behind in digital education. We recognize the need for significant and urgent adjustments through a comprehensive examination of these institutions. These changes

create several opportunities and constraints for the improvement of digital education. It will be feasible to maintain these institutes' unavoidable role in fostering the expansion and viability of higher education by making a significant shift. The education system must actively pursue the goal of protecting itself as a pioneer in quality and innovations at a time when a pivotal legal project has been discussed to reframe the institution's role to keep defining the future of distance learning and digital learning in higher education.

Despite the wide range of technologies and applications, they are mostly used in environments that integrate in-person and online instruction, typically in conjunction with flipped classroom strategies, to create flexible learning environments and provide access to those environments. Studies regularly discussed the advantages of encouraging students' active participation in the learning process both inside and outside the classroom. Overall, using all digital technology categories was more frequently associated with improved student learning outcomes and processes. This can look ahead and further consider the need for educators and, in our opinion, researchers as well, among whom we include ourselves. We hope to contribute to the ongoing research and discussion regarding the use of digital technologies in learning in higher education.

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