Transformation Of Education In The Digital Era

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ABSTRACT

Education in the digital era has undergone major changes through the integration of technology that encourages various new learning approaches, such as online learning, blended learning, and flipped classroom. This article discusses the main aspects of the transformation of digital era education such as digital-based educational media and the concept of ICT in learning. This study uses a literature review method, namely a method by searching, selecting, and reviewing the writings and thoughts of previous researchers in the form of books, journals, articles, and documents. The data analysis technique uses content analysis. Based on the review of the research results conducted by previous experts, the results of this study are that digital change in the education sector is an effort to implement digital system changes at all levels of education. To realize the expected educational goals, quality human resources are needed, both soft skills and hard skills. However, the obstacles faced are the readiness of human resources for educators and education personnel who are less qualified in each educational unit, the readiness of infrastructure that is not evenly distributed in each educational unit. It is important for all stakeholders to continue to support digital-based education transformation to ensure the preparation of future generations to succeed in a changing world. The use of multimedia technology can increase learning motivation and make learning more interesting. The use of multimedia applications can be in the form of company profiles, videos for tutorials, e-learning, or computer-based training.

Introduction

The National Education System Law states that education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual religious strength, self-control, personality, intelligence, noble morals, and skills needed by themselves, society, nation and state. Education is a dimension of development. The education process is closely related to the development process, while development is directed towards developing quality

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human resources, and development in the economic sector that supports one another in achieving national development goals (Oemar Hamalik: 2000).

As a component of education, the purpose of education occupies an important position among other components of education, it can be said that all components of all educational activities are carried out solely directed towards or aimed at achieving these goals. Thus, activities that are not relevant to these goals are considered deviant, non-functional, and even wrong, so they must be prevented from occurring. Here it can be seen that the purpose of education is normative, namely containing elements of norms that are coercive, but do not conflict with the nature of student development and can be accepted by society as good life values. (Umar Tirtarahardja and S.L. La Sulo: 2005).

In an era that continues to transform rapidly, education cannot avoid the impact of the digital revolution that has hit all areas of life. Since the last few decades, technological advances have fundamentally changed the way we interact with information, culture, and of course, the educational process. This shift, from conventional learning to the use of digital technology, has profound consequences and potential to change the global educational landscape. As an introduction, significant changes in the accessibility of information are one of the main characteristics of educational transformation in this digital era. Along with the spread of internet connectivity, students and educators now have access to a large number of learning resources instantly. No longer limited by geographical boundaries or traditional curriculum, the world becomes a classroom for those willing to explore it. However, this shift is not only limited to the aspect of 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 fun. The learning process that was previously passive and linear becomes more dynamic, allowing students to be actively involved in understanding complex concepts. Not only that, the digital era also witnessed a fundamental shift 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 work together on cross-border projects. This not only develops social skills but also opens up opportunities for more holistic learning (Sindi Septia Hasnida, et al: 2024).

Education in the digital era has undergone major changes through the integration of technology that encourages various new learning approaches, such as online learning, blended learning, and flipped classrooms. Technology is not only a tool, but also a major catalyst that changes learning methods from conventional to more interactive and collaborative (Albina et al., 2022). Educational transformation is not just the use of technological tools, but involves a total restructuring of the education system to create an inclusive, results-oriented learning environment that is able to answer the challenges of the times. This concept encourages a collaborative, creative, and adaptive learning model in order to produce graduates who are ready to face global challenges and have skills that are relevant to technological developments and the dynamics of society. Educational transformation, in its essence, aims to create future leaders and citizens who are skilled, critical, and able to adapt in the digital era. With the concept and implementation of educational transformation, it is hoped that education can become a driver of positive change in society (Dorlince O Hutapea, et al: 2024).

In the context of education, technology can be an effective means to improve the quality of learning in educational institutions, expand access to education, and overcome various challenges faced today. Although technology plays an important role in education, the challenges in implementing technology in the world of education are also quite large,

such as the readiness of human resources, the availability of supporting facilities for educational technology. So in this study, researchers will examine more deeply the transformation of education in the digital era.

Methods

This study uses a literature review method, which is a method of searching, selecting, and reviewing the writings and thoughts of previous researchers (Zulia Putri Perdana, et al: 2021). Literature research is a research activity carried out by collecting information and data using various sources available in the library (SARI, Milya: 2020). Literature review involves collecting library materials, reading and taking notes, and processing research materials. The various stages of the literature review method involve searching for theoretical references that are relevant to the identified case or question. These references can be found in books, journals, articles, and documents (Hidayat, R, Ulya, H., Pakuan, D., S. A. J. K: 2019).

Result and Discussion

The Digital Era can be considered as the development of an evolutionary system where the circulation of knowledge is not only high, but also increasingly beyond human control, making it increasingly difficult to manage our lives. The social implications of the Digital Era are enormous and will increase as the function of technology becomes more knowledge-based. Understanding the digital era will help ensure that we build sustainable socio-economic relationships both with technology and with advanced knowledge assisted by technology. The digital era has changed the way we live and work by creating a knowledge-based society. Over time, the digital era will have the same impact on all areas of life including Education (Triyanto: 2020).

The world is currently experiencing incredibly rapid technological advances, which require other components to adapt and follow these developments. They must also be encouraged to live in a new life that is all digital and sophisticated compared to a few years ago. The emergence of modern progress affects various parts of life, especially learning technology (David Maulana Ghufron, et al: 2023). In addition, the concept of 21st-century education focuses on the use of technology to facilitate project-based and problem-solving learning, which engages students in developing critical, creative, and collaborative skills. Project-based learning (PBL) and problem-based learning (PBL) approaches are some of the methods that are now increasingly being adopted, allowing students to gain a deep understanding of the material through research and team collaboration (Majir, 2021). This transformation also presents new challenges for educational institutions in ensuring that teachers are ready to face the changes demanded by technology. For example, digital-based learning can expand access to education, but on the other hand, requires infrastructure readiness and increased technological skills for teachers to optimize its use (Hadisaputra et al., 2018).

According to Hilda Taba in Mahmud Arif (Muhammad Arif: 2008) broadly education is part of "social engineering" which deliberately and systematically takes place in a certain period of time so that it does not only mean face-to-face interaction between teachers and students in a classroom environment. Education is the core of the "cultivating" process that takes place in the midst of community life, which contains the process of developing potential, cultural inheritance, and the fusion of the two. It can be understood that through education it will be able to influence the daily behavior of people who have been affected by globalization. How to act and behave in their environment, so that they can be on par

with other nations, in this case it can be through educational transformation. Mezirow's opinion explains the concept of transformation as follows: ... the concept of transformative learning which he defines as "the process by which we transform our takenforgranted frames of reference"). Then it is further stated that He asserts that transformation takes place through a process of critical reflection that is facilitated by open dialogue in a safe setting. In conjunction with this reflection and dialogue, Transformation Theory's focus is on how we learn to negotiate and act on our own purposes, values, feelings, and meanings rather than those we have uncritically assimilated from others Mezirow (Unwanullah, Arif: 2012).

Which means that the concept of transformative learning is defined as a process in which we change the frame of reference. He asserts that transformation takes place through a process of critical reflection facilitated by open dialogue in a safe atmosphere. In relation to reflection and dialogue, the focus of transformation theory is on how we learn to negotiate and act on our own purposes, values, feelings, and meanings that we have critically assimilated from and to others. Education for transformation in Naif (Naif Adnan: 2015) is the mainstream of Freirean-oriented education (Paulo Freire). The theory put forward by Paulo Freire often becomes a dialogical discourse to resolve the deadlock in education. One of his most famous theories in education is that education is to humanize humans (humanization). This theory is more inclined towards the philosophy of existentialism which tries to initiate the concept of humans and the ins and outs of the problems surrounding them. This educational stream challenges the establishment of education which is considered stagnant without providing significant meaning and change for the reality faced by humans.

Digital change in the Indonesian education sector is not a new issue, but existing regulations support specific efforts to implement digital change at all levels of education in Indonesia. Until now, various discourses, support steps, and public relations related to the industrial era 4.0 have not helped the education sector achieve significant progress in the digital transformation of Indonesian education (Khalisatun Husna, et al: 2023). To realize the expected educational goals, quality human resources are needed, both soft skills and hard skills, as well as those who are literate or not GAPTEK towards ICT. Considering entering the 21st century, our education must be based on ICT or digital with learning familiarly called 4C. However, the obstacle faced is the readiness of human resources for educators and education personnel who are less qualified in each educational unit. Not to mention the readiness of infrastructure that is not evenly distributed in each educational unit or the disparity of human resources for educators and education personnel and their infrastructure. This means that on the one hand we are required to follow changes in the field of science and technology, especially the label of education in the 21st century based on ICT, on the other hand human resources and infrastructure are still experiencing disparities in every region in Indonesia. However, whatever the difficulties, the fact is that the world of education must continue to advance, it must not be left behind (Verdinandus Lelu Ngongo, et al: 2019).

The transformation of education in the digital era is not just the introduction of new technology, but a revolution in the approach to learning. 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 the preparation of future generations to succeed in a changing world. The transformation of education in the digital era brings substantial changes in the way we learn and teach. While there are challenges that need to be overcome, its benefits in increasing accessibility, increasing interactivity, and personalizing learning make it an inevitable journey. By understanding and overcoming

these challenges, we can ensure that education in the digital era makes a sustainable positive contribution to society (Sindi Septia Hasnida, et al: 2024).

DIGITAL-BASED EDUCATIONAL MEDIA

Digital-based learning may be a fairly enjoyable learning revolution. The teaching and learning process can be created more lively and interesting through the help of multimedia. Multimedia in the teaching and learning process aims to help educators explain difficult materials. The use of multimedia technology can generate learning motivation and make learning more interesting. In its development, multimedia can be divided into two, namely linear multimedia and interactive multimedia. Linear multimedia is multimedia that is sequential or sequential, each student or user of this multimedia uses it according to the order step by step according to the packaging of the specified material (Wina Sanjaya: 2012).

Interactive multimedia is multimedia that is not linear, but students have choices according to the menu offered, in studying a topic of discussion students can choose which one to study first. Thus, the characteristic of interactive multimedia is the presence of a kind of controller commonly called a graphical user interface (GUI), which can be in the form of icons, buttons, scrolls or others (Wina Sanjaya: 2012). The use of multimedia applications can be in the form of company profiles, videos for tutorials, e-learning, or computer-based training. The term multimedia learning varies. Some call it CALL (computer-assisted language learning), CAI (computer-assisted instruction), CELL (computer-enhanced language learning), or CBI (computer based instruction).

The use of multimedia (text, video, audio, animation, and interactive) in learning is very popular with students. However, the most frequently used multimedia element is text rather than using video, audio, animation, or interactivity. When multimedia is viewed as a whole (the unity of each element), multimedia is very popular when used as a learning medium. However, multimedia should not only be viewed from each element, because if these components become one unit, the benefits provided will definitely be much greater. Multimedia will help students become more active and creative in learning, and make educators facilitators who provide convenience for students to learn, not as givers of orders/instructions to students.

There are many types of electronic devices, but in e-learning it is more suitable to use the internet. According to Ali Mudlofir et al., e-learning is information technology in education in the form of a virtual school where all teaching and learning processes are carried out virtually with materials that can be downloaded independently (Ali Mudlofir: 2016). Ideally, good learning is one that frees learners to learn. In accordance with the above, students can easily download their own materials and organize their own virtual learning. There are also many uses of terminology that have almost the same meaning as e-learning. Web-based learning, online learning, computer-based training/learning, distance learning, computer-aided instruction, and so on, are terminologies that are often used to replace e-learning. In practice, e-learning is often identified with distance education. In other words, distance education is the same as e-learning (Dewi Salma Prawiradilaga, et al: 2013). There are many meanings but it can be concluded with the use of electronic devices to learn in a virtual class using the internet. In addition to the above opinion, according to Rusman, WBE (Web-Based Education) based learning or sometimes called E-learning (electronic learning) is defined as the application of web technology in learning to support the educational process and utilize the internet during the learning process (Rusman: 2012).

Basically, e-learning has 2 types, namely synchronous and asynchronous. (1). Synchronous Training. Synchronous means "at the same time". So, synchronous training is a type of training, where the learning process occurs at the same time when the teacher is teaching and the student is learning. This allows direct interaction between educators and students, either via the internet or intranet. (2). Asynchronous training Asynchronous means "not at the same time". So, someone can take training at a different time from the teacher giving the training.

CONCEPT OF ICT IN EDUCATION

Information and Communication Technology (ICT) contains three words, namely technology, information, and communication, each of which has a definition. Technology is the development and application that aims to solve problems. So, technology is usually referred to as new discoveries that are helpful. Information is the result of data processing for certain purposes and benefits. Communication is the process of delivering information from the information provider to the information recipient. So, information and communication are very closely related. So, Information and Communication Technology (ICT) means that there is a discovery of data processing that produces information and the information can be disseminated quickly and has a longer storage period. Another definition of ICT is a variety of sets of technological tools and resources used to communicate and create, distribute, store and manage information. From this definition, ICT includes radio, television, video, DVD (digital versatile disc), telephone, satellite systems, computers, and network hardware and software; as well as equipment and services related to this technology, such as video conferencing and electronic mail (I.A. Huda: 2020).

The internet, which is one of the results of information technology, is an information resource that can reach the entire world. The information resource is so vast and large that no one person, no one organization, or even no one country can handle it alone. However, the internet is not just a network and the usefulness of the internet is not from the computer itself but from the information resources obtained from the internet. Computers are important in relation to the internet because computers do the work of moving data from one place to another, and executing programs that provide the opportunity to access information (T. Mildawati: 2016). In today's era of globalization, improving the quality of education must be prioritized in relation to competition between human resources. Superior and quality human resources can have an impact on improving a country's education which then contributes to improving the nation's standard of living (M. Suradji: 2018). Information and telecommunications technology or ICT which has developed very rapidly in the last decade has had a tremendous impact on various sectors of our lives such as business, entertainment and education. The impact on education is very clear to us. The rapid development of information technology in the current era of globalization cannot be avoided anymore its influence on the world of education. Global demands require the world of education to always and continuously adjust technological developments to efforts to improve the quality of education, especially the adjustment of its use for the world of education, especially in the learning process. Information technology is the development of information systems by combining computer technology with telecommunications. The tendency of change and innovation in the world of education will continue to occur and develop in entering the 21st century which is now marked by the use of computer technology and telecommunications in the learning process. These changes include: easier to find learning resources, more choices for using

and utilizing ICT, the increasing role of media and multimedia in learning activities (Haris Budiman: 2014).

ICT in the world of education can be divided into two roles, namely:

1. As a learning presentation medium, the simplest example is teaching materials in the form of powerpoint slides or animations using the flash program;
2. As an independent learning medium or E-learning, for example students are given assignments to read or search for sources from the internet, send answers to assignments, even try and do learning materials.

Through E-learning, learning can be done anywhere and anytime, not limited by space and time. This encourages students to analyze and synthesize knowledge, explore, process and utilize information, produce their own writing, information and knowledge. Students are stimulated to explore science. Facilities that can be used by students to learn through E-learning include: E-Book, E-Library, interaction with experts, email, mailing List, News Group, and others. While the benefits of utilizing ICT in order to support the implementation of learning are:

1. Improve the quality of learning;
2. Expand access to education and learning;
3. Help visualize abstract ideas;
4. Facilitate understanding of the material being studied;
5. Display more interesting learning materials;
6. Enable interaction between learning and the material being studied (H. Budiana, N. Sjafirah, and I. Bakti: 2015).

In the learning process, the use of information technology can be used in various ways. For example: (1) Virtual experiment. Demonstrations using the help of information technology are used to display an experimental activity in front of the class. The purpose of this virtual experiment is a laboratory activity that is moved in front of the computer. Children can do several experiments by utilizing virtual experiment software, for example Crocodile Clips. This method can be used if the school does not have a complete science laboratory or is used before conducting a real experiment. In this activity, the teacher can make a film on how to do an activity, for example how to measure with a micrometer correctly or take some important activities. So that in this way students can be directed to do the right activities or draw conclusions from the activities; (2). Virtual class. The meaning of class here is that students learn independently based on the web, for example using Moodle. The form of virtual class that has been developed in several schools that have information technology facilities. In this virtual class, students will get materials, assignments and tests online (Wahjono: 2015).

ICT is the basic capital in implementing the e-learning learning model. The e-learning learning model with all its advantages will greatly help the world of education in Indonesia, e-learning can be an alternative way to improve the quality of Indonesian education and make efforts to equalize it throughout Indonesia. It is common knowledge that the distribution of the quality of education in Indonesia is not even. There is a fairly large gap between one region and another. Education in Java and Sumatra or western Indonesia tends to be more advanced than in eastern Indonesia. This gap must receive serious attention from the government. E-learning can be a creative solution for the government. The development of information technology has influenced the world of education, especially in the learning process. With the development of the use of ICT, there are five shifts in the learning process, namely: from training to appearance; from classroom to anytime and anywhere; from paper to online or channels; physical facilities to network facilities; from cycle time to real time (M. Rosenberg: 2001). Here are some digital

technologies that can be utilized to improve the quality of the learning process characterized by active learning, knowledge construction, inquiry, and exploration in students both when they are physically in the classroom or when they are far from the teacher's reach.

1. Interactive Whiteboards (IWB). This technology allows images from a computer to be displayed via a digital projector, onto a large board or even on a wall. Users can interact with the content on the board using their fingers or a stylus. Over the past decade, interactive whiteboards have become a popular teaching and learning tool, especially in elementary school classrooms. Research studies from recent literature report on high levels of student motivation, teacher enthusiasm and school-wide support associated with these technological tools. Many studies to date have reported the potential of interactive whiteboards to improve the quality of the teaching and learning process by increasing levels of interaction, communication and collaboration.

2. Software Applications. Various applications that are already available or developed independently for learning purposes. These applications are designed to operate on mobile devices such as smartphones and tablet computers. The use of software applications can facilitate a personal learning environment that is useful or indeed important for future learning. The use of software applications will drive changes in the face of education and the ways in which today's so-called net generation or millennials use technology to learn. Software applications when used in learning can support this learning, enabling individuals to regulate their own learning. In addition, learning will take place in different contexts and situations that cannot be provided by a single learning provider. Related to this is the growing recognition of the importance of informal learning.

3. Web 2.0, which refers to the second generation of the World Wide Web. Web 2.0 includes features and functionality that were previously unavailable, e.g. podcasts, blogs, wikis, RSS (Rich Site Summary). RSS is used to update web content that changes regularly), social networking and tagging.

4. Social media. In today's digital age, social networking plays a central role in learning in informal settings. Social media offers young learners such as primary school students the opportunity to explore complex responses and participation with cultural content. Of course, in its implementation, it is necessary to consider the transformation in digital literacy and the process by which young learners can connect with knowledge in informal learning environments to become active cultural participants (Nandang Hidayata, Husnul Khotimahb: 2019)

ICT influences students in learning and exploring information with extraordinary abundance, and ICT also influences teachers to innovate in teaching methods. The challenges faced by educators are certainly not easy. Educators such as teachers and lecturers are faced with the demands of preparing students to be able to compete in the future characterized by ICT. Currently, educators not only act as the main source in the teaching and learning process and the main provider of information, educators must also act as facilitators, companions, mentors and partners for students in developing skills and knowledge. ICT has enormous potential to be developed in the world of education, such as increasing the efficiency and quality of learning. ICT can be developed by creative educators, by teaching abstract and difficult materials, through simulations and animations so that they become easier for students to understand. Educators are expected to be able to utilize ICT optimally to develop innovation in learning. Currently, the right learning method is student-centered learning to encourage student development and skills.

Students are required to be able to think critically and solve problems and have good skills and communication in working together. Students are also required to have adaptive nature, initiative, be able to analyze information and high curiosity. Therefore, educators are the spearhead to be able to deliver students to fulfill these competencies by integrating ICT in the learning process.

With the help of ICT, educators can do many activities in the world of education such as administration, communication, development of learning resources, making learning plans, delivering teaching materials, evaluation, activities in and outside the classroom, independent learning to teacher professional development. However, there are several requirements for the application of ICT in the teaching and learning process, including: (1). Educators and students must have access to the technological devices used, especially internet access, (2) teaching materials are available that are easy for students to understand, (3) educators must have knowledge and skills in the field of technology to help students achieve academic standards.

Conclusion

The concept of transformative learning is defined as a process in which we change the frame of reference. Digital change in the Indonesian education sector is not a new issue, but existing regulations support specific efforts to implement digital change at all levels of education in Indonesia. Educational transformation in the digital era is not just the introduction of new technology, but a revolution in the approach to learning by utilizing innovative methods, education can be inclusive, quality, and relevant. Digital-based learning may be a fairly enjoyable learning revolution. The teaching and learning process can be created more lively and interesting through the help of multimedia. The use of multimedia technology can arouse learning motivation and make learning more interesting. The use of multimedia applications can be in the form of company profiles, videos for tutorials, e-learning, or computer-based training. The term multimedia learning varies. Information and telecommunications technology or ICT which has developed very rapidly in the last decade has had a tremendous impact on various sectors of our lives such as business, entertainment and education. Through E-learning, learning can be done anywhere and anytime, not limited by space and time. Facilities that can be utilized for learning through E-learning include: E-Book, E-Library, interaction with experts, email, mailing list, News Group, and others. ICT is the basic capital in implementing the e-learning learning model. The e-learning learning model with all its advantages will greatly assist the world of education in Indonesia, e-learning can be an alternative way to improve the quality of education and make efforts to equalize throughout Indonesia.

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