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# THE ROLE OF DIGITAL TECHNOLOGY TO ENHANCE CREATIVITY AND INNOVATION SKILLS FOR LEARNERS IN THE 21ST CENTURY ERA

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**ABSTRACT**

*The 21st century era is characterized by the rapid advancement of digital technology that affects various aspects of life, including education. Digital technology offers various opportunities to improve the quality of education, including in developing creativity and innovation skills for learners. The purpose of this study is to explore and understand the role of digital technology in improving creativity and innovation skills for learners in the 21st century era. This research utilizes qualitative research with data collection techniques in the form of literature studies. After the data is collected, the analysis is carried out through 3 steps, namely data reduction, data presentation, then a conclusion is drawn. The findings of this study show that digital technology has an important role in improving creativity and innovation skills for learners in the 21st century era. Digital technology can help learners to develop creative thinking, improve problem solving skills, and develop adaptability. Strategies to integrate digital technology in learning to improve creativity and innovation skills for learners include creating a conducive learning environment for the use of digital technology, providing training to teachers on the use of digital technology, and developing digital technology-based learning resources.*

**KEYWORDS** *Digital Technology, Creativity Skills, Innovation, Learners*



## INTRODUCTION

The 21st century era is characterized by rapid advances in digital technology that have significantly changed various aspects of life, including education. Learning in the 21st century era shows a striking difference with the learning methods in the past. Today, learning has been guided by predetermined standards,

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where the main attention shifts from teachers to students (Pahrudin, 2019). Teachers have a definite role in providing materials and setting clear goals for learners. Collaboration is also a key element in 21st century learning, as technological advances have changed the way we work, socialize, play and learn. The 21st century era is known for automation that turns manual routines into automated ones, where technology, especially gadget devices, becomes an integral part of everyday life (Iftitah, 2023).

Technological developments have had a major impact on various aspects of life, including education. Educators are now required to have creative and innovative learning abilities in delivering learning materials. Technological innovation has given birth to various new learning methods that support the learning process. These advances have also given rise to a variety of new, more specific branches of science, such as cognitive science, molecular biology, information technology, and nanoscience, which have contributed significantly to the development of education and learning in this modern era (Hakim, 2023).

Digital technology opens up great opportunities to improve the quality of education, especially in developing creativity and innovation skills for learners. Creativity is the ability to create new things that are useful and can overcome challenges in society that involve the ability to think originally and produce innovative ideas. On the other hand, innovation involves applying those ideas to do something new. Meanwhile, innovation is the process of generating new value by realizing, combining, or developing existing ideas and knowledge. This process involves customizing and applying these ideas to create new products, processes, or services that have added value (Fitri, 2023).

Previous research by (Said, 2023) confirmed that the use of technology as a learning medium has a positive impact on improving the quality of learning. Through technology, the accessibility of learning can be improved, flexibility in the learning process can be guaranteed, and the effectiveness of learning can be improved. The use of technology can also increase students' interactivity in learning, encourage their involvement in learning activities, and spur project-based learning.

Another research conducted by (Sinaga, 2023) highlights the importance of 21st century learning in facing the demands of the digital era. 21st century learning emphasizes the importance of character development and skills relevant to current industrial conditions and technological developments. One of the 21st century learning approaches is to familiarize students with the 4Cs, namely Communication, Collaboration, Critical Thinking and Problem Solving, and Creative and Innovative. Teachers must be able to present learning that is relevant to the needs of the 21st century and continue to develop skills and innovations in implementing learning.

The findings can serve as a basis for further research in understanding the dynamics of digital technology use in education and how it can be applied more effectively in improving learning quality. In addition, this study also contributes to theories of learning and innovation by highlighting the role of digital technology as an important factor in enhancing creativity and innovation skills. The purpose of

this research is to explore and understand the role of digital technology in enhancing creativity and innovation skills for learners in the 21st century era.

## RESEARCH METHOD

This research adopts a qualitative research approach. Qualitative research is a motede that aims to understand the phenomena experienced by research subjects, such as in terms of attitudes, views, goals, and actions as a whole by describing them through words and language. This research is conducted in a certain natural context and uses a variety of natural methods (Rukin, 2019). The data collection method used in this research is literature study. The data collected was then analyzed through three steps, namely data reduction, data presentation, then conclusions. First, data reduction, which is the process of simplifying and selecting relevant data for the research focus. Second, data presentation, where the data that has been reduced is arranged in a systematic form for easy understanding and further analysis. Third, conclusion drawing, which involves interpreting and determining the meaning of the data presented, as well as making final conclusions that support the research objectives.

## RESULT AND DISCUSSION

Entering the current era or known as the 21st century, humanity is faced with great challenges characterized by the accelerated development of science, technology, and information, as well as the loss of space and time boundaries between countries. The emergence of these changes has encouraged the need for new standards in education so that students have the competencies needed in the 21st century (Kurniawati et al., 2019). Education in Indonesia must be ready to produce young people who are equipped with the skills needed to face the challenges of the 21st century. The skills that students need to master include creative thinking, flexible problem solving, the ability to collaborate, and innovation. These skills are important so that students can face and solve complex problems that occur in this century.

The existence of increasingly complex challenges both now and in the future requires an increase in learning skills, especially in terms of creativity and innovation. According to (Pare & Sihotang, 2023), explaining that creativity and innovation skills are key in facing these demands. Learners need to be able to acquire and hone these skills in order to adapt to rapid and complex changes in society and the world of work today and in the future.

According to (Mashudi, 2021) to face these challenges, students need to have several important skills. First, learners must have the ability to think critically, meaning that they are able to analyze information carefully and make the right decisions. Second, learners must have the ability to think creatively, which helps them to generate new ideas and innovative solutions to problems. Then, the ability to innovate is also important, as learners need to be able to develop new ideas and create unprecedented solutions.

The importance of creativity and innovation skills in students is reflected in the ability to generate new ideas and innovative solutions to complex problems. In addition, creativity and innovation also help students compete in an increasingly competitive job market. The ability to carefully analyze information and make informed decisions is also a very important skill. This means that creativity and innovation not only provide an edge in solving problems, but also prepare students for success in the world of work that demands adaptability and innovation.

Since creativity and innovation are important aspects that must be possessed by students, then how to increase this creativity and innovation for students, and one way is to utilize digital technology. According to (Ambarwati et al., 2021), innovation strategies in education must be able to implement smart use of technology and utilize existing potential to create better learning processes and learning practices. The integration of technology in education can help create a more dynamic and effective learning environment, allowing students to develop the creative and innovative skills needed in this modern era.

Technology is the result of the development of science which also has an impact on the world of education. Therefore, it is important for the education sector to utilize technology to support the learning process. According to Tondeur (in Lestari, 2018), digital technology has begun to be applied in various educational institutions as a learning support tool. This technology is used both as a tool to access information and as a learning tool that helps in learning activities and completing tasks.

By definition, digital technology is a type of information technology that prioritizes the use of computers or digital devices in performing various activities, compared to direct human involvement. Furthermore, it tends to adopt automated and sophisticated operating systems, using computerized or computer-processable formats. The essence of digital technology is its ability to perform calculations quickly and efficiently, and process information in the form of numerical values (Danuri, 2019).

The development of digital technology has advantages in terms of quality and efficiency in terms of data generation and transmission. For example, images become clearer due to improved quality, data capacity becomes more efficient, and the process of sending data becomes faster. In education, digital technology has been implemented in several aspects, as mentioned in (Lestari, 2018):

1. Learning media
   Digital technology has been used as a means to enrich the learning process by presenting interactive, visual, and more engaging content to students. This can include the use of multimedia presentations, learning videos, educational games, and online learning platforms.
2. Administrative tools
   Digital technology is also used to make administrative tasks easier for teachers and school staff. This includes the use of student management software, digital attendance systems, academic record management systems and applications for curriculum planning.
3. Learning resources

Various digital learning resources, such as e-books, e-journals, video tutorials and other online resources, are available for students and teachers to expand students' knowledge beyond the classroom. These resources can be accessed online from anywhere at any time, increasing flexibility in the learning process.

Digital technology provides a number of major benefits in education, such as its ability to improve the efficiency, quality, and effectiveness of the teaching and learning process. Using technology, teaching can become more interactive and personalized, allowing teachers to create engaging and motivating learning materials and provide more timely and personalized feedback to students (Alimuddin et al., 2023). Furthermore, digital technology can help students to access resources and information more widely and deeply. It helps to enhance collaboration and engagement in the learning process, where students can work together on online projects, discussions and activities, even if they are in different locations. Technology also supports student participation in interactive activities and simulations, which helps them better understand complex concepts and processes.

The role of digital technology in improving learners' ability to develop creative thinking and innovation is as follows. First, the role of digital technology in honing students' creative thinking skills by providing various tools and platforms that help learners to explore creative new ideas. Digital technology gives access to learners to use online learning resources such as e-books, interactive learning materials, videos and other digital resources. With this technology, learners can access these learning materials anytime and from anywhere, overcoming time and geographical constraints (Said, 2023). Wide access to learning resources allows learners to seek inspiration and learn from creative approaches practiced around the world. It encourages them to think beyond conventional boundaries and come up with innovative solutions. Self-directed learning also encourages learners to hone their creativity and innovation in solving their own learning problems.

Digital technology has a role to play in improving learners' problem-solving skills by facilitating collaboration and communication between students, teachers and fellow students. Through online learning platforms, discussion forums and collaborative tools, students can work together on projects, exchange ideas, provide feedback and learn from different perspectives (Said, 2023). This collaboration, facilitates a more interactive and cooperation-based learning process, which encourages learners to develop strong problem-solving skills.

In addition, the role of digital technology in the development of problem-solving skills for learners can be that simulation software and data analysis tools allow them to create various scenarios and analyze the results, helping to deepen their understanding of complex concepts and find effective solutions to real problems (Kurdi, 2021). In a sense, digital technology provides a platform for learners to practice and test their understanding of the subject matter in a controlled and interactive context, which in turn hones their problem-solving skills.

Another role of digital technology is to help learners develop their adaptability. In the ever-evolving digital age, adaptability is becoming increasingly crucial. Digital technology helps learners hone this adaptability by introducing them

to a variety of tools and platforms that are constantly evolving. Learners who can keep up with the latest technological developments will be able to increase their knowledge in various fields and develop new skills that will be useful in the future. They also have a greater chance of securing employment, as they have a deep understanding of the latest trends in different fields. In addition, their ability to understand and use new technologies can also help companies become more efficient, as they are able to apply the latest technologies for various needs (Alimuddin et al., 2023).

For example, learners can gain knowledge about using new software, adapt to the latest technology and keep up with the latest developments in the digital realm. In addition, with the help of digital technology, learners can develop independent learning skills through project-based learning and self-directed learning. This encourages the ability to hone adaptation to changing situations and needs more effectively. So that they can prepare for future challenges and adapt to a dynamic environment effectively.

So, based on these findings, it can be said that digital technology plays a significant role in enhancing creativity and innovation skills for learners in the 21st century era. Therefore, effective strategies are needed to ensure that the role of digital technology can be optimized. The first strategy is that schools should create a learning environment that is conducive to the use of digital technology. In the learning process, the learning environment plays a very important role in energizing learners and socially influencing the overall learning process. According to (Damanik, 2019), the learning environment is not only a place where learning occurs, but also a source of information and experience that affects the success of the learning process and the development of learners.

To build a learning environment suitable for the use of digital technology, schools must first pay attention to adequate infrastructure, such as computers, internet access, and digital learning software, to support the implementation of digital learning design (Firnando, 2024). In addition, schools can also develop classrooms equipped with interactive technologies such as digital whiteboards, projectors, and virtual reality (VR) devices that can create a more dynamic and interesting learning atmosphere. Thus, with the availability of a learning environment equipped with digital technology infrastructure, the use of technology can be optimized to improve creative skills and encourage innovation in the learning process of students.

The next strategy to ensure the role of technology can be optimized, by providing training to teachers on the use of digital technology. As mentioned by (Ambarwati et al., 2021), technological advances must be supported by human resources who are skilled in operating the technology. Empowering individuals with relevant skills in the digital realm is key to participating in various aspects of life, both economic, social, and cultural, both now and in the future. One approach that can be taken is to provide new knowledge and training to teachers so that they are ready to face the development of the curriculum and technology.

Training and professional development for educators is vital in preparing them to integrate technology in educational contexts. Through proper training and development, educators can acquire the necessary knowledge and skills to utilize

technology effectively. They can also understand the potential and risks associated with using technology in education (Alimuddin et al., 2023). Educator training and development involves various activities such as workshops, seminars and online courses specifically designed to develop educators' technological skills. In addition, collaboration with higher education institutions or technology providers can also be an effective way to continuously update their technological knowledge and skills.

Next, after developing the appropriate environment and human resources, the next strategy is to develop digital technology-based learning resources so that the role of technology can be optimized. Learning resources are anything that can be used as a reference or material to improve students' knowledge and skills (Sasmita, 2020). Learning resources in the form of digital technology consist of hardware that acts as a teaching aid, and software that becomes teaching material. The development of digital learning materials aims to align with students' needs and learning styles, by integrating various multimedia elements and ensuring accessibility. The development of digital learning resources involves creating interactive and engaging content, such as learning videos, e-learning modules, educational games, and virtual simulations. These contents can be adjusted to the applicable curriculum as well as the individual needs of learners.

So by implementing these strategies, it is hoped that the role of digital technology in education can reach an optimal level with very positive benefits for learners' abilities. Thus, digital technology is not only a tool, but also the main driver in developing learners' creative and innovative potential in the 21st century era. This confirms the importance of utilizing technology as a tool that supports the learning needed to face the challenges arising from changes in the current era.

## CONCLUSION

Digital technology plays a crucial role in enhancing learners' creativity and innovation skills today. Through the utilization of digital technology, learners can hone their creative thinking skills, improve their problem-solving skills, and expand their adaptability. There are several effective strategies in integrating digital technology into the learning process to enhance learners' creativity and innovation skills. These include creating a learning environment that supports the use of digital technology, providing training to educators regarding the utilization of such technology, and developing digital technology-based learning resources. Thus, digital technology is not just a tool, but also the main catalyst in developing learners' creative and innovative potential in the 21st century era.

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