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Educational technology innovation during the COVID-19 pandemic

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ABSTRACT

Innovations in education are continuously being made to continue learning during the COVID-19 pandemic. One solution for dealing with the negative impact of the pandemic on education is to innovate accompanied by technology or to innovate in the elements of learning to achieve educational and learning goals. This research aims to provide an overview of educational innovations in Indonesia during the COVID-19 pandemic. This research uses a descriptive research method and a descriptive content analysis study. Research analysis is carried out on international articles, national articles, and other sources regarding learning solutions for the pandemic by making innovations in the field of educational technology. The use of technology in learning cannot be separated from distance learning during the COVID-19 pandemic. Therefore, to solve the education problem during this pandemic, innovations are made in the technology used in understanding and the elements of learning to achieve educational goals.

ABSTRAK

Inovasi dalam pendidikan terus dilakukan untuk melanjutkan pembelajaran pada masa pandemi COVID-19. Salah satu solusi untuk menangani dampak negatif dari pandemi dalam bidang pendidikan adalah dengan melakukan inovasi yang disertai oleh teknologi atau melakukan inovasi dalam unsur-unsur pembelajaran untuk mencapai tujuan pendidikan dan pembelajaran. Tujuan penelitian ini diajukan sebagai tinjauan umum terkait inovasi pendidikan di Indonesia pada masa pandemi COVID-19. Penelitian ini menggunakan metode descriptive research atau descriptive content analysis study. Analisis penelitian dilakukan pada artikel internasional, artikel nasional, maupun sumber lain mengenai solusi pembelajaran pada masa pandemi dengan melakukan inovasi di bidang teknologi pendidikan. Penggunaan teknologi dalam pembelajaran tidak dapat dipisahkan dalam pembelajaran jarak jauh di masa pandemi COVID-19. Maka dari itu, untuk menyelesaikan masalah pendidikan di masa pandemi ini, inovasi yang dilakukan tidak hanya dalam bidang teknologi yang dipakai dalam pembelajaran saja, tetapi perlu ada inovasi dalam unsur-unsur pembelajaran untuk tetap mencapai tujuan pendidikan pada masa pandemi ini.

Kata Kunci: *COVID-19; Inovasi; Pembelajaran; Teknologi Pendidikan.*

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INTRODUCTION

Currently, the world is experiencing problems due to the COVID-19 virus. This virus that has the speed of spreading has a fast time and is very deadly and very dangerous. Therefore, various countries around the world are busy establishing different policies as an action to stop the chain of spread of this virus, The Government of Indonesia sets a Large-Scale Social Restrictions (PSBB) policy as a measure to prevent the spread of COVID-19. This policy is enforced in each region at a certain time. This policy caused significant changes both in the economic sector, the health sector, and even in the learning sector.

In education, the Indonesian government and the Ministry of Education and Culture (Kemendikbud) are making efforts so that educational actors, namely educators and students, can organize learning even in ways that have not previously been implemented, namely by conducting learning using technology in education. The Ministry of Education and Culture stipulates that education in Indonesia is held, but with a different learning system, namely Study From Home (SFH) or Distance Learning (PJJ) (Wahyuningsih, 2021). The Ministry of Education and Culture enforces the implementation of the teaching and learning process to be carried out online (in a network) with the help of technology. This policy is following the Republic of Indonesia Ministry of Education and Culture Circular Letter number 3 of 2020 regarding the prevention of Coronavirus Disease (COVID-19) in Education units and the Letter of the Secretary General of the Ministry of Education and Culture number 35492/ A.A5/ HK/ 2020 dated 12 March 2020 concerning Prevention of the Spread of Coronavirus Disease (COVID-19).

Online learning provides challenges for educational actors, namely educators, students, and institutions. It even provides challenges for the wider community, such as parents, and in practice, educators must find out how to convey learning material and be accepted readily by students. students (Salsabila et al., 2020; Talkah & Muslih, 2021). Likewise, students must be able to adjust to situations and conditions like today, one of which is mental readiness. Mental readiness can be in the form of each individual's desires, wishes, and aspirations in achieving his goals (Jumasrin, 2019). Students with a way of learning and mental readiness will continue to be diligent when studying, while students who do not have a way of education and mental readiness, even though they want to learn, will not be active.

Because there are obstacles in learning during the COVID-19 pandemic, there is a need for innovation in education so that learning can continue. One of the solutions to deal with the pandemic's negative impact on education is to innovate accompanied by technology or innovate in learning elements to achieve educational and learning goals. They were supported by technological developments that were almost beyond the 4.0 industrial revolution. So that in implementing online learning, it can run effectively even though in carrying it out, educators and students are in different places (Verawardina et al., 2020). Innovation in learning using technology can solve problems in the delay of students to acquire knowledge with lots of access to learning resources that can be accessed easily, learning activities can be carried out anytime and anywhere so that students are able to face and develop their skills in this modern life.

In online technology-based distance learning, internet use utilizes platforms such as applications, websites, social media, and the Learning Management System (LMS) as learning media used to conduct online learning (Gunawan et al., 2020; Wiragunawan, 2022). These various platforms can be used to support knowledge transfer through multiple discussion techniques and others. The government also carried out innovations in learning by establishing an e-learning learning model during the pandemic, which is very helpful in learning during the COVID-19 pandemic.

In another article that discusses educational technology, an article by Suprianingsih et al., (2019) entitled "Game Design as a Learning Media for Hydroponic Gardening" discusses learning by applying game-based media that can facilitate students' and society's understanding by providing appropriate learning. with the topic raised regarding hydroponic gardening methods and systems, in contrast to articles written discussing how educational technology is very influential with virtual face-to-face learning or commonly called Study From Home so that this article can be used as a reference in organizing learning at what level of education even.

Based on the description above, an article review was carried out, which had the aim of providing an overview regarding educational technology innovations in learning during the COVID-19 pandemic. It is essential to know the implementation and impact of learning during this pandemic on students in Indonesia with the hope that it can provide information and improve the policies implemented.

LITERATURE REVIEW

Educational Technology

Educational technology can be defined as an attempt to solve problems in the field of education related to problems or issues in education. Educational technology is a study and ethical practice that is used to facilitate the ongoing learning process and has the goal of improving performance in education through educational areas with the use of technology as an appropriate resource.

The area of educational technology is decomposed from the components of the definition of learning technology based on the assumptions of Seels and Richey in their book entitled Instructional Technology: The definition and domains of the field defines Learning Technology as "theory and practice in the design, development, utilization, management, and evaluation of processes and resources for learning"

The role of educational technology in solving learning problems can be seen from the needs of the education itself. Humans, in order to meet their needs properly, need to learn. Meanwhile, to be able to learn effectively and efficiently, it is necessary to utilize various kinds of learning resources. Learning technology seeks to design, develop, and utilize various learning resources so that it can facilitate and facilitate someone to learn (Elihami & Saharuddin, 2017; Nase, 2021). So that in the end, there is an opportunity for someone to learn for life, anywhere, anytime, and by anyone, in any way and a learning source that suits their conditions and needs.

Learning technology is needed to be able to reach students wherever they are. Educational technology is also used to facilitate some students who have not had the opportunity to learn in order to meet their learning needs by following developments and increasing efficiency and effectiveness in learning (Nurfadhillah et al., 2021). Learning technology conceptually can play a role in teaching humans by developing and or using various learning resources, which include human resources, natural and environmental resources, opportunities or opportunities, and by increasing the effectiveness and efficiency of educational resources. (Budiyono, 2019) The role of learning technology to increase educational productivity can be pursued through learning potentials by 1) accelerating the learning rate (rate of learning), 2) helping teachers to use their time better, 3) reducing teacher burden in presenting information so that teachers can foster and develop students' learning enthusiasm (Elihami & Saharuddin, 2017).

Learning technology plays a role in efforts to solve educational and learning problems by 1) combining various approaches from the fields of economics, management, psychology, engineering, and others systemically; 2) solving learning problems in humans as a whole and simultaneously by paying attention to and studying all conditions and their interrelationships; 3) using technology as a process and product to help solve learning problems; 4) the emergence of folding power or synergy effects, where the combination of approaches and or elements has more value than just the sum (Wijayanthi, 2018).

Purwanto, in his book entitled Traces of the Development of Educational Technology in Indonesia states that the role of educational technology in solving learning problems, especially in expanding access and improving the quality of education, through: a) implementing learning development procedures in curriculum development; b) application of learning development procedures in the preparation of learning materials, modules, textbooks, or electronic books (e-books); c) application of learning methods that emphasize more on the application of the latest learning theories; d) develop and utilize various types of media in accordance with the needs and with due observance of the principles of their use effectively and efficiently, and; (e) developing learning strategies to build and find identity through active, interactive, creative, effective and fun learning processes.

Educational Technology Innovation

Innovation, when viewed from the word, comes from English, namely innovation which means everything that is new or renewal. In the Big Indonesian Dictionary (KBBI), innovation is defined as the inclusion or introduction of new things. These new inventions are different from those that already exist or have been known before (ideas, methods, or tools). This is in accordance with the opinion of Syamsuddin and Fuady (2020), who state that innovation is a new idea that can be applied to produce or improve a product, process, or service. Therefore, it can be interpreted that innovation is carried out to achieve a certain goal or solve a certain problem in a new way that already exists or was previously known.

Etymologically, education comes from the Greek word "pedagogie," which means guidance given to children by adults. Whereas in English, education is "education," which means development or direction. In Undang-Undang Nomor 20 Tahun 2003 concerning the Sistem Pendidikan Nasional, it is explained that education is a conscious and planned effort to create a learning atmosphere and learning process so that students (students) actively develop their potential to have religious, spiritual strength, self-control, personality, intelligence, noble character, and skills needed by himself, society, nation, and state. It can be concluded that education is an activity that is carried out intentionally and planned through a process of guidance activities to children so that they have emotional and spiritual intelligence and become good human beings in carrying out life and their future lives.

Educational Innovation itself according to Rusdiana in her book entitled The Concept of Educational Innovation states that innovation is used to solve problems in education, in this case covering matters related to the components of the education system both in the narrow sense, namely the level of educational institutions and in the broad sense, namely the national education system (Munirah, 2015). Another understanding states that educational innovation is a new and qualitative change that is different from what existed before and is deliberately sought to increase the ability to achieve certain goals in education (Ansori & Sari, 2020). There are two main objectives in educational innovation explained by the IKIP Malang Lecturer Team in his book entitled Introduction to the Fundamentals of Education, namely renewal and innovation in education as a new response to problems in education and as an effort to develop more effective and efficient education for actors education, especially educators and students.

In this context, it can be understood that educational innovation is a new change and qualitatively different from the previous situation, which was deliberately attempted to increase the ability to achieve certain goals optimally in education. In essence, educational innovation is a renewal in education or innovation carried out to solve educational problems. Educational innovation is an idea, item, or method that is felt or observed as new for a person or group of people (society), either in the form of new results or change something old so that it can be more helpful and used to achieve educational goals in solving current educational problems.

Educational innovation in Indonesia can be seen from four aspects: educational goals, educational and teaching structures, curriculum and teaching methods, and changes to educational aspects and processes. The purpose of the innovation itself is to achieve efficiency and effectiveness regarding the target of the maximum number of students with the maximum educational results according to the criteria of the needs of students, society, and development by using the resources of the workforce, money, tools and time in the right amount. as small as possible (Sukatin, 2020; Yulaini, 2017). So it can be concluded that educational innovation is a new or old way that is redesigned to solve educational problems whose goal is to achieve educational goals efficiently and can reach a wide range of students easily.

The development of technology was one of the innovation is during the Industrial Revolution 4.0, which resulted in all aspects of life in its implementation in direct contact using technological tools to facilitate human activity. Even now, society 5.0 aims to prepare human resources, one of which is always ready to touch technology. Therefore, innovation and technology cannot be separated in practice because the two are interrelated, and both have the goal of constantly innovating to facilitate human activities in various aspects, one of which is education.

METHODS

Descriptive research or Descriptive content analysis study is a method that is included in the qualitative descriptive approach. Content analysis is a scientific technique to interpret text or content (Adu et al., 2019). The sample taken in this study is a sample in the form of a source that will be used as a comparison or reference for the results to be obtained later. In this method, the process of sorting and selecting sources related to the research content is carried out. Comparison of searches from sources aims to maximize the results obtained following the discussion in the article. This search comparison was carried out by taking sources that met the criteria as sources with educational technology content during the COVID-19 pandemic.

RESULT AND DISCUSSION

Coronavirus Disease, a virus that existed in 2019 which can be called the COVID-19 virus or Coronavirus Disease, is a type of virus that causes a new disease that has never been previously identified in humans. Common symptoms of COVID-19 infection are symptoms of acute respiratory distress such as fever, cough, and shortness of breath (Lidiana et al., 2021; Puti, 2020). Currently, the COVID-19 virus outbreak is occurring in all parts of the world, including Indonesia. The impact of this virus has resulted in all activities having to implement physical distancing, or it can be called social distancing, which means taking physical care and keeping a distance to reduce the spread of COVID-19 by not touching each other and maintaining a distance of one meter in all social activities. This application is also carried out in activities in the education sector, namely learning. Various schools and tertiary institutions in Indonesia have begun implementing physical distancing through online learning activities.

Therefore, the spread of this virus affects various aspects of life. At the beginning of the spread of the coronavirus, it affected the world economy, but the world of education also felt its impact. Policies taken by many countries, including Indonesia, by closing educational activities, forced the government and related institutions to provide alternative educational processes for students and students who could not carry out the educational process directly at educational institutions as in general with face-to-face learning.

Activities involving groups of people are now beginning to be restricted, such as going to school, working, worshiping, and so on. The government has also issued regulations urging people to work, study, and pray from home to reduce the spread of the virus and patients

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exposed to COVID-19. The Minister of Education Nadiem Anwar Makarim issued *Surat Edaran Nomor 30 Tahun 2020* on *Satuan Pendidikan* and *Nomor 36962/MPK.A/HK/2020* concerning *Pelaksanaan Pendidikan dalam Masa Darurat Coronavirus Disease (COVID-19),* which emphasizes learning activities to be carried out online by applying distance learning away to prevent the spread of the virus.

In this regard, *Permendikbud Nomor 65 tahun 2013* explains that to achieve the learning process as stipulated in the 2013 curriculum, it is necessary to apply a scientific approach and adopt thematic learning models. Inquiry, and teachers as educators encourage students to produce works (Based on *Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 65 Tahun 2013 tentang Standar Proses Pendidikan Dasar dan Menengah*).

Permendikbud was issued to prevent the spread of the COVID-19 virus from the Education cluster. But even so, the learning process must still be carried out because education is a person's right as a citizen. Policies issued by the government are based on calculations and considerations of various possibilities that may occur. Based on this policy, educators develop learning methods and strategies aligned with the guidelines for implementing education during the COVID-19 pandemic.

In implementing the policy, there are obstacles faced by educators and students. These changes occur due to circumstances that force change due to the pandemic. Because the emergence of a pandemic was something beyond predictions, the implementation of learning activities was also hampered (Asotska-Wierzba, 201). But over time, all parties are getting used to it and are starting to learn to live side by side with the pandemic by continuing to make efforts to utilize technology in the learning process.

Educational Technology

With the emergence of the COVID-19 pandemic, teaching and learning activities that were originally carried out in schools have now become online learning at home, also known as *Pembelajaran Jarak Jauh* (PJJ), which aims to prevent the spread of the virus. Distance learning is learning by educators (teachers, lecturers, teaching staff) with students in different places with the help of technology that can carry out learning anywhere. Distance learning uses technological assistance in the learning process using the internet network and applications that can facilitate the learning process. Distance learning itself is often referred to as online learning. Online learning itself can be carried out according to the abilities of each school (Prasetyo & Zulela, 2021). Of course, in the implementation of distance learning, it is necessary to pay attention to the educational process standards that have been set, so in the learning process, the teacher is flexible following the situation and conditions of students facing distance learning with the help of this technology.

In the process, learning is carried out online with the help of information and communication technology, which aims to slow the spread of the coronavirus. Learning that was previously held directly in class is now carried out using video conferencing using applications such as Google Meet and Zoom or learning videos that can be accessed on social media or websites. Many educational technology innovations have been implemented as learning solutions during this pandemic. Basically, educational innovation is an effort to

improve educational aspects in the practice of carrying out learning. Educational innovation is a new change, qualitatively different from what existed before, and is deliberately attempted to increase the ability to achieve specific goals in education.

Education itself in practice continues to develop following the times and continues to exist to create human beings who can live life with the knowledge they gain. Education is one aspect that must participate in innovation. The existence of technology has changed traditional learning patterns, becoming hybrid, even fully digital (Lobova & Ponkina, 2021). The use of technology in the education process is the emergence of various learning platforms that can be accessed by educators and students for technology-based learning activities (Al-Hakim & Azis, 2021; Susanty, 2020).

Therefore, it can be concluded that the development of learning with the help of technology will not be far related to innovation. Innovation continues to be carried out in human life, including in the aspect of education. In this aspect, technology is used as one of the innovations in education. Technology acts as a renewable tool whose job is to help achieve educational goals in learning where technology is a tool and learning resource. Technology itself has changed the way of learning from face-to-face to distance learning using video conferencing so that learning uses an e-learning model.

Educational Technology Innovation

Innovations made during learning during this pandemic cannot be separated from the use of technology as a learning medium and e-learning learning methods. The development of e-learning can run well if there is a collaboration between innovative devices and adaptive Human Resources (HR) for the sustainability of the e-learning system (Prodanova et al., 2021). Technology presents potential as a link and resource in learning, as an alternative when the learning process needs to be implemented in an emergency, and not only using technology as a means of communication but also collaboration (Zecca, 2021). In digital technology-based distance learning using the internet, it utilizes platforms like applications, websites, social media, and learning management systems (LMS) as learning media (Gunawan et al., 2020; Handayani et al., 2021). These various platforms can be used to support the transfer of educator knowledge to students by using learning methods that are supported by various techniques and tactics that can attract student motivation, for example, by methods of discussion, question, and answer, and others. The government also carried out innovation in learning by establishing an e-learning as a learning model during this pandemic.

Educators use many applications in the online learning process at home, such as websites, e-learning, Google Classroom, Whatsapp, Zoom, Edmodo, and other applications (Astini, 2020; Rosa, 2021; Roza et al., 2021). Educators can take advantage of various features on each platform used during learning. Like the features on Google classroom, educators can use assignments as a place to collect assignments and information on assignments, grading as a notification of the value given by educators to students on learning outcomes in the form of assignments or tests, communication as a means of communication between educators and students, time- costs as settings, reminders, as well as methods for educators and students in managing time, archive course data archiving tools so that data

can be collected automatically to devices and not lost, mobile applications are programming that makes it easier for students and educators to use applications, and privacy protect the personal data of students and educators.

Distance learning by applying the method of giving assignments online for students via WhatsApp groups is seen as effective in emergency conditions due to the current coronavirus (Jannah & Santoso, 2021). Many teachers implement learning in various ways at home, from the differences in learning, the basis is still online learning. Some use the concept of online lectures, and some continue to teach in class as usual but videotape them and then send them to the students' Whatsapp application, some use free content from various sources (Dewi, 2020; Juliawan et al., 2021).

Technology as software plays a significant role in learning, especially in the current COVID-19 pandemic. Technology makes it easy for educators and students to carry out distance learning (Mu'minah & Gaffar, 2020; Riyandi et al., 2020). In addition, technology also helps educators to add choices of learning methods that can be chosen, such as the blended method (Bedebayeva et al., 2021). Various kinds of platforms are provided with the intention of facilitating the implementation of distance learning, including facilitating educators in conducting assessments of students even though they are not carried out face-to-face, by utilizing various platforms such as Google documents as a medium for conducting online discussion forums, submitting exams via Google form, as well as providing Quizzes through the website or application.

Technology assists students in obtaining subject matter that may not be obtained during distance learning by accessing various websites and applications such as Edutafsi.com, Wolframalpha.com, Slideshare, Inspigo, and many more. In addition, technology also plays a role in increasing the creativity of educators and students. Educators can innovate in delivering learning materials by utilizing various social media sites such as Facebook, Instagram, YouTube, and so on (Salsabila et al., 2020) and various other possible methods. To be combined (Meng et al., 2022). As with educators, students can use various social media sites to fulfill assigned tasks. Technology as a learning medium needs to be considered when using technology in learning, one of which is the use of various platforms as online learning media, educators should provide understanding to student parents so that there are clear understandings in its implementation.

Giving directions to students about the use of technology as a form of introduction to the functions and benefits of the software. Therefore, innovation is carried out not only in learning media, but innovation is carried out in every component of educational elements with the help of technology. Starting from goals, strategies, learning resources, and learning evaluations, collaboration with technology can be done because, at this time, all aspects of life are in direct contact with education. Especially in the current implementation of learning, human resources are needed who can innovate on how to implement distance learning due to COVID-19.

Discussion

Learning innovation using technology can provide benefits in supporting the success of online learning during a pandemic like today. The success of online learning is not only influenced by the role of internet technology but also by the quality of human resources. Internet technology will not have a significant impact if operators or users do not have good knowledge and skills in using and managing technology. Internet technology innovation in online learning plays a crucial role because, without internet-based technology, it can hinder online learning. Internet technology also influences students or students to find learning materials they do not understand. Therefore, there is a need for educational innovation to support learning during the COVID-19 pandemic, both with the help of technology and the creativity of educators in managing learning at this time.

CONCLUSION

Based on the results of the review and discussion, it can be concluded that innovations made in the field of educational technology during the COVID-19 pandemic need to be carried out by utilizing digital platforms at the school level so that the education process goes in a better, more effective and more enjoyable direction. Teachers are also expected to be more innovative in packaging teaching materials and more creative in developing learning methods to attract student enthusiasm. However, it is necessary to readjust to the various abilities of each teacher, student, and parent in providing online learning facilities so that the obstacles experienced can be minimized.

Learning innovation efforts carried out by the government to prevent the spread of COVID-19 are expected to provide novelty and benefits for the realization of effective and efficient education. In carrying out technology-based online learning, teachers, students, and parents have experience and new knowledge related to learning technology, especially for those who are technologically illiterate. The hope is that learning innovation during the COVID-19 pandemic can be used as an opportunity to support the quality of education in the future and compete globally. Learning innovations can continue to be carried out anytime, anywhere, and by anyone, both educators and students, in order to achieve educational goals, namely to mature humans through innovative education and training with the use of technology.

AUTHOR'S NOTE

The author declares that there is no conflict of interest regarding the publication of this article. The author confirms that the data and content of the article are free from plagiarism.

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