The Fundamental Strategies that will Drive Higher Educational Sector Towards Digital Transformation in Industry 4.0

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Abstract

Digital transformation is the coordination of digital technologies with organizational aspects and human variables in a specific setting. It goes beyond simply implementing a technology solution. Additionally, it calls for the thoughtful and complete application of digital technology to the creation of new skills and theoretical frameworks. The goal of the current study is to examine the basic practices that will propel Industry 4.0's digital transformation of the educational sector. Utilizing a qualitative research approach that included a comparison and analysis of the relevant body of earlier work, the study discovered that digital transformation in education can be driven by several factors, including campus safety, data security, student achievement, strategy, data enablement, student-cantered services, cost and availability, digital integration, and artificial intelligence. The study concluded with a variety of strategies that can aid in the digital transformation of universities and other institutions of higher learning, like establishing a solid foundation for information and communication technology systems and delivering cyber security that is up to date with current best practices, among the many strategies suggested.

1- Introduction

The term "*digital transformation*" refers to a process that entails changing how labour is organized in response to the emergence of novel digital technology and business models. The term "*digital transformation*" is used to describe this procedure. Digital transformation is more than just putting a technology solution into practice; it is the coordination of digital technologies with organizational factors and human factors in a particular environment. Additionally, it necessitates the thorough and deliberate application of digital technology to the development of new competencies and conceptual frameworks. A higher emphasis is placed on how people use their digital expertise, knowledge, and technology in an interoperable way by the professions of the knowledge economy and the fourth iteration of education. However, workers are also expected to comprehend a smaller and smaller set of concepts and theories [1, 2]. The World Economic Forum (WEF) predicts that because of the changes brought about by digital transformation, 65 percent of youngsters who are presently enrolling in primary schools will eventually work in completely new businesses or professions that do not already exist. This is due to the numerous changes that have been brought about by the digital transformation [3]. To properly use digital solutions in the classroom, you might need either hardware or software. Hardware-based solutions can be used to raise academic standards. Some examples are tablet computers, smartphones, and interactive SMART boards. We use the term "hardware-based solutions" to describe these technologies' uses [4].

The adoption of software-based solutions might improve students' ability to collaborate on their academic work in groups, which will speed up the learning process overall [4, 5]. The COVID-19 pandemic necessitated the widespread

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use of digital learning in all forms of educational systems. The rapid global adoption of digital transformation in the year 2020 called for a re-evaluation of the significance of technology in terms of working patterns, educational practices, and lifestyle choices. This leads to the conclusion that the adoption of digital transformation will accelerate globally in the next years. The COVID-19 pandemic brought to light yet another enduring issue. There are still billions of people who do not have internet access, even though it ought to be a basic human right. Many children in Africa were prevented from acquiring education as a direct result of governments using pandemic mitigation response measures such as lockdowns and mandatory social isolation in response to the COVID-19 virus outbreak [6]. Parents, especially those who resided in more remote and rural areas, were compelled to watch helplessly as their children's educational options were severely constrained.

This was especially true for the parents of many school-age children [7]. In the instances where learning did occur using remote learning modules that were either accompanied by television or radio, there were fewer subjects and less overall content that was addressed. Additionally, there was no guidance, criticism, or communication from their respective instructors [7]. In more than 87 percent of the world's countries, the vast majority of which are in sub-Saharan Africa, more than 30 percent of girls who are old enough to attend elementary school do not do so. Young girls continued to experience significant barriers that limited their access to education, particularly distance learning, along with many other vulnerable groups of children. This was particularly accurate for underdeveloped nations. Young women have very few options for higher education because of these obstacles. Parents and guardians who had either very little formal education or none continued to struggle when it came to helping their children receive an education at home [6].

Previous studies, according to Wilms et al. [8], mostly concentrated on the effects of digitalization in the context of commercial organizations and business processes. In light of this, this study will examine the digital transformation of higher education, with an emphasis on the core strategies that will power this transition. According to Wilms et al. [8], the term "*digital transformation*" describes the changes that digital technologies bring about and have an impact on. Wilms et al. [8] investigated the impact of digital transformation on colleges and students. One of the primary findings by Wilms et al. [8] was that while Ph.D. students and employees do not prefer using social networking sites for collaboration and communication, Bachelor's and Master's students do. Wilms et al. [8] suggested that despite the availability of an expanding number of contemporary platforms for direct contact, the findings indicate that email is still the primary method of communication between groups of students and employees. According to Benavides et al. [5], the Industrial Revolution 4.0's technological growth has permeated higher education institutions (HEIs), forcing them to contend with a digital revolution in every aspect.

According to Castro Benavides et al. [5], the application of digital transformation methodologies to the HEI domain is a new area that has attracted interest recently since it enables us to characterize the intricate interrelationships between players in a digitally enabled education domain. The specific traits of the digital transformation (DT) implementation process that has occurred at HEIs were enumerated by Castro Benavides et al. [5]. The major conclusions by Castro Benavides et al. [5] demonstrate that this topic is indeed in its infancy and that none of the DT in HEI concepts that have been identified have been developed holistically. According to Castro Benavides et al. [5], this circumstance necessitates additional investigation into how HEIs may comprehend DT and meet the demands of the present-day fourth industrial revolution. To adapt to the changes brought about by new technologies, Abad-Segura et al. [9] further claimed that the digital transformation of the education sector necessitated the engagement of sustainable management. According to Kopp et al. [10], there are five prevalent preconceptions about digitalization that they believe hinder rather than help the successful implementation of digital transformation at higher education institutions (HEIs). According to Kopp et al. [10], these presumptions are related to the concepts of change, pace, technology, skills, and money. Building on this foundation, the current study seeks to investigate the fundamental procedures that will drive the educational sector towards digital transformation in Industry 4.0.

2- Brief Literature Review

2-1- Definition of Terms

2-1-1- Industry 4.0

Industry 4.0, the so-called "*fourth industrial revolution*", is currently altering nearly every area of human existence. The revolution indicates a major transformation regarding how organizations generate things, the methods by which individuals live and connect, and how people are governed [11]. The first mechanization occurred during the Industrial Revolution, which was powered by water and steam. Electricity-powered assembly lines and mass production were hallmarks of the Second Industrial Revolution. The "fourth industrial revolution will take what was started in the third with the introduction of computers and automation and enhance it with intelligent and autonomous systems that are fuelled by data and machine learning". The first industrial revolution saw mechanization using water and steam power. Powering assembly lines and producing in bulk, electrical modernization was a hallmark of the second industrial revolution [7, 11]. The fourth industrial revolution, or Industry 4.0, is characterised by growing automation as well as the employment of smart technology and smart factories. Informed data helps to manufacture things in a manner that is

more productive and efficient throughout the value chain. As part of Industry 4.0, flexibility is improved so those producers may better satisfy the demands of their customers" through mass customisation, ultimately aiming to reach efficiency with a lot size of one in many instances" [12]. A smart factory can "achieve information transparency and make better judgments by receiving more data from the manufacturing floor and integrating that data with other firm operating data. This allows the smart factory to make better decisions and achieve information transparency" [11, 12].

2-1-2- Digital Transformation

The transformation of an organization's business operations from their existing condition into a state in which they can compete in today's digital environment is what is meant by the phrase "digital transformation," which has been used for many years to describe this process [7, 13]. Additionally, "digital transformation refers to the incorporation of digital technology into all aspects of a company's operations, which results in a significant shift in the manner in which you conduct business and provide value to customers". This shift can be attributed to the incorporation of new digital technologies such as artificial intelligence and machine learning. A revolution in corporate culture is also essential, in which companies must regularly question the status quo, engage in experimentation, and figure out how to get comfortable with failure [13]. A declaration of the problem, an elucidation of the opportunity, or an aspirational objective should serve as the starting point for digital [7].

2-2- Empirical Literature Review

Because the digital transformation of education is a time-consuming process that only became a pressing issue in the spring of 2020 as a direct result of COVID-19, the volume of published material on the subject has recently increased. Bilyalova et al. [14] described the characteristics unique to digital education as well as the current state of its implementation, anticipated outcomes, and concerns regarding this topic. Bilyalova et al. [14] argue that today's digital technology is more than just a resource; it's also a way of life that expands people's horizons. There are now options for both on-demand and continuing learning. After presenting the foundations of digital education and the current state of its implementation in modern society, Bilyalova et al. [14] argued that the benefits and drawbacks of this mode of instruction for today's students and the efficiency of the teaching-learning process in which they engage should be critically examined. According to Katyeudo and de Souza [2], guiding and promoting the digital transformation of teaching processes requires a holistic approach that considers technological, human, organizational, and pedagogical variables. Education 4.0, as defined by Katyeudo and de Souza [2], aims to provide students with the knowledge and abilities they'll need to thrive in a world shaped by the Fourth Industrial Revolution and other pressing global issues. Part of these difficulties is raising awareness about climate change and finding ways to lessen its consequences.

Bogdandy et al. [4] suggested that digital transformation is a long process in education but that it became an urgent problem due to COVID-19 in the spring of 2020. The study by Bogdandy et al. [4], which came in at number four, investigated the experiences, feelings, and general expressions of students concerning digital education and recent changes. According to the findings by Bogdandy et al. [4], the students appreciated digital education, and around half of them expressed a desire to carry on with it in the years to come. In addition to this, Bogdandy et al. [4] found that students would prefer to utilize their own devices during tutorials, which allows for some adjustments in the working environment. The findings, however, showed that some of the students had technical problems, which may have been brought on by the heterogeneous software environment and may be remedied by providing the students with support material. According to Benavides et al. [5], higher education institutions (HEIs) have been penetrated by the technological advancement that the Industrial Revolution 4.0 brings with it. This compels institutions to deal with a digital transformation in all parts of their operations. According to Benavides et al. [5], the application of digital transformation strategies to the HEI domain is a developing subject that has raised interest in the recent past. These methodologies make it possible for us to describe the intricate relationships that exist between players in a sphere of education that is supported by technological advancements. Benavides et al. [5] undertook a study to provide a summary of the differentiating elements of the implementation process of digital transformation (DT) that has taken place in HEIs. This study was published in 2020. One of the most important discoveries was that none of the identified DTs in the HEI plans had been designed in a holistic dimension. This is one of the key discoveries that demonstrates that the field is still in its infancy.
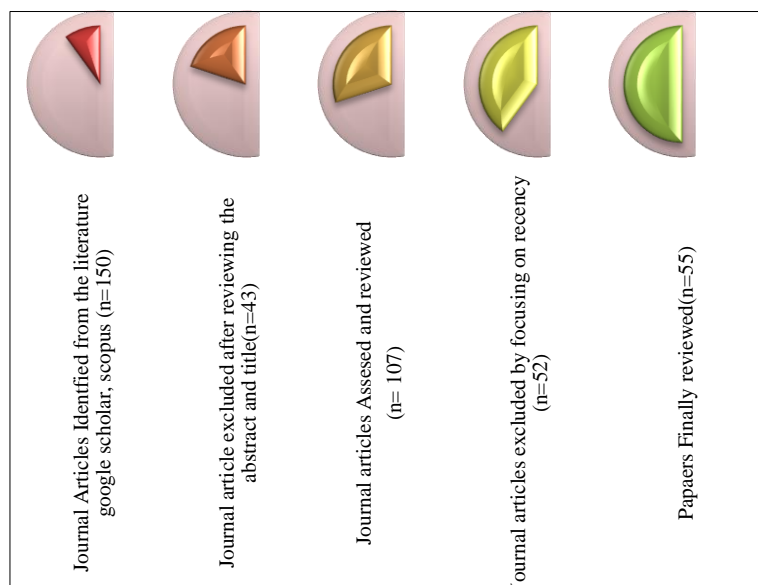
In addition, Abad-Segura et al. [9] argued that sustainable management must be integrated into digital transformation initiatives in the education sector to account for the inevitable shifts that result from the introduction of cutting-edge technologies. Patterns in the international research done on this issue from 1986 to 2019 have been examined and investigated, as per the interpretation of Abad-Segura et al. [9]. To get there, we used bibliometric analysis to look at 1590 publications from the Scopus database. The research done by Abad-Segura et al. [9] provides information on the scientific output of authors, journals, organizations, and countries that aid in the growth of this field of study. Abad-Segura et al. [9] reported finding evidence of an exponential trend in the primary subjects of study, social sciences and environmental sciences, over the past five years. Sustainability is the most prolific journal, and Mulder, of The Hague University of Applied Sciences, is the author with the most publications, as found by Abad-Segura et al. [9]. Although

the Delft University of Technology stands out as the most fruitful establishment. The United States of America ranks first in both the number of academic publications and the number of international partnerships in its research, as reported by Abad-Segura et al. [9].

Rospigliosi [15] suggested that because of the COVID-19 epidemic, there is an acceleration of the digital transformation of many parts of life. These elements include how we interact with one another socially, how we shop, and how we teach and learn. According to Rospigliosi [15], one sector in which interactive teaching and learning are undergoing rapid transformation is colleges, where the pandemic has expanded the utilization of a lot of online procedures. Rospigliosi [15] went on to say that "universities have repeatedly had to change what they do and how they do it to accommodate the times in which they operate. These changes can be reviewed on the scale of centuries, such as the gradual move away from Latin as the core curriculum for students'' vocational studies." Rospigliosi [15] also stated that universities have repeatedly had to change what they do and how they do it to accommodate the times in which they operate. According to Rospigliosi [15], the months that have followed the breakout of COVID-19 have been a moment of rapid transformation for many colleges towards becoming online universities. This transition has taken place throughout this period. This is a component of a longer-term trend toward expanded usage of interactive learning environments in education and training, as well as a component of the broader digital revolutions that are occurring across the economy in many cultures. But for this discussion, lets centre our attention on the extensive and quick change that has occurred because of the influence of COVID-19. Our goal is to determine how well universities will be able to operate after most of their operations are moved online.

3- Methodology and Data

This study employed a qualitative research methodology that included both an analysis and a critique of the pertinent body of prior work. A full review that enables researchers to study past research to uncover research gaps, consistencies, and inconsistencies in earlier studies is an illustration of what is termed a critical review. Researchers can study published content, make notes about it, critically evaluate it, and then synthesize it by using a critical review [16, 17]. The recommendations made by Webster &Watson [18] were carefully considered by the researchers to ensure that the study was as thorough as it possibly could have been. According to Webster &Watson [18], a thorough examination must take into consideration four crucial factors. These kinds of queries include What's new? So what? Why so? and well done, for instance. To ensure that the review was thorough, the researchers made it a point to follow this instruction. To find the necessary data, the Publish or Perish search tool was used to search both the Scopus and Google Scholar databases. In total, 55 articles were considered for this inquiry. Wee &Banister [19] claim that between fifty and one hundred papers are the optimum quantity for a thorough review article. The next thematic conversation that will be held around the body of work will be based on the conceptual frameworks that are being presented here. A thorough review of the pertinent literature was carried out after reaching the point of saturation, which is the point at which further inspection of further articles yields no new information on the topic under investigation. When a topic has reached saturation, there is no longer any new information to add to the body of knowledge. When the saturation point was eventually reached, this was done. Once it was decided that there was no longer any new information on the inquiry's subject, this action was taken [16, 19]. The flowchart shown in Figure 1 illustrates how the process of doing a literature review can be divided into several different categories.

Journal Articles Identified from the literature google scholar, scopus (n=150)

Journal article excluded after reviewing the abstract and title(n=43)

Journal articles Assesed and reviewed (n= 107)

Journal articles excluded by focusing on recency (n=52)

Papaers Finally reviewed(n=55)

Figure 1. A flowchart depicting the process of conducting a literature review
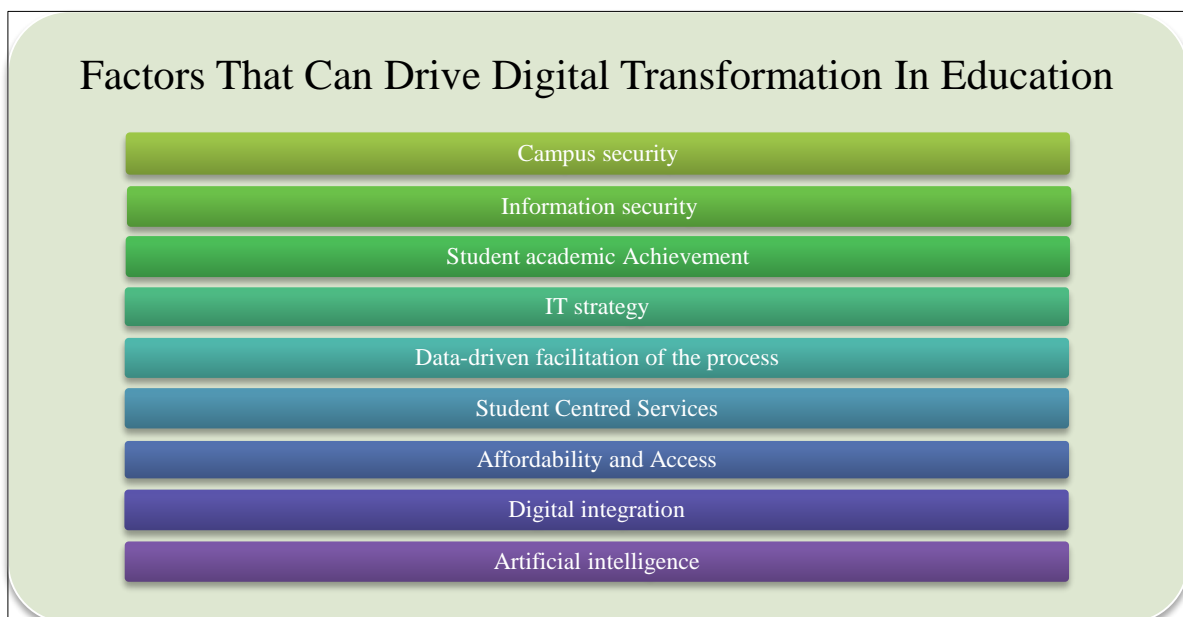
Figure 1 above shows that a total of 55 publications were analyzed in this study, with most of the relevant information coming from searches in the Scopus and Google Scholar databases. When considering the results that were published by Snyder [20], it is crucial to note that the selection of papers required the involvement of two reviewers. This was essential in picking the final articles. According to Snyder [20], it is advisable to have two reviewers to preserve the effectiveness and dependability of the search technique. The studies that were included in the meta-analysis were chosen based on two criteria: how long it had been since they were completed and how well their designs addressed the research question. These standards were used to select the studies for inclusion. Nonetheless, older pieces were considered as well. The publications that were mostly focused on were those that had been published from the year 2000 up to the present. The primary focus was on writings that appeared in print between the years 2000 and the present. The publications that contained critical review articles and content analysis in the study design were the ones that drew our interest the most. The review articles we used helped us find more of what we needed, and the papers themselves were more pertinent to our research.

4- Results and Discussion

The term digital transformation refers to much more than simply upgrading one's hardware or software, although these factors are sometimes involved. A learning environment in which everything is connected can be created through digital transformation, which involves both a physical and philosophical shift to fulfil the ever-increasing expectations of students, teachers, and campus.

4-1- Factors that Can Drive Digital Transformation in Higher Education?

The factors that are driving the digital transformation in education are highlighted in Figure 2, which can be found below. These factors include, but are not limited to, Campus security, Information security, Student Academic Achievement, IT strategy, Data enablement, Student-Centered Services, Affordability, Digital integration, and Artificial intelligence, among plenty of other factors.

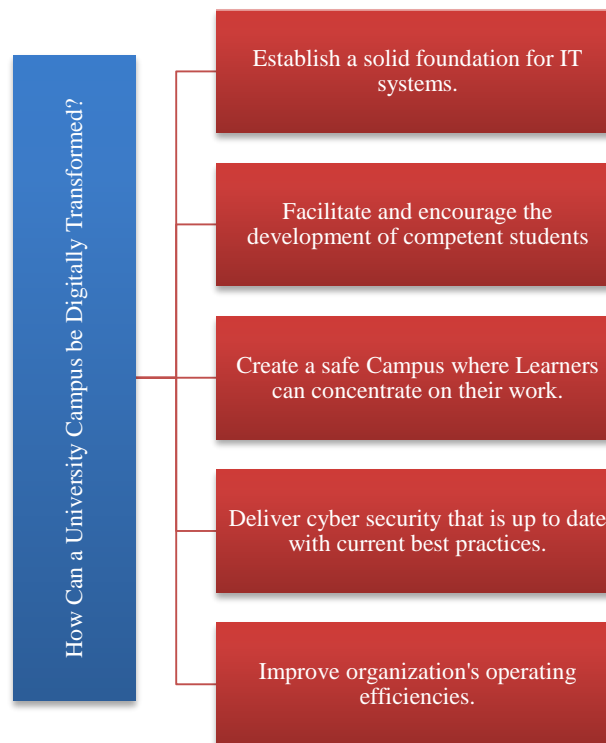**Figure 2.** Factors that drive digital transformation in education

In figure two above, the factors that are driving the digital transformation in education are highlighted. These factors include, but are not limited to, "Campus security, Information security, Student Academic Achievement, IT strategy, Data enablement, Student-Centered Services, Affordability, Digital integration, and Artificial intelligence, among a lot of other factors". The use factors lead us to the main thrust of this study, which is the investigation of the fundamental procedures that will drive the educational sector towards digital transformation in Industry 4.0. According to Tungpantong et al. [21], transformative innovation has been a result of globalization and digital disruption. According to Tungpantong et al. [21], educational institutions must provide qualified human resources with up-to-date knowledge, competencies, and abilities.

Tungpantong et al. [21] contend that it is essential to create systems and other relevant supporting variables at the same time. Tungpantong et al. [21] hold the view that developing the structure and education management system to be flexible, efficient, and effective towards the quality and standards of international education is important in terms of

teaching and learning systems, service systems, and infrastructure. Based on the DeLone and McLean information system success model, Tungpantong et al. [21] believe three main factors affect the success of the information system. This is digital transformation, which is the application of new technology to already-existing organizational resources in new operations to create opportunities and challenges for the organization. It has six elements. Enterprise Architecture, as defined by Tungpantong et al. [21], is the planning of the use of information and communication technology to be connected to a structured work process in five dimensions and digital leadership by someone who has skills, attitudes, knowledge, and experience in both fields. According to Pereira et al. [22], the current technological development enables new types of collaboration amongst dispersed networks of diverse actors and makes it simple and quick to access more information, processing power, communication, and connectivity. Pereira et al. [22]'s subsequent argument was that this new reality goes beyond conventional bounds to have an impact on people, other organizations, and society at large. It not only offers huge possibilities for innovation and improved performance for organizations.

4-2- How Can a University Campus be Digitally Transformed Strategies for Success?

The "metaphorical walls and gates that have defined higher education are crumbling" because of the digital change that is currently taking place [23]. To avoid the same outcome, the literal walls and gates, as well as the physical campuses, will need to be rethought. Even if they are breathtaking, steeped in history, and full of symbolism, those qualities alone won't be enough. The grand country estates of England will become the American counterpart of museums of a bygone golden age, and those locations that are attractive but do not provide educational value will become the grand country estates of America. This is a crucial time for people who believe that true higher education must include the communal activities that take place on a traditional college campus. Leaving things as they have always been and failing to modify the facility's trajectory promptly will put the institution in jeopardy. In the following Figure 3, we attempt to answer the question, Can a university campus be digitally transformed? in many ways.

Figure 3. **How Can A University Campus Be Digitally Transformed?**

The purpose of figure 3 above is to attempt to address the question of whether a university campus may be digitally altered. According to Matt et al. [24], digital transformation is an ongoing and complicated process that has the potential to significantly influence the operations of an organization. As a result, it is essential to delegate sufficient and understandable duties to define and put into action a plan for digital transformation. According to the argument presented by Matt et al. [24], businesses run the risk of seeing a reduction in their operational capacity and scope if they implement a digital transformation strategy with only partial commitment. Therefore, organisations should make sure that the person who is logistically accountable for the strategy of digital transformation has appropriate experience in initiatives involving change and directly tie the individual's incentives with the goals and achievements of the strategy. The discussion below gives answers to the question, How can a university campus be digitally transformed?

4-3- Establish A Solid Foundation for IT Systems

The first thing that must be taken into consideration is establishing a robust base for IT systems. IT Systems refer to "the hardware, software, data, databases, data communication lines, network and telecommunications equipment, Internet-related information technology infrastructure, wide area network, and other information technology equipment that can help in all aspects of education and the management of an institution". IT Systems can also be used to describe the infrastructure of the Internet. This was brought to light during the pandemic, when many educational institutions, including universities, were unable to provide teaching and learning because they lacked a stable foundation for their information technology systems. According to the OECD [25], the COVID-19 pandemic had a dramatic influence not only on people's health but also on how they learn, work, and live.

Among the most important issues posed by COVID-19 is the question of how to adjust a system of education that is constructed around physical schools. During the height of the outbreak, it was estimated that more than 188 countries, representing almost 91% of all registered students around the world, stopped their schools to stop the virus from spreading further. When a school is closed, it has a very significant and negative effect on all of the students, but notably on the pupils who are most at risk. These students are more likely to face extra obstacles, such as a lack of access to the necessary infrastructure to carry out online classes. "Children and youth from low-income and single-parent families; immigrants, refugees, ethnic minorities, and Indigenous backgrounds; children and youth with diverse gender identities and sexual orientations; and those with special education needs suffer because they are deprived of physical learning opportunities, social and emotional support available in schools, and extra services such as school meals." This was one of the revelations that came out of the pandemic. If countries do not take sufficient measures to promote educational equity and inclusion, most of these students will fall further behind in their studies and become more isolated as a result. Furthermore, these students lost the most in terms of educational outcomes and the support provided by schools when this occurred. All these problems might have been solvable to a greater extent if educational institutions had more robust information technology systems. In conclusion, a strong foundation for the IT infrastructure is necessary if digital transformation is to be a successful endeavour.

4-4- Deliver Cyber Security That Is Up to Date with Current Best Practices

Cybersecurity has always been accorded a high priority by institutions; nevertheless, as a direct result of digital transformation, cybersecurity is undergoing substantial modification at present. As more educational institutions adopt smart campus strategies, there will be an increase in the number of connected and mobile devices added to campus networks. Additionally, Internet of Things devices will gradually gain access to apps and data from beyond the network perimeter as more educational establishments implement smart campus strategies. As a result of this, it is of the utmost importance to ensure that universities and all other types of educational institutions provide cyber security that is up to date with the most effective procedures that are now accessible. Rahman et al. [26] noted that even though the Internet has had a positive impact on people's lives, there have emerged several negative difficulties associated with its use. For instance, incidents such as cyberbullying, online fraud, racial abuse, pornographic content, and gambling have significantly increased due to the lack of awareness and self-mechanism among Internet users to protect themselves from becoming victims of these acts of violence.

According to the research mentioned in Rahman et al.'s [26] study, which states that prior studies have revealed that level of awareness, the level of awareness among individuals who use the internet is still relatively low to moderate. The cultivation of knowledge and awareness among Internet users from an early age, i.e., young children, is critical since essential steps need to be taken to protect oneself. This includes young children. When students utilize digital technology, they should be adequately trained to identify potential dangers, such as cyberbullying, the safety of their data, and the credibility of the news they read on social media. Teachers have a high sensitivity toward digital awareness issues, which Corradini & Nardelli [27] found to be an indication of how essential the issue is. Corradini & Narelli concluded from their research that this high level of sensitivity is an indication of how significant the problem is. The second point that was brought up by Corradini & Nardelli [27] was that instructors express a need for themselves to acquire specialized training on digital awareness in addition to supporting the activities that they participate in. This was the second point that was brought up by the researchers.

4-5- Create A Safe Campus Where Kids Can Concentrate on Their Work

Campus security needs to be addressed immediately, quickly, and completely due to the increasing digital revolution. It calls for specific, thoughtful, and integrated solutions to personal safety measures. It is not enough to be able to respond to an incident by issuing a warning to the entire student population over the public address system to keep the campus secure. To ensure that everyone on campus is safe, it is crucial to ensure that everyone is aware of the incident, that emergency service team members are integrated, that a clear message is distributed to individual and university devices, and that the steps being taken in the wake of the incident are evaluated and compared to make improvements. To meet these objectives, the architecture that supports the platform for handling emergency circumstances must be both secure

and aware of the applications that are operating on it. The implementation of dependable, approachable, and economical communication networks can increase your critical response time. The development of an information technology safety net contributes to the maintenance of collaborative learning and ongoing education. Solutions for campus resilience improve students' safety and confidence in the use of various digital tools. It is crucial to enhance emergency communications responsiveness to make it quicker and more accurate, to enhance coordination and information sharing with first responders, to enhance communication with prompt, widespread community notification, and to enable learning continuity whether it takes place on campus, remotely, or in a hybrid setting. The need for continual development and the importance of holding onto new information are two more crucial factors to consider. It is imperative to have the ability to review and investigate previous emergencies while also having quick access to all relevant information about each emergency call. Understanding where potential communication breakdowns may have occurred, how long it took response teams to act, and the part that important strategic decisions played can mean the difference between ensuring the future safety of students, staff, and visitors in any campus environment and not ensuring that future safety.

4-6- Improve the Organizations Operating Efficiencies

To facilitate the digital transformation of educational establishments, one of the many strategies that can be implemented is to guarantee that the technologies of the digital era are utilized effectively. These technologies help enhance efficiency, and to tell the truth, they are crucial for educational institutions that wish to remain competitive in their respective fields. Therefore, organizations should rapidly integrate the technologies of the digital age, including the most recent digital advances in the areas of mobility, data analytics, cloud computing, and the Internet of Things (IoT), into their operations, procedures, and computing systems. A high-performance autonomous network, the Internet of Things (IoT), and corporate innovation serve as the foundation for networking in the digital age. According to Bilyalova et al.'s (2019) findings, technology will assist educators in automating or simplifying the process of carrying out several labour-intensive responsibilities. Automating procedures that are normal yet time-consuming, such as checking student attendance and learning performance, can make these chores simpler and cut down on the amount of time they take. The systematization and selection of individual assignments for students can be made much easier with the help of contemporary technology tools, which also make it easier to track the students' activity and involvement in the conversation, among other benefits. The capacity of modern technology tools to portray educational content that is challenging for perception and comprehension helps to cut down on the amount of time and effort that a teacher needs to put in to convey it. For instance, students can use augmented reality technology to construct molecules of complex chemical compounds in their own hands within a virtual environment. This allows them to start with atoms and work their way up.

4-7- Facilitate and Encourage the Development of Competent Students through Creativity

The ability to be creative is considered by many professionals in the fields of education and psychology to be an essential psychological talent for success in school and the future workforce.

Because of this, educational institutions have a responsibility to educate and cherish them. Students develop the self-assurance necessary to participate and engage with their environment, peers, and teachers when they are provided opportunities in the classroom to consider flexible thoughts and are encouraged to do so. Learning is also directly enhanced by creativity, which does this by boosting motivation, enhancing the depth of comprehension, and fostering delight. According to Bilyalova et al. [14], there are a multitude of resources available for coordinating the fruitful educational activities of pupils. There is no shortage of tools that can drastically alter the organization of training activities, and some examples of these tools include mobile platform applications and electronic textbooks. To make the process of learning more exciting and appealing, some technological devices utilize a variety of different types of incentives, which aid in the assimilation of information during the learning process [14, 28]. These devices "also use competitive scenarios for the distribution of points and awards. Students are allowed to offer facts and their arguments in favour of, for example, historical people or scientific concepts in role-playing games that are included in some mobile platforms and e-books". These games may be found in some e-books and on mobile platforms. In addition to this benefit, the incorporation of constructive rivalry into the learning process is facilitated using gaming technologies. Modern automated learning systems can considerably help in the arrangement of productive learning activities and realistically analyze the achievements of each student. It is essential to emphasize the fact that a crucial criterion for the utilization of such technological gadgets is the successful completion of learning goals in this context.

5- Conclusion

The implementation of a technology solution is only part of what is involved in digital transformation. Digital transformation also involves the alignment of digital technologies with the organizational aspects and human factors present in each setting. In addition to this, it requires the careful and methodical application of digital technology to the process of developing new skill sets and conceptual frameworks. The purpose of the present study is to analyze the

essential procedures that will lead the educational sector towards digital transformation in Industry 4.0. Using a qualitative research methodology that comprised both an analysis and a critique of the relevant body of earlier work in the field. According to the findings of the study, the factors that can be used to drive digital transformation in education include campus security, information security, student academic achievement, strategy, data enablement, student-centred services, affordability, digital integration, and artificial intelligence, among plenty of other factors. The study found that these factors can be applied to drive digital transformation in education. In addition, the research investigated the subject of whether a university campus could be digitally upgraded. Several programs that can assist universities and other types of institutions of higher learning in digitally transforming their operations have been presented. Some of the suggestions include establishing a solid foundation for information and communication technology systems and delivering cyber security that is up to date with current best practices, among many others.

6- Declarations

6-1- Data Availability Statement

Data sharing is not applicable to this article.

6-2- Funding

The author received no financial support for the research, authorship, and/or publication of this article.

6-3- Institutional Review Board Statement

Not applicable.

6-4- Informed Consent Statement

Not applicable.

6-5- Conflicts of Interest

The author declares that there is no conflict of interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the author.

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