CONTINUING PROFESSIONAL DEVELOPMENT OF HIGHER EDUCATION: MAPPING THE POTENTIAL OF DIGITAL TRANSFORMATION

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INFORMATION	ABSTRACT
	In the current situation, many higher education institutions offer academic and non-academic programs with either fully or partially blended learning. In fact, a small number of higher education providers offer mini degrees, mini qualifications, also known as digital transformation. In the current era of globalisation and rapid technological developments, the need for graduates who have special skills and competencies that are relevant to the industry is increasing. Therefore, the digital transformation program is an effective solution for students to tackle this challenge. This program not only provides opportunities for students to improve their skills, but also to support the achievement of qualifications and competencies that are in line with global needs. Digital transformations consist of these meanings: 1) competency-based; 2) personalised, self-directed; 3) demonstration of new or existing expertise; 4) availability on demand; 5) job embedded learning and application and 6) specified learning by doing and applying. The primary concerns about digital transformations are credibility and recognition, standardisation and the technical challenges of tracking and verifying credentials. This is where the need for employer and college involvement in curriculum design for these non-credit offerings becomes apparent.

1. Introduction

The rapid development of digital technology has brought about the industrial revolution 4.0 which has disrupted all aspects of human life. There have been major and profound changes in various fields or known as deep shifts. Work and the way of working have changed, many types of jobs that have been safe have suddenly disappeared, replaced by robots and technology, while new jobs that were never thought of have emerged. Higher education, no exception, is also faced with a Volatile, Uncertain, Complex and Ambiguous (VUCA) world (Waller et al, 2019). There is no other choice for higher education and universities as the organizing institutions except to change, transform to become more adaptive and agile. If they do not adapt quickly, universities will lose their relevance and be abandoned by students. The industrial revolution 4.0 is strengthening the

innovation-based economy with new competency needs. One of the main assets for the growth of innovation and knowledge economy is the pool of creative talents. Universities are the crucible for the formation of creative and adaptive talents.

Digital transformation has significantly changed the education aspect. Digital technology opens up new opportunities in the teaching and learning process but also presents challenges that must be overcome by educators and educational institutions. This article will discuss how digital transformation affects education, the challenges faced and the opportunities that can be utilized.

Digital transformation has changed many aspects of our lives, including education. Advances in information and communication technology have opened the door to changes in the way students learn and participate in the learning process. This development provides new opportunities to enhance student engagement and skills in the educational context. In an increasingly connected and digitalized era, traditional learning media have seen developments into interactive, diverse and easily accessible digital learning media. E-learning platforms, online learning videos, educational applications and various other digital tools have become an integral part of the student learning experience (Isman & Canan Gungoren, 2014; Barbour & Reeves, 2009). Thus, it is important to understand how digital transformation in learning media has affected student engagement and skills. In this context, this article will discuss the positive impact of digital transformation in learning media on increasing student engagement. Digital learning media has opened up new opportunities for students to actively participate in the teaching and learning process. They can access learning materials anytime and anywhere, collaborate with their peers through online platforms and engage in more interactive

discussions. All of these can help increase students' interest and motivation in their learning. Digital transformation also enables the development of more relevant skills in today's digital age, where students can learn about digital literacy, technological problem-solving skills and online communication skills, all of which are essential for their future success. By understanding the current state of the digital age that impacts education and a deep understanding of the issues that arise, educators can design effective strategies to maximize the benefits of digital transformation in learning media while ensuring that all students have equitable access and opportunities to thrive in this digital age.

In an era of rapid transformation, education cannot escape the impact of the digital revolution that has engulfed all aspects of life. Over the past few decades, technological advances have fundamentally changed the way we interact with information, culture and of course, the educational process (Bleazby, 2020). This shift from conventional learning to the use of digital technology has profound consequences and the potential to transform the global educational landscape. As an introduction, significant changes in information accessibility are one of the key characteristics of educational transformation in this digital era. With the expansion of internet connectivity, students and educators now have instant access to a vast array of learning resources. No longer limited by geographical boundaries or traditional curricula, the world becomes a classroom for those willing to explore it. However, this shift is not limited to accessibility. The transformation of education in the digital era has also given rise to a new paradigm in learning methods. The use of educational applications, simulations and learning games opens the door to interactive learning that is not only effective but also enjoyable. The previously passive and linear learning process

has become more dynamic, enabling students to actively engage in understanding complex concepts. Furthermore, the digital era has also witnessed fundamental changes in the dynamics of the relationship between teachers and students. Through online learning platforms, collaboration and communication become more open. Students can participate in global discussions, exchange ideas and even collaborate on projects across borders. This not only develops social skills but also opens up opportunities for more holistic learning.

2. Method

This study applied a qualitative research design using a literature review approach to examine the digital transformation-based teaching and learning process in higher education. The objective was to generate evidence-based insights by synthesizing existing scholarly works and the researcher's academic perspectives. A systematic search was conducted in major databases, including Scopus, Web of Science and Google Scholar, covering the period from 2009 to 2024. Keywords such as digital transformation, teaching and learning, higher education and adaptive technology were used. Inclusion criteria required that publications be peer-reviewed and directly address digital transformation in education, while studies outside this scope were excluded.

Following the guidance of Creswell (2009), McAlpine and Amundsen (2011) and Arifin and Hermino (2017), this paper emphasizes that academic contributions must be grounded in relevant prior research. Accordingly, the selected literature was thematically analyzed to identify key patterns, challenges and opportunities. These findings serve as the foundation for the discussion and recommendations presented in this study. This methodological approach ensures the reliability of the findings and provides a comprehensive understanding of digital transformation in higher education.

3. Literature review

Several studies conducted by previous researchers (Misco, 2007; Berg et al, 2013; Wagner, 2013; Young, 2015; Williams, 2015) suggest that the power in teaching learning process in the globalization era with complex quality competition dynamics requires visionary leaders who can produce various policies and operationalization of school community work based on a clear vision, enthusiasm and work dedication to achieve the educational goals of the school they lead. The existence of a clear vision of education carried out consistently by educational leaders must also be supported by cultural changes that are more oriented to the quality of both the process and the results of education. Thus the important things that position themselves as educational leaders who are broad-minded in achieving the quality of education in the globalization era are those that can have a strong influence on the effectiveness of educational attainment (Berg, et al., 2013; Hewitt, et al., 2014; Severson & DeStefano, 2014).

Referring to the above understanding, it can be interpreted that a digital transformation-based teaching learning process can be transformed based on the cultural values in schools and also is needed by the Principal in carrying out the mandated tasks. Many digital transformation-based models that can be adopted and applied in various educational institutions or schools but the relevant model depends on the leadership style by Principal to be applied in schools in the current era of globalization with high competitiveness, are transformative learning leadership. This is also as stated in (Hallinger, 2003; Hannum et al, 2013; Kopnina, 2013) that in the era of globalization and the complexity of the development of the education world, the role of educational

leadership related to the digital transformation in the learning process is not merely instructional but the educational leader or a school principal should be able to act as a supervisor and an introduction to the transformation of experience, knowledge and skills to the residents of the school they lead.

With regard to organizational culture relevant to the digital transformation in the learning process in schools also can be found in several studies conducted by previous researchers about school culture as a system of organizational culture leading to an achievement in the quality of education are as stated by Oord (2008), Winch (2015) that the school culture will be the uniqueness of an existing education delivery system in it and the learning process have to adapt with the current situation and have to consider with the future expectation. This culture is of course related to beliefs, values, norms and standards and behavior. In line with this, the quality of education is not only determined by aspects of academic achievement of the students but also from the aspect of character education which is the internalization of culture in schools to bring students in the development of good personality amidst the dynamics of the advancing era, continues to grow (Whitaker & Gruenert, 2015). Thus, in order to achieve good quality education, qualified education leaders are needed and those who are able to understand the vision, mission and goals of the school to be integrated together with the internalization of values in the school become a reference in an integrated, characterized and educational process quality in the process (Reeves, 2006).

Furthermore, Wagner (2013) argues that digital transformation in the learning process is related to the school culture: "a complex set of beliefs, values and traditions, ways of thinking and behaving". The school culture has important elements, such as 1) the location, environment and physical infrastructure of the school building, furniture and other equipment; 2) school curricula that contain ideas and facts that form the whole education program; 3) individuals who are school residents consisting of students, teachers, and administrative staff and 4) moral values, the regulatory system and the climate of school life.

4. Results and discussion

4.1. Digital transformation in the teaching learning process

Digital transformation in learning media is a fundamental change in the teaching learning process that occurs in response to advances in information and communication technology. This change includes the use of digital technologies such as computer hardware and software, the internet, mobile devices and various other technological tools, to enhance students' learning experiences. This includes the shift from traditional learning media to digital media, such as e-learning platforms, online learning videos, educational applications and various other digital resources. In this regard, digital transformation in learning media has several key components:

First, Accessibility and flexibility: Students can access learning materials online from almost anywhere and at any time, eliminating geographical and time barriers. This gives them flexibility in how they learn. Accessibility refers to the ease of access or availability of information or services to a wide range of people, including those with special needs (Murphy & Rodriguez Manzanares, 2008). Meanwhile, flexibility which is far from plagiarism, includes the ability to adapt ideas or work in an original way without involving plagiarism.

Second, Interactive: Digital learning media often offer interactive elements, such as online exercises, tests, discussions and peer collaboration. This increases student engagement and provides instant feedback. Interactive learning involves

active student participation in the learning process. This may include the use of technology, group discussions, simulations or hands-on activities to enhance engagement and understanding. This approach can promote deeper understanding and allow students to apply concepts in practical contexts.

Third, Digital skills: Students have the opportunity to develop digital skills, such as digital literacy, use of specialized software and understanding how to operate in a digital environment.

Fourth, Measurement and tracking: Digital transformation allows educators to track student progress more accurately and provide more detailed feedback to help students achieve their learning goals.

Fifth, Personalized learning: Technology can be used to tailor learning content to individual students' needs, enabling more effective learning rates.

Sixth, Lifelong learning: Digital transformation also enables continuous lifelong learning, where individuals can continue to develop their skills throughout their careers.

Seventh, Collaboration and communication. Advances in technology have enabled better collaboration between students and teachers. Online learning platforms allow for discussions, exchange of ideas and collaborative projects, creating an environment where students can learn from each other and develop their social skills. Collaboration is the process by which individuals or groups work together to achieve a common goal while effective communication involves the exchange of ideas and information. To keep collaboration and communication free from plagiarism, it is important to give credit to the original contributors, cite the sources used and avoid using material without permission or acknowledgement.

Eighth, Use of artificial intelligence (AI) and Educational analytics. The use of artificial intelligence in education opens the door to personalized learning. Educational analytics systems can track individual student progress and provide tailored recommendations, allowing for a more focused and effective approach (Nguyen, 2015; Ohler, 2011). The use of Artificial Intelligence (AI) in educational analytics involves applying technology to analyse educational data. AI can help identify patterns, provide personalized recommendations and improve efficiency in the teaching process. To keep the information free from plagiarism, be sure to provide proper references regarding the use of AI technology in an educational context and avoid using material without permission or clear sources.

Ninth, Ethical and security challenges. While this transformation brings great benefits, we are also faced with ethical and security challenges. Personal data protection, cybersecurity and ethical considerations in the use of educational technology are concerns that need to be addressed. Ethical challenges in the context of technology, including artificial intelligence, involve moral considerations regarding the use and impact of the technology on individuals and society. This includes privacy, discrimination and the social impacts that may arise from the implementation of the technology. Meanwhile, security challenges relate to efforts to protect systems and data from security threats such as cyberattacks. The application of technology, including artificial intelligence, can increase security risks if not properly regulated. Steps need to be taken to protect sensitive data and prevent exploitation or attacks on AI systems. It is important to address both of these aspects holistically so that technological developments remain in line with ethical values and remain safe from security threats.

Tenth, Teacher training and technology integration. Educational transformation requires adequate teacher training to integrate technology into their teaching. Support and investment in teacher digital skills development are key to ensuring that the benefits of technology are fully realized in the classroom. Teacher training is the process by which educators are provided with up-to-date knowledge, skills and understanding of teaching methods, learning strategies and content knowledge. Technology integration in the context of teacher training includes the use of digital tools and platforms to enhance teaching effectiveness. It is important to detail teacher training methods and provide specific information on how technology integration supports the development of teaching skills. Include verifiable sources of training strategies and the benefits of technology integration in the context of education.

Eleventh, Strengthening technology infrastructure. Governments and educational institutions need to ensure adequate technology infrastructure to support digital learning. Fast internet access and adequate devices are fundamental to the success of this transformation. Technology infrastructure strengthening is the process of building, improving and strengthening the technology foundation of an organization or system. It involves improving the reliability, performance and security of technology infrastructure such as networks, servers and other hardware, to support efficient operations. This process includes regular maintenance, upgrades and adaptation to technological developments so that the infrastructure remains relevant and high-performing.

However, while providing many benefits, digital transformation in learning media also faces several challenges such as inequality of access to technology, data security issues and potential digital fatigue. Therefore, wise planning and management are needed to ensure that digital transformation in learning media provides maximum benefits to students while addressing potential risks and obstacles. Digital technology enables more interactive and personalized learning. E-learning platforms, educational apps and online collaboration tools make it easier for students to access learning materials and allow them to learn at their own pace and style. Virtual reality and augmented reality also provide more immersive and engaging learning experiences.

4.2. Digital transformation to improve students' skills

Digital transformation in learning media has become a major focus in modern education. Advances in information and communication technology have changed the way students learn, interact and develop their skills. This article discusses the positive impact of digital transformation in learning media on increasing student engagement and skills. The use of technology in learning media such as e-learning platforms, online learning videos and educational applications, has enabled students to access learning materials more flexibly (Pachler, 2013). They can learn anytime and anywhere, allowing for a learning experience tailored to individual needs. Some important components in learning, one of which is media. Where the media plays a role in generating interest and attention of students which will make learning effective and interesting. If the use of media refers to information technology then preparing it becomes uncomplicated. And this will make students learn actively and can also train critical thinking skills.

In addition, digital media allows for the use of interactive elements, including online discussions, collaboration and interactive exercises, which increase student engagement in the learning process. In addition to increased engagement, digital transformation in learning

media also allows for the development of skills that are relevant to the demands of the times. Students can gain digital literacy, technological problem solving, online communication skills and an understanding of the latest technologies. This not only prepares them for the increasingly digitalized world of work but also helps them become more competent lifelong learners. However, to achieve optimal results, it is important to address the challenges associated with digital transformation such as unequal access to technology, personal data protection and potential digital fatigue. With a deep understanding of these issues, educators can design effective strategies to maximize the benefits of digital transformation in learning media while ensuring that all students have equitable access and opportunities to thrive in this digital age. Digital transformation in learning media is a critical step towards more effective and relevant education in the 21st century.

While technology offers many benefits, there are challenges that must be overcome. One of them is the digital divide, where not all students have equal access to adequate devices and the internet. In addition, educators need to develop new skills to effectively use technology in the learning process. Data security and privacy issues are also major concerns in the use of digital technology (Shepherd, 2011).

Digital transformation opens up huge opportunities for innovation in education. Data-driven learning enables educators to better understand students' needs and development and thus provide more appropriate support. Technology also enables lifelong learning and access to high-quality education anywhere, anytime. Educational institutions must adapt quickly to seize these opportunities and ensure that all students can benefit from digital technology.

Furthermore, through the implementation of appropriate strategies, educators can ensure that digital transformation in learning media not only increases student engagement but also overcomes potential obstacles. With a student-centered approach, students can be empowered to learn at their own pace and style while developing relevant skills for an increasingly digitalized future. Digital transformation in learning media is an important step towards creating an educational environment that supports the growth and development of students in this digital era while ensuring that education remains relevant and inclusive for all.

4.3. E-learning in the teaching learning strategy

The strategy of using E-learning to support the implementation of the learning process is expected to increase the absorption of students for the material being taught; increase active participation of students; improve students' independent learning abilities; improve the quality of educational and training materials, improve the ability to display information with information technology devices, expand the reach of the teaching and learning process using the internet, not limited to space and time. There are several teaching strategies that can be applied using E-learning technology, as follows:

First, Learning by doing: Learning simulation by doing what is to be learned; an example is a flight simulator, where a prospective pilot can be trained to fly a certain aircraft as if he were practicing with a real aircraft.

Second, Incidental learning: Learning something indirectly. Not all things are interesting to learn, therefore with this strategy a student can learn something through something more interesting and it is hoped that the real information can be absorbed indirectly.

Third, Learning by reflection: Learning something by developing ideas/concepts about the subject to be learned. Students are encouraged to develop an idea/concept by providing initial information and the application

will "listen" and process the input of ideas/concepts from students to then provide further information based on input from students.

Fourth, Case-based learning: Learning something based on cases that have occurred regarding the subject to be learned. This strategy depends on expert sources and cases that can be collected about the material to be learned. Students can learn a material by absorbing information from expert sources about cases that have occurred on the material.

Fifth, Learning by exploring: Learning something by exploring the subject to be learned. Students are encouraged to understand a material by exploring the material independently. The application must provide sufficient information to accommodate the exploration of students. Learning something by setting a target to be achieved (goal-directed learning). Students are positioned as someone who must achieve a goal/target and the application provides the facilities needed to do so. Students then develop independent strategies to achieve these goals.

Thus, education and learning in the digital era should be packaged in digital form to suit the tendencies of students who like to use digital devices in their daily lives. Their habit of using digital technology tools is a special characteristic of the digital era society that must be answered by education to provide educational materials in digital devices so that they can be accessed virtually by students (Journell, 2010). Learning in the digital era has different characteristics from student learning in the past, the generation in this era is those who have a digital native character.

5. Conclusion and suggestion

5.1. Conclusion

To optimize the proportion of digital transformation opportunities in the teaching learning process, schools and governments need to work together to adapt technology for educators and students with the support of appropriate facilities. It means that the transformation of education in the digital age is not just the introduction of new technologies, but a revolution in the approach to teaching learning process. By utilizing innovative methods, education can be inclusive, quality and relevant. It is important for all stakeholders to continue to support this change to ensure that the next generation is prepared to succeed in an ever-changing world. The transformation of education in the digital age brings substantial changes in the way we learn and teach. While there are challenges that need to be overcome, the benefits in increasing accessibility, enhancing interactivity and personalizing learning make it an inevitable journey. By understanding and addressing these challenges, we can ensure that education in the digital age makes a sustainable positive contribution to society.

Digital transformation-based teaching learning process involves the use of the latest technology to expand access and provide interactive learning experiences where the transformation process aims to bring about significant changes to improve the quality and effectiveness of learning. In the ever-evolving digital era, digital transformation in the teaching learning process can be used such as online media that has brought significant benefits in increasing student engagement and skills. By utilizing technology, students can access learning materials more flexibly, participate in more interactive learning and develop digital skills that are relevant to the future. However, it is also important to consider challenges such as inequality of access and data security issues in implementing this digital transformation. With wise planning and management, digital transformation in learning media can be an effective tool for achieving more relevant and inclusive education.

5.2. Suggestion

There are three basic principles that need to be used as a reference in the development and utilization for the teaching-learning technology approach, namely: 1) System approach; 2) Learner-oriented; 3) Utilizing learning resources as much and as varied as possible (utilizing learning resources). Thus, efforts to solve problems in the learning process can be done by utilizing a technology-based learning approach as a medium and learning resource.

In the transformation of technology-based learning, information and communication technology has four main functions that are used in learning activities, namely: 1) Information technology as a tool; 2) Technology functions as knowledge; 3) Information technology as materials and tools for learning and 4) technology also plays a role as a medium to facilitate the formation of collaborative interactions and build meaning in a context that can be understood more meaningfully.

Further researchers can conduct research based on the two suggestions above that are relevant to a country's national policies and based on the global needs.

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