



# Transforming Education Through Technological Innovation In The Face Of The Era Of Society 5.0

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## ABSTRACT

Technological and industrial developments have reached Society 5.0, and education today is centered on a balance where the Internet is not only a medium of information but plays a role in living life. The formulation of the problem in this study is how education transforms education in Indonesia in facing the era of Society 5.0. The purpose of this research is to explain how education is transformed in facing the era of Society 5.0. The research method used is qualitative descriptive with literature studies. This study concludes that technological developments cannot be avoided, so we must be able to adapt and respond to these developments. The era of Society 5.0 is marked by rapid technological development and integration between humans and technology. The transformation of education has become very important in this era, where the need for digital skills, creativity, collaboration, and problem-solving is increasing. Technological innovation is critical in changing how education is delivered, accesses information, and interacts between learners and educators. This article discusses how technological innovation can change the education paradigm, facilitate active and collaborative learning, and improve the quality of education in the era of Society 5.0.



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## INTRODUCTION

Society 5.0 is an era of digital transformation that significantly impacts almost all sectors of life, including education. In the era of Society 5.0, digital technologies such as artificial intelligence (AI), the Internet of Things (IoT), big data, and cloud computing significantly improve efficiency, productivity, and quality of human life. The transformation of education is significant in facing the challenges and opportunities offered by the Era of Society 5.0. Technological innovation can be vital in improving education systems, facilitating personalized learning, and preparing future generations for the demands of an increasingly complex society.

Education in Indonesia has experienced a new dynamic, namely the change of the era, which was initially the industrial revolution 4.0 to the era of Society 5.0. The development of information technology is currently considered to be the gatekeeper of civilization-era society 5.0. This concept developed initially in Japan, which stated that the era of Society 5.0 is "A human-centered society that balances economic advancement with the resolution of social problems by a system that highly integrates cyberspace and physical space" (al-Fikri, 2021). Furthermore, Estitika in her research stated that one of the skills and competencies of 21st century teachers is the mastery of technology in learning. (Wijaya et al., 2016), this is an opportunity for transformation to occur in education, as well as a threat for those who are not ready to adapt to technology.

Today's technological developments bring new changes to all sectors of life. One sector that has experienced the impact of this technological development is the education sector. Education is a basic need of every human being. With these developments, various conveniences and changes in the way of teaching and learning are increasingly felt as it is known that the pattern of education that used to be teaching and learning activities centered on teacher activity to transfer knowledge to students is now shifting and creating a new environment where the learning environment is centered on students (Marisa, 2021).

Education is learning from a group's knowledge, skills, and habits from one generation to another. This is implemented through teaching, training, and research (Siahaan et al., 2023). Education is manifested in the form of guidance from others, but it also does not rule out the possibility of self-taught. The experience experienced by a person also shapes the pattern of thought, feeling, and action can also be called a life education. In life, education is a very important aspect, a big role that provides progress in thinking and acting, is a positive impact on the implementation of a sound education system. A good education system certainly comes from a good curriculum system. The curriculum has a significant role in the process of advancing education in a country (Sakti, B., 2022).

Education in Indonesia tends to use the curriculum left over from the colonial era. This makes Indonesia have to make improvements in terms of curriculum. Development of the curriculum in Indonesia after Indonesia's Independence in 1945; the curriculum in Indonesia underwent many changes in 1947, 1952, 1964, 1968, 1975, 1984, 1994, 2004, 2006, and 2013 until 2022; the Merdeka Curriculum was born. Curriculum changes often occur because they are in harmony with changes in political, social, cultural, economic, scientific, and technological systems in the life of the nation and state (Siahaan et al., 2023)

Education has a substance called curriculum. To achieve certain goals, the curriculum is seen as a plan of learning activities for students in schools. Objectives, teaching materials, teaching and learning activities, schedules, and evaluations all refer to the curriculum. Written documents that are the product of policymakers and curriculum creators are referred to as curricula. Different things certainly must also be done because, basically, the changing times have also made the world of education transformed in terms of learning tools. In the current era of society 5.0, people need to coexist with technology to maintain their way of life.

Mawardi (2017) research findings demonstrate the efficacy of utilising technology as a tool for educational transformation, addressing the evolving demands and complexities of global development, particularly in the realm of information and technology advancements. In order to attain the desired level of excellence, there exist various approaches that can be pursued. One such approach, as elucidated by Salisbury, pertains to Five Technologies for educational transformation. This technology has been extensively utilised in the corporate realm, enhancing the competitiveness and adaptability of business operations. The technologies encompassed within this framework include: (1) System Thinking, (2) System Design, (3) Quality Science, (4) Change Management, and (5) Instructional Technology.

The research conducted by Wijaya et al. (2016) demonstrates that the skills required in the business and industrial sectors of the 21st century encompass three key areas: (1) the ability to innovate and acquire new knowledge; (2) proficiency in managing one's personal and professional life; and (3) competence in utilising technology and information media.

## **RESEARCH METHODS**

This research uses a qualitative approach with a literature study method. The literature study method is a data collection technique by conducting a literature review that is relevant to the research and aims to provide a description to the reader (Rondiyah et al., 2017). Data analysis techniques use content analysis techniques to obtain the right data to support the research objectives. In this journal article, the method used is a qualitative research approach by collecting data through literature reviews, case studies, and comprehensive analysis. The qualitative research approach makes it possible to gain a deep understanding of the phenomenon of educational transformation through technological innovation. The literature review was conducted by searching and analyzing various relevant literature sources on technological innovation in education and educational transformation in the era of Society 5.0. These literature sources may include journal articles, books, research reports, and other related sources. (Nastiti & Ni'mal'Abdu, 2020)

Case studies were also conducted to gain deeper insights into the implementation of technological innovations in education in several educational institutions. This case study involves observation, interviews, and data collection from educational institutions that have adopted technological innovations. The data obtained from these case studies are analyzed to identify trends, challenges, and benefits of technological innovation in an educational context.

In addition, a comprehensive analysis was also conducted to blend and analyze data obtained from literature reviews and case studies. These data are analyzed by comparing, classifying, and

extracting relevant information to describe the transformation of education through technological innovation in the face of the Society 5.0 Era.

This research method is used to gain a comprehensive understanding of the trend of technological innovation in education, the challenges in adopting it, and the benefits resulting from the transformation of education through technological innovation. With this approach, this journal article can provide deep insights and strong arguments about the role of technological innovation in transforming education in the era of Society 5.0.

## **RESULTS AND DISCUSSION**

The era of Society 5.0 is an era where humans coexist with technology. We have lived in a new era where globalization and the rapid evolution of digital technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), and Robotics bring significant changes to citizens. The era of disruption has made fundamental changes in the life sector. In the era of Society 5.0, all aspects of life are related to technology; this has made humans have to think critically and be able to adapt and innovate. The presence of this new era is hoped that humans can continue to develop themselves when technology is growing rapidly. Education must also transform in the era of Society 5.0. Indonesia, whose talent and interest approach is one of the learning techniques mentioned in the independent curriculum (Wahono, 2022, p. 175)

In the era of Society 5.0, not only must we be equipped with critical thinking but also analysis and creation. High Order Thinking Skills (HOTS) or higher order thinking is a breakthrough in finding the right knowledge concepts with direct practice and feeling how to deal with problems found in the environment of Inquiry Learning, Discovery Learning, Project Based Learning, and Problem-Based Learning in learning models that will change critical thinking reasoning skills. (Kristiyono, 2018, p. 36)

This technological transformation in the education sector is the government's effort to overcome the learning crisis that occurs as a result of the pandemic, which hampers teaching and learning activities. By combining the support of technology and the education system, it is expected to be able to improve the quality of learning in Indonesia.

The development of the times makes the world today must prepare for revolution 5.0, which makes us have to face fundamental changes, including the way we live, work, and relate to each other. The era of revolution 5.0 is actually not new, considering that we are currently in the industrial phase 4.0, where collaboration between humans and technology is slowly starting to be applied. In the concept of era 5.0, the industry began to touch the virtual world in the form of human, machine, and data connectivity. One of the unique characteristics of Industry 5.0 is the start of the use of the Internet of Things (IoT) and also the application of artificial intelligence (AI). (Sasikirana, 2020)

The development of the 5.0 era will certainly also have an impact on the world of education. In this revolution, the changes made are not only in terms of learning but also include perspectives from the concept of education itself. Mature curriculum development must be carried out so that later the output of the education system in Indonesia is able to produce global thinking, soft skills, transversal skills, and invisible skills that are useful in many work situations.

In addition, the role of professional and competent educators also has a considerable influence in facing the world in the era of revolution 5.0. Educators are required to have skills in the world of education and are also able to think creatively. Education is a dynamic thing, and for that, the system applied in the world of education should also keep up with the times. The fulcrum of a country is a good and integrated education system. If the world of education is not prepared to keep up with existing developments, it is certain that Indonesia will become a lagging country.

The results of Houtman's research in 2020 explained that Merdeka Belajar is an innovation in providing policymakers related to policy implementation that learning outcomes cannot always be measured from cognitive aspects in the form of values but affective and psychomotor aspects in the form of attitudes, skills, creativity, innovation, independence, and competence are also needed. Accreditation is also a determining factor for these educational institutions, whether or not they are good in the implementation of education (Daga, 2021) This is in line with the emergence of Society 5.0, which is the impact of the rapid industrial revolution 4.0, which affects the conventional industrial order to become all-digital. Humans who cannot be separated from technology are certainly one of the most interesting things. Because the changing behavior of society certainly also has an impact on students. Education is certainly also affected, so assessment cannot be measured in just one aspect.

The results of K. Nagy's research explain that the development of innovation models in education is very useful for the transformation of social needs. (Nagy et al., 2020) The concept of Society 5.0 is being examined through the process of innovation planning and implementation. The creation of innovation models continues to be adjusted to the needs of Society 5.0 for innovation. The paradigm of creating innovations in adjusting to the needs of Society 5.0 is easier and able to help recover from disasters due to the COVID-19 pandemic due to technological advances. Reviewing the facilities and needs of each school in Indonesia is important to implement an independent curriculum in training students to be more optimistic in facing challenges in the era of disruption and Society 5.0. (Handayani & Muliastri, 2020)

The results of Marisa's writing in 2022 regarding the implementation of the Independent Curriculum in the Era of Society 5.0 that the Independent Curriculum is one of the solutions for Indonesian education in the future. A more flexible curriculum will certainly also make it easier for teachers to provide learning; plus, in the era of Society 5.0, it is certainly a challenge for teachers to adjust to learning that must be technology-based (Marisa, 2021). With the idea of digital transformation in education, it is expected to be able to build an education system and encourage learning to be of higher quality so that Indonesia can compete and become a more advanced country than the previous era.

### **Trends in Technology Innovation in Education**

Technological innovation in education has provided a variety of significant benefits. One prominent trend is the use of artificial intelligence and data analysis to personalize learning. By utilizing this technology, education can be tailored to the needs and learning speed of each student. In addition, virtual and augmented reality technologies have also become an important trend in creating immersive and interactive learning experiences. Online learning platforms are also growing, allowing for wider and more flexible access to education. Technological innovation in education has brought significant changes in the way we learn and teach (Priyambodo & Saputri, 2021).

Some of the emerging trends of technological innovation in the context of education are as follows: (1). Personalized Learning: Technology has enabled more personalized learning for each individual. Through the use of artificial intelligence and data analysis, education can be tailored to the needs and learning speed of each student (Suhendar, 2021) Adaptive learning systems allow students to access relevant material and obtain feedback appropriate to their abilities. (2). Game-Based Learning: Technology has introduced elements of play into the learning process. Game-based learning uses game elements such as challenges, rewards, and competitions to make learning more engaging and interactive. This can increase student motivation and involvement in the learning process. (3). Virtual Reality and Augmented Reality: The use of virtual reality and augmented reality technologies has opened the door to immersive and interactive learning experiences (Legi et al., 2022) Through the use of devices such as VR headsets or AR apps on mobile devices, students can explore virtual environments that resemble the real world, visualize abstract concepts, or interact with three-dimensional objects in a learning context. (4). Online Learning Platforms: Online learning platforms or e-learning have become a strong trend in education. With this platform, students can access learning materials flexibly and independently via the Internet. It enables distance learning, access to diverse learning resources, and collaboration between students and teachers through discussion forums and online communication tools. (5). Internet of Things (IoT) in Education: The concept of the Internet of Things, where everyday devices and objects are connected to the Internet, has also been applied in an educational context. IoT enables the use of smart devices, such as sensors, interactive whiteboards, or IoT-based learning tools, to enhance the learning experience and collect relevant data for analysis and improvement of learning. (6). Digital Skills and Problem-Solving: Technological innovation has also placed emphasis on developing digital skills and problem-solving abilities. In an era dominated by technology, it is important for students to have a good understanding of technology, including skills such as programming, data analysis, cybersecurity, and critical thinking. Technology has provided the tools and resources necessary to practice these skills through online courses, programming platforms, and collaborative projects.

These trends in technological innovation in education continue to grow along with technological advances and increasingly complex educational needs. It is important for educational institutions and educators to keep abreast of these trends and utilize them effectively in creating innovative and relevant learning environments for students in the era of Society 5.0.

### **Challenges in Adopting Technological Innovation**

Although technological innovation in education offers a lot of potential, challenges must also be faced. One of them is the digital divide between students who have adequate access and technology skills and those who do not. It is important to ensure that all students have equal opportunities in accessing and utilizing these innovations. In addition, data protection and privacy are also important issues that need to be addressed seriously in the use of technology in Education (Legi et al., 2022). Adopting technological innovations in an educational context is also faced with a number of challenges that need to be addressed.

Here are some of the challenges often faced in adopting technological innovation: (1). Digital Divide: One of the main challenges is the digital divide between students who have adequate access and technology skills and those who do not. Some students may not have stable internet access, adequate devices, or a sufficient understanding of technology use. These gaps can result in inequalities in access to technology-based education, which can exacerbate existing education gaps. (2). Teacher Training and Skills: The implementation of technological innovations in education requires good training and understanding from educators. These challenges include awareness of the potential of technology in learning, understanding of how to integrate technology into the curriculum, and expertise in using relevant technology tools and platforms. Lack of training and support for teachers can be an obstacle to adopting technological innovations. (3). Data Security and Privacy: In using technology in educational environments, data protection and privacy are important issues. Student personal data, learning information, and interaction records may be collected and stored in digital systems. Therefore, it is important to have strict policies related to data privacy and information security so that no misuse of data or privacy violations occurs. (4). Cultural and Mindset Change: Adopting technological innovation requires a change in culture and mindset within educational institutions. Some educators may have resistance to the use of new technology or may be uncomfortable with the changes taking place. It is important to promote broad understanding and support from all relevant parties in order for technological innovations to be effectively accepted and adopted. (5). Sustainability and Cost: Technological innovation often requires significant financial investment. Adopting and maintaining relevant technologies over the long term requires considerable resources. These challenges include the cost of hardware, software, network infrastructure, and ongoing maintenance. It is important to consider financial sustainability in planning and implementing technological innovations.

To address these challenges, it is important to engage all stakeholders, including teachers, students, parents, and public policy. Strong support and a holistic approach are needed to address challenges and drive the successful adoption of technological innovations in education.

### **Benefits of Education Transformation through Technology Innovation**

The transformation of education through technological innovation brings a number of significant benefits. In a personalized learning approach, technology can help identify individual student needs and interests, increasing learning efficiency and effectiveness. The use of technology also enables better collaboration between students and teachers through online platforms and communication tools. In addition, the proper use of technology can also improve students' digital and problem-solving skills, an important preparation for entering the technology-dominated workforce (Legi & Wamo, 2023).

The transformation of education through technological innovation brings a number of significant benefits to students, educators, and the education system as a whole. Here are some of the key benefits of transforming education through technological innovation: (1). Personalized and Adaptive Learning: Technological innovation enables more personalized and adaptive education. By utilizing artificial intelligence and data analysis, education can be tailored to the needs and learning speed of each student. Students can gain learning experiences tailored to their own interests, abilities, and learning styles. This helps improve students' academic understanding and achievement. (2). Broad and Flexible Access to Education: Technological innovations, such as online learning platforms, enable broader and more flexible access to education. Students can access learning materials from anywhere and anytime using internet-connected devices. It enables distance education, self-directed learning, and lifelong learning for individuals in diverse backgrounds and geographic locations. (3). Interactive and Immersive Learning Experiences: Technologies such as virtual reality and augmented reality bring interactive and immersive learning experiences. Students can explore virtual environments that

resemble the real world, visualize complex concepts, and interact with three-dimensional objects in a learning context. This increases student engagement and deepens their understanding of the learning material (Han et al., 2022) (4). Increased Collaboration and Communication: Technological innovation facilitates better collaboration and communication between students and educators. Online learning platforms, discussion forums, and online communication tools allow students and teachers to interact directly. This allows for a more effective exchange of ideas, group discussions, and feedback. These collaborations also prepare students to work in teams and build social skills needed in the real world. (5). Digital Skills Development: The transformation of education through technological innovation also helps in the development of students' digital skills. Through the use of technology in learning, students can gain the understanding and skills necessary to interact with digital technology effectively. These include programming skills, digital literacy, an understanding of cybersecurity, and the ability to use a variety of technological tools and platforms (Mardina, 2017) (6). Preparation for a Changing World of Work: Technological innovation in education prepares students for a constantly changing and technology-dominated world of work. By acquiring digital skills, problem-solving skills, and adaptability, students will be better prepared for future challenges. They will have a competitive advantage in entering an increasingly connected and technology-driven job market.

The transformation of education through technological innovation has great potential to improve the quality and relevance of education. These benefits open up new opportunities to create better learning experiences and help students prepare themselves for an increasingly complex and digital future.

## CONCLUSION

Education has changed in Society 5.0. In civilization 5.0, learning devices must coexist with technology. Digitalization aids learning and teaching. Education can prepare people for Society 5.0 and help progress society. Technological advancements will continue. To maximise this technology's use, everyone must adapt. Society 5.0 also relies on education. Thus, education policy should be carefully considered to minimise the detrimental effects of technology advances. Finally, technological innovation in education is crucial for Society 5.0. Education technology has transformed learning and teaching. Personalised learning, game-based learning, virtual and augmented reality, online learning platforms, IoT in education, and digital skills development have benefited students, instructors, and the education system. However, embracing technological advancements requires addressing the digital gap, teacher training and skills, data security and privacy, cultural change and mindset, sustainability, and cost. To solve these issues, teachers, students, parents, and authorities must collaborate. Despite the limitations, technological innovation in education has major benefits. Benefits include personalised and adaptive learning, broad and flexible access to education, interactive and immersive learning experiences, increased collaboration and communication, digital skills development, and preparedness for the changing workplace. To establish an innovative, relevant, and student-centered learning environment in Society Era 5.0, education must continue to incorporate technology. Technological innovation in education prepares future generations for the problems and opportunities of this century and creates a more advanced and sustainable society.

## REFERENCES

- al-Fikri, H. M. (2021). Peluang dan tantangan perguruan tinggi menghadapi revolusi digital di era society 5.0. *Prosiding Seminar Nasional Pendidikan*, 3, 350–355.
- Daga, A. T. (2021). Makna Merdeka Belajar dan Penguatan Peran Guru di Sekolah Dasar. *Jurnal Educatio FKIP UNMA*, 7(3), 1075–1090.
- Han, D. I. D., Bergs, Y., & Moorhouse, N. (2022). Virtual reality consumer experience escapes: preparing for the metaverse. *Virtual Reality*. <https://doi.org/10.1007/s10055-022-00641-7>
- Handayani, N. N. L., & Muliastri, N. K. E. (2020). Pembelajaran Era Disruptif Menuju Era Society 5.0 (Telaah Perspektif Pendidikan Dasar). *Prosiding Seminar Nasional IAHN-TP Palangka Raya*, 1, 1–14.
- Kristiyono, A. (2018). Urgensi dan Penerapan Higher Order Thinking Skills di Sekolah. *Jurnal Pendidikan Penabur*, 17(31), 36–46.
- Legi, H., Giban, Y., & Hermanugerah, P. (2022). Virtual Reality Education In Era 5.0. *Journal Research of Social, Science, Economics, and Management*, 2(04), 504–510.

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- Legi, H., & Wamo, A. (2023). MERDEKA MENGAJAR DI ERA DIGITAL. *PEDAGOG Jurnal Ilmiah*, 1(1), 16–20.
- Mardina, R. (2017). Literasi digital bagi generasi digital natives. *Prosiding Conference Paper*. May.
- Marisa, M. (2021). Inovasi kurikulum “Merdeka Belajar” di era society 5.0. *Santhet:(Jurnal Sejarah, Pendidikan, Dan Humaniora)*, 5(1), 66–78.
- Mawardi, I. (2017). Transformasi Lembaga Pendidikan Tinggi: Penguatan Kualitas Lulusan SDM di Era Globalisasi. *Jurnal Ilmiah Penelitian, Pengkajian Dan Pengembangan*, 3.
- Nagy, K., Hajrizi, E., & Palkovics, L. (2020). Responsible innovation in support of society 5.0-aspects of audit and control. *IFAC-PapersOnLine*, 53(2), 17469–17474.
- Nastiti, F. E., & Ni'mal'Abdu, A. R. (2020). Kesiapan pendidikan Indonesia menghadapi era society 5.0. *Jurnal Kajian Teknologi Pendidikan*, 5(1), 61–66.
- Priyambodo, P., & Saputri, W. (2021). Bagaimana Menjadi Guru Sains di Era 4.0 bagi Generasi Y dan Z? In *SPEKTRA: Jurnal Kajian Pendidikan ...*. scholar.archive.org.
- Rondiyah, A. A., Wardani, N. E., & Saddhono, K. (2017). Pembelajaran sastra melalui bahasa dan budaya untuk meningkatkan pendidikan karakter kebangsaan di era MEA (masyarakat ekonomi ASEAN). *Proceedings Education and Language International Conference*, 1(1).
- Sasikirana, V. (2020). Urgensi Merdeka Belajar Di Era Revolusi Industri 4.0 Dan Tantangan Society 5.0. *E-Tech*, 8(2), 393456.
- Siahaan, F. E., Siahaan, S., Siahaan, B. L., & Situmeang, S. A. (2023). IMPLEMENTASI KURIKULUM MERDEKA BAGI GURU IPA di KELAS RENDAH. *Jurnal Penelitian Dan Pengabdian Masyarakat Nommensen Siantar*, 3(1), 13–19.
- Suhendar, A. (2021). *Guru Pendidik 4.0: Menjadi Guru Kreatif, Inovatif, dan Adaptif di Era Disruptif*. books.google.com.
- Wahono, T. (2022). Penguatan Pendidikan Guru Sekolah Dasar Agama Hindu Pada Sistem Pembelajaran Blok Implementasi Merdeka Belajar. *Widya Aksara: Jurnal Agama Hindu*, 27(2), 175–183.
- Wijaya, E. Y., Sudjimat, D. A., & Nyoto, A. (2016). The transformation of 21st century education as a demand for human resource development in the global era. *Proceedings of the National Seminar on Mathematics Education*, 1(26), 263–278.