

The Impact of Digital Transformation in Higher Education: The Case Study from Vietnam

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The education sector in general and higher education, in particular, has paid great attention to digital transformation into teaching. Digital transformation is not only a general development trend but also helps to change the traditional teaching method to a new active teaching method that helps learners to be active and creative when participating in the learning process. The traditional classroom model, which has existed for a long time, is gradually shifting to classrooms that apply information technology to teaching and learning to reduce lectures and transfer knowledge to develop the initiative, creativity, and capacity of students to learn. Create opportunities for learners to learn anytime, anywhere, learners can be active in the learning process, contributing to building a learning society. The article clarifies the impact of digital transformation on higher education in Vietnam. From there, offer an oriented solution to help digital transformation become an effective tool in higher education in Vietnam today.

Keywords: digital transformation, industrial revolution 4.0, higher education, Vietnam

INTRODUCTION

With the entry of the twenty-first century, social production has leaped forward in both quality and quantity, with the increasing participation of knowledge factors in production. Under the current conditions of the fourth industrial revolution, education will undergo extensive changes to be able to make up for the shortage of highly qualified and skilled workers due to practical requirements. Therefore, digital transformation in education in higher education is an indispensable and objective task. It is implemented in terms of organizational model, management mechanism, program content, and training methods to activate the creative energy of managers, teachers, and learners. The implementation of digital transformation not only creates a smart educational model, thereby making learning and absorbing knowledge simpler and easier for learners, but also creates favorable conditions for knowledge transmission and develops learners' ability to self-study without being limited in time and space and allowing them to access scientific knowledge brought by the fourth industrial revolution great opportunity for international integration. For these reasons, studying the opportunities and challenges of digital transformation in higher education in Vietnam, thereby offering solutions to promote the role of digital transformation in higher education in Vietnam, meets the requirements of socio-economic development and international integration in Vietnam today.

Research Questions

- What are the opportunities and challenges for digital transformation in Vietnam higher education?
- What are the solutions to improve the effectiveness of digital transformation in higher education in Vietnam in the coming years?

LITERATURE REVIEW

The digital transformation in higher education in Vietnam has taken place strongly and clearly in recent years, but in the world, this has happened since the 90s of the last century. Around the world, research on the application of information technology, digital transformation in teaching, and the application of E-learning in education has been studied since the 90s, the beginning of E-learning was researched and developed strongly in North America, and Europe. After that, countries in Asia also paid attention to development research, especially Korea, Singapore, Japan, and China. Research on the application of information technology, digital transformation in teaching, and the application of E-learning in education has been researched and developed by the US and several countries in Europe. Research on promoting the application of the Internet, information technology, and digital transformation in schools confirms that learning with the support of information technology has certain benefits such as Learners can interact with the virtual learning environment, learn according to their learning style, and can self-organize the learning process actively.

KERIS (2016), “in Korea since the late 90s of the twentieth century, Korea has built and developed an education management information system (EMIS) in two basic modules: edition: The Statistical System of Education (ESS); *National Education Information System* (NEIS). In 2014, the Korean Ministry of Education began to apply the 3.0 e-government management model, performing the main tasks: Publicity and transparency in the quantity and quality of information; search, filtering, and evaluate data provided to the public; promoting communication and cooperation between institutions; big data structure based on governance model; manage services to satisfy and better meet the needs of Korean citizens within the framework of each government policy. To accomplish the above tasks, the Korean Ministry of Education has applied a series of solutions such as: Increasing the number of educational institutions that are allowed to disclose information (according to the Special Circular on the Provision of Information, information of educational institutions), review the categories of information, methods, and methods of providing, expand the provision of diverse information and data through Electronic Document Delivery Service, Research Information Sharing Service, Educational Administration, and Finance System, building big data (Big Data) through the NEIS system and providing customized services for users; Expand connectivity between NEIS and systems of related ministries, including the tax system, fire department or other social welfare programs. In the early years of the 21st century, the Korea Educational Development Institute (KEDI) continued to improve the quality of providing educational information and services through reports, online and offline publications, and books guide. In particular, KEDI Institute has established a service portal that allows wide, continuous, and timely access to the needs of statistics and data in education for all subjects individuals, researchers, and professionals educators, policymakers (KERIS, 2016).

Josep M. Mominos & Juli Carrere (2016), in Portugal, studies under the Trainers Training to Virtual Learning Communities (Trainers Training to Virtual Learning Communities) program provide a supportive model for educators and instructors to develop competencies to use and integrate information technology on web technology, in a collaborative learning approach. The courses are designed to develop attitudes towards the use and integration of technology; Develop the capacity to plan and monitor web-based distance education; Develop the capacity to integrate and use information and communication technology for distance education through the web; Develop strategies and methods to promote learning in a web-based educational environment; “On a social scale, digital technology helps to narrow the gap between rich and poor in access learning opportunities. Students in remote and low-income areas often have difficulty accessing university due to a lack of information, finance, or other conditions (Schneider & Guan, 2016; Carter, 2016).

Halinen (2018) analyzed the national strategies for the information society, in which priority is given to the exploitation and application of information technology, and maximum digital transformation in the field of education. This strategy has developed into a national master plan with 8 major goals, and 43 actions to be achieved in the field of education: National goals and systematic change, people's skills future learning, pedagogical and practice models, E-learning materials and applications, school infrastructure and support services, teacher identification, teacher training, and pedagogical reputation; management and leadership culture in schools, governance, and cooperation; digital transformation enables higher education to change the traditional teaching ways of running their activities including, learning, inquire, and operating with the novel, creative and saved manners (Thai, Quynh & Linh, 2021). The article "*Impact of the industrial revolution 4.0 on higher education in Vietnam: challenges and opportunities*", the authors commented:

"The industrial revolution 4.0 with its rapid development speed and profound impacts on all areas of the social life of each country, if left behind of this revolution, the backward development is also inevitable. On the contrary, if you make good use of the advantages of this revolution, the opportunities are huge. In the digital era, higher education will change profoundly from the educational environment, the role of teachers and learners to teaching methods. Currently, not only Vietnam but also many countries around the world are facing the big challenge of a shortage of highly qualified, specialized and skilled workers. Therefore, in order to renovate higher education to meet the requirements of the labor market, it is necessary to raise awareness and renew thinking on higher education development; renovating training programs and methods" (Tri, et al, 2021); In the process of digital transformation, many new problems have arisen in Vietnam, requiring research and answers, many challenges and challenges to socio-economic development in Vietnam. Implementing digital transformation in the fields of economy, health, education, contributes to improving the quality of life, however, digital transformation has not yet met the requirements of socio-economic development in Vietnam today, thereby building solutions to promote the digital transformation process in Vietnam in order to develop breakthroughs and quickly catch up with the development of the modern production force (Dung et al., 2021).

Liebowitz (2022) wrote "With the COVID pandemic and threatening variants upon us, everyone has had to "pivot" and adapt to "new normal" conditions. This has been especially true of universities and how education is delivered to their students. We have witnessed growing trends in moving from digitization to digitalization to digital transformation" (Liebowitz, 2022); "higher education in Vietnam currently still has limitations such as outdated content and teaching methods, high-quality human resources that do not meet the requirements of international integration, and technology from schools to universities production, business, and social organizations through technology transfer are still low" (Tri & Hoa, 2022).

Through an overview of domestic and international research works, it can be seen that digital transformation in education has asserted its importance, which is reinforced when the epidemic situation is difficult. The current difficulties have caused people to change their way of teaching and learning. It is thanks to the massive E-learning platforms that countries have studied and practiced for a long time that have helped the data warehouses (Big Data) have a large reserve, continuously creating favorable conditions for students, students and students can access the data source and use. Obviously, these are the foundations, the foundation of digital transformation in education. However, the research team found that there are some research gaps as follows: (i) regardless of the approach, the research shows that digital transformation in higher education is now an urgent issue. However, the majority of universities in Vietnam are still in their infancy, and there has not been an equal digital transformation between universities; (ii) many authors have built a digital transformation capacity framework, systems, and tools, but it is still cumbersome or just in the foundation stage; (iii) in the context of the complicated development of the Covid-19 epidemic, it can be seen that the limitations that the above studies have not touched are the impact of the digital

transformation in higher education on the activities of the university. How do students learn and what are the causes of those problems?

METHODOLOGY

Digital Transformation Concept, Digital Transformation in Education

Although it has been around for a long time in the world, it was not until the industrial revolution 4.0 broke out that digital transformation appeared and became popular in recent years.

Digital transformation is the main way to go in the industrial revolution 4.0. There is still much debate about the definition of digital transformation, such as “the use of data and digital technology to comprehensively and comprehensively change all aspects of socio-economic life, reshaping how we live, work and relate to each other” (Ministry of Information and Communications, 2019). Along with this, according to Microsoft “digital transformation is about rethinking how organizations bring together people, data, and processes to create new value” (An, 2019).

In Vietnam: “Digital transformation is understood to be the process of changing from a traditional business model to a digital one by applying new techniques such as big data (Big Data), Internet of Things (IoT), cloud computing (Cloud)... to change the operating method, leadership, working process, and company culture. Not only does digital transformation play an important role in businesses, but digital transformation also plays an important role in other areas of society such as government, mass media, medicine, science...” (Thuy, 2019).

From the above points of view, it can be understood: “Digital transformation is the process of total and comprehensive change of individuals and organizations in the way of living, working, and producing methods in the digital environment, based on digital technologies” (Tho & Xanh, 2020, p.370). Digital transformation is a comprehensive and profound transformation in all economic, political, cultural, and social fields to make the most of the power of the times and technological advances to improve efficiency and competitiveness and create a basic foundation for the journey of sustainable development.

The “National Digital Transformation Program to 2025, with a vision to 2030” approved in the Prime Minister’s Decision No.749/QĐ-TTg dated June 3, 2020 determined as follows: Platform development supporting teaching and learning remotely, thoroughly applying digital technology in management, teaching and learning; digitizing documents and textbooks; building a platform to share teaching and learning resources in both face-to-face and online forms. Developing technology for education, towards personalized training. 100% of educational institutions implement distance learning and teaching, in which pilot training programs allow students to study online at least 20% of the program’s content. Use digital technology to assign homework and check students’ preparation before going to class. Simply put, digital transformation in education is the application of advanced technologies to enhance the learner’s experience; improve teaching methods as well as create the most convenient learning environment.

Digital transformation in education and training focuses on two main contents: digital transformation in educational management and digital transformation in teaching, learning, testing, assessment and scientific research. Digital transformation in management is the digitization of management information, the creation of interconnected large database systems, the implementation of online public services, the application of 4.0 technologies (AI, blockchain, data analysis, data) to manage, operate, forecast, support leaders at all levels, management decision-making in leadership and administration. Digital transformation in teaching, learning and testing and assessment is digitizing materials (e-textbooks, electronic lectures, e-learning lecture repositories, multiple-choice question banks), digital libraries, laboratories virtual experiment, deploying online training system; converting all teaching methods, methods, classroom management techniques, interacting with learners into digital space, exploiting information technology to organize successful teaching.

Digital transformation applications will create a smart educational model, thereby making learning and absorbing knowledge simpler and easier for learners. The explosion of technology platforms has created favorable conditions to impart knowledge and develop learners’ self-learning ability without being limited in time and space. Currently, digital transformation in education is applied in three main forms: applying

technology in teaching methods: smart classrooms, programming in teaching; technology application in management: tools for operation and management; technology application in the classroom: teaching tools, facilities.

Education helps preserve and transfer knowledge and skills from generation to generation, contributing to moral training and perfecting each individual's personality. Therefore, the role of education for people is enormous and irreplaceable in modern society. Digital transformation is an inevitable path in the current development stage in which human infrastructure is built by education. Digital transformation in education is the application of digital technology to innovation in all aspects of educational organization and operation (management, teaching, learning, scientific research, and community service). This process has taken place since the turn of the 21st century due to the explosion of information technology, but when the world entered the 4.0 industrial revolution, it became a global trend. In the context of the strong development of science and technology today, human skills and knowledge have become the main assets of all nations and peoples. If in the past, production labor mainly relied on natural resources, now production labor focuses on attracting talent and brain resources.

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Conditions to Ensure Digital Transformation in Higher Education

- The digital transformation process in the education industry needs to be based on the national technology foundation. In particular, this foundation needs to be unified in all education systems. This helps everyone from teachers to students/students to professionals in the field of training get involved.
- Digital transformation requires new technology infrastructure and new equipment for both learners, instructors, educational institutions and management agencies.
- Accompanying hardware devices are software applications and platforms for all educational and management activities of all levels to take place on it.
- Digital transformation requires the thinking and management capacity of education industry leaders as well as school leaders to change.

If the application of information technology in education mainly refers to separate, separate programs and software, digital transformation requires all these individual things to be compatible and interconnected, integrated on the same digital platform.

This digital platform enables teaching, management, learning, testing, assessment, examination, learner management and teaching activities, as well as the entire interaction between learners and teachers and school takes place.

Finally, digital education culture, including issues of learning attitude, understanding of academic ethics, self-discipline, sense of lifelong learning.

In addition, the human factor is the next necessary condition for digital transformation in the education industry. Therefore, universities should strengthen the training of technical support staff specializing in technology. Even the most talented training systems should be expanded.

In addition, the author uses the methodology of dialectical materialism to research. The article uses a comprehensive approach to examine the impact of digital transformation on higher education in countries around the world and Vietnam's perspective on the role of digital transformation in higher education.

This article uses analytical, synthetic, logical, and historical methods to analyze the impacts of digital transformation on higher education. That means that every object exists, moves, and develops under specific conditions of space and time. Spatial and temporal conditions directly influence on digital transformation in higher education. If the same object exists in the conditions of time and space, its properties will be different, and change completely. Therefore, studying the problem of digital transformation in higher education must be associated with their internal relationship.

Along with that, the article uses data analysis methods from Vietnamese documents (reports of the Government, and world organizations on digital transformation in higher education). From that data, we

assess the reality of digital transformation in higher education in Vietnam, thereby proposing solutions to develop digital transformation in higher education in Vietnam in the coming years.

RESULTS & DISCUSSION

Opportunities of Digital Transformation in Higher Education

Before the appearance of digital transformation, most teachings followed traditional teaching methods, such as students focusing on studying in lecture halls and studying discussion materials. With the arrival of the industrial revolution 4.0, digital transformation has created many opportunities to carry out teaching and learning with new forms and tools in the digital environment.

First of all, learners can learn anywhere, anytime. The internet is a global communication medium that allows learners to access knowledge from many different countries. Online classes allow learners to access knowledge and do exercises when they need them. In particular, undergraduate and graduate students have quick access to lesson information. Can participate in seminars or online discussions in class, and at school. Students can even test and take the exam online without having to go to school. Thus, the score in the exam is very fair due to the grading machine, and it does not take much time for the lecturer to grade and enter. It will meet the individual's learning needs and avoid unnecessary negatives on the exam.

Second, students are not limited in terms of study time and space. On the contrary, if traditional higher education is limited to a four-wall space with teachers and students listening and copying, the digital transformation in higher education will make it possible for students to interact and learn with any leading professor in any field, in any field and not limited by time and space. Digital transformation is an effective method to mobilize society's intellectual resources to participate in learning, training, and fostering comprehensive human development in terms of communication, culture, and way of life, thereby contributing to training citizens who can assert themselves and live with others in the digital age. Not only that, the digital transformation in moral education will help teachers use modern software, actively apply information technology in management (Mona eLMS, School management software - education VnResource EBM Pro...) and teach with modern software (E-Learning LectureMaker, E-Learning iSpring Presenter, E-Learning Elucidat...); invest in Internet connection to report, collect and exchange information online (Hung, 2017).

Thirdly, digital transformation makes the entire learning process of students more interesting. The application of information technology in teaching by lecturers such as the insertion of unique and unique effects, images, and videos into the lectures makes students feel more interested in learning. When participating in online learning, students can communicate with everyone even during the lesson and in forums afterward, and can share their learning progress on social media, online social... This makes the subject more effectively.

Fourth, learning resources are fair to all learners. This means that all students can access learning, data, and content provided by lecturers on an Internet-connected platform. Because all the knowledge is on the website. The lecturer is the person who connects the knowledge chain and becomes the pioneer in exploiting knowledge. At the same time, the previous practice subjects were mainly direct practice. Based on simulation technology, learners can practice using virtual space in laboratories of different disciplines. At the same time, an online library with a widely amount of knowledge helps students to exploit. This is far from the traditional library with a limited volume of books and insufficient information.

Fifthly, strengthen international cooperation in training high-quality human resources for higher education institutions. Digital transformation helps bring countries together. Countries can learn from each other's experiences in the fields of education, training, exchange of experts, and cooperation in scientific research. Digital transformation also helps students have the opportunity to receive scholarships and work with large corporations around the world.

Challenges of Digital Transformation in Higher Education

Firstly, the digital transformation in higher education requires that Vietnam change the method and content, and program because some industries will be lose and new ones will be born. This gives rise to

changes in the structure of training occupations and the learning content of learners. Up to now, the percentage of Internet users in Vietnam has reached nearly 90% of the population. With a mobile phone connected to the Internet, learners can access a large data store of humanity, update modern knowledge to improve their understanding of the world and contribute to the formation of the world. Students develop skills in searching and selecting information, building critical thinking skills suitable for their purposes and fields, also improving foreign language skills. Rich and multi-dimensional resources will effectively serve students' learning in the digital age.

Second, about data warehouses. In the current digital information era, many methods of data collection and measurement have provided a detailed analysis of the future trends of learners, internal effectiveness, student experience, and many other types of information about schools, universities, and vocational training schools. These are priceless details. However, the problem is that these data sometimes reflect excessive "optimism", sometimes inaccurate, and lack reliability, especially in the field of education. School leaders need to make scientific forecasts, make business decisions and implement new educational measures to "pick up" the most useful information, thereby collecting the most useful information related to forming a smooth, timely, accurate, and systematic data set.

Third, digital transformation is the application of technology to all teaching and learning activities carried out in the era of technology boom based on the internet system, therefore, it requires a high level of both technical and manpower. Meanwhile, Vietnam continues to lag behind the world in terms of technology, and has not yet mastered the core technologies of digital transformation and basic foundation systems. Therefore, digital transformation in higher education in Vietnam is still basically using available technologies in the world to successfully implement a digital transformation, universities and colleges must have the appropriate technology infrastructure - both hardware and software. Therefore, having the right information technology infrastructure plays a very important role in meeting the increasing needs of Vietnamese universities and colleges in the short term as well as in the long term. Although there has been awareness about the need for digital transformation, however, due to limited production capacity, the degree of automation is still not high, and there are many difficulties in applying the digital transformation.

In addition, the digital transformation has caused many difficulties in remote and isolated areas for accessing online lesson. The problem must be prioritized to overcome for successful implementation and especially the need for online teaching and learning during the current epidemic period. In the mountainous or remote areas, network infrastructure and information technology equipment are not guaranteed, which greatly affects the work of educational management in teaching and learning.

Fourth, they have not actively accepted the online learning method. Due to inherently traditional learning habits, students are not fully equipped with technical knowledge. Not to mention not all students can afford to buy smartphones or laptops to update and study when required. Since then, the impact is not small that students do not want or do not actively study in the new environment.

Fifth, the challenge comes from the perception of training institutions. Digital transformation will affect the entire organization and operation of training institutions, causing a lot of pressure for administrators right from the awareness of the importance of digital transformation in moral education to financial resources to create consensus and mobilize the participation of a large number of lecturers, about the effectiveness of digital transformation. Digital transformation must start with a change in leaders' thinking, from strategy, and traditional thinking to strategy, and effective digital business thinking.

Solutions to Digital Transformation in Higher Education

From the analysis of opportunities and problems for higher education digital transformation, it is clear that to improve the effectiveness of this activity, specific solutions are required as follows.

For State Agencies

It is necessary to raise awareness and popularize ideas for each teacher, lecturer, and school administrator to understand the importance of digital transformation and jointly build a digital culture in education. Fosters and improves skills and professionalism in the application of technology for all teachers, lecturers, and school administrators towards the goal of successfully implementing digital transformation

in education. Training and fostering a team of managers and teachers with the necessary information technology and safety skills and knowledge to operate in the digital environment and meet the requirements of digital transformation.

The State needs to plan and issue mechanisms and policies to meet the requirements of digital transformation in higher education in Vietnam. Currently, the legal provisions on the momentum of digital transformation in education are still incomplete and synchronous. Therefore, the *Government and the Ministry of Education and Training of Vietnam* need to promulgate, amend and supplement legal regulations on digital transformation in education so that policies and legal regulations have a solid legal basis, creating a premise for awareness-promoting activities related to digital transformation in higher education to be effective, to keep pace with social changes to a certain extent. In addition to promulgating laws, the State also needs to have a financial support mechanism and the necessary facilities for higher education institutions to carry out digital transformation smoothly and effectively (Tavangarian, 2004).

At the same time, it is necessary to promulgate laws and regulations on teaching, assessment, and acceptance of results based on digital transformation. Up to the present time, although there have been schools that have changed the argument in teaching and learning. However, the testing and evaluation are still traditional. Therefore, it is necessary to have specific documents recognizing the online examination and examination. Avoid costly expenses such as exam proctors, lecturers grading papers...

Higher education institutions need to change the content and training programs in the direction of strongly applying information technology to teaching and learning activities, thereby helping teaching and learning activities take place at all times, everywhere, thus shifting the goal of developing education and training in terms of quantity to focus on quality and efficiency; moving from knowledge education to knowledge education combined with learners' skills. In addition, higher education institutions also need to pay attention to investing in facilities, equipment, and human resources: teaching staff, open data library systems for learning, and administrators' educational principles to always be ready for digital transformation. Infrastructure investments are key to ensuring a successful digital transformation.

For Lecturers

Lecturers who participate in the digital transformation method need to fully understand the nature of digital transformation as well as the comprehensive impact (opportunities and challenges) on higher education in Vietnam today. Each lecturer is constantly learning and cultivating professional knowledge and needs to make good use of means, electronic devices, and computers, related to the application of information technology for teaching. It is necessary to change the teaching method from one-way, passive knowledge transmission to applying modern, learner-centered teaching methods to promote students' self-study and self-research (Tri, 2021).

For Students

The biggest challenge when applying modern teaching methods is that many students are too familiar with the passive way of absorbing knowledge (the teacher reads and the students copy), so when switching to the new method, students must be active. Activeness, thinking ability, and creativity, are traits of students who cannot adapt in time. Besides some students who are very active and love to study, there are still others who only go to class because of obligations. Therefore, digital transformation requires students to improve their initiative, creativity, and interest in learning. In contrast to passively absorbing theory, students need to be active in self-study, self-research and searching and analyzing information to meet the requirements of the subject. To accomplish this, students must engage in independent thinking, and group discussions, and learn more about theories beyond books, teachers must self-study through practice, as well as learn and update information from the media (Tho & Xanh, 2020, p.368).

CONCLUSION

Digital transformation in higher education is an inevitable path in the context of the industrial revolution 4.0, which strongly affects all areas of today's social life. Digital transformation in higher education not

only enhances education and training but also produces citizens with the knowledge and skills to become global citizens. This requires the whole society to keep up with the development trend of technology. Education is no exception, to develop society requires human resources. Higher education needs to take in a lot of digital resources. Only in this way can we transmit, orient, and build a sustainable knowledge system. This is an opportunity for Vietnamese higher education to innovate in terms of content and methods to train high-quality human resources to meet the requirements of sustainable development. Affirming the ability and position of Vietnamese education in harmony with the global education trend. The synchronous implementation of the above solutions will create opportunities for Vietnam to successfully digitally transform higher education to train people who can live and work well in the future. On the other hand, how to teach and learn in college can also change with the advances in digital technology.

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