ISSN: 2614-6754 (print)
ISSN: 2614-3097(online)

Halaman 6701-6713
Volume 8 Nomor 1 Tahun 2024

Modernization of Education in The Era of *Society 5.0*

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Abstrak

Artikel ini membahas tentang transformasi pendidikan di tengah perkembangan masyarakat digital yang semakin maju atau dikenal dengan society 5.0. Fokus utamanya adalah integrasi teknologi, dimana pembelajaran tidak hanya menggunakan teknologi sebagai alat, tetapi juga sebagai media pembelajaran. Pendekatan pembelajaran yang dipersonalisasi, dengan penggunaan kecerdasan buatan, memungkinkan adaptasi materi dan gaya pembelajaran agar sesuai dengan kebutuhan setiap siswa. Selain itu, artikel tersebut membahas tentang pengembangan keterampilan abad ke-21 yang menjadi sorotan utama dalam pendidikan modern. Pendidikan di era masyarakat 5.0 menekankan kolaborasi antara industri dan lembaga pendidikan, memastikan relevansi keterampilan praktis yang dibutuhkan dalam pasar kerja yang terus berubah. Meskipun terdapat banyak peluang, tantangan seperti infrastruktur, pelatihan guru, dan keamanan data juga meningkat. Sebagai kesimpulan, artikel ini menyoroti pentingnya kolaborasi, personalisasi, dan fokus pada keterampilan abad 21 sebagai elemen kunci dalam menciptakan sistem pendidikan yang relevan dan efektif untuk masa depan.

Kata kunci: *Modernisasi, Pendidikan, Masyarakat 5.0*

Abstract

This article discusses the transformation of education amidst the increasingly advanced development of a digital society, which is known as society 5.0. The main focus is technology integration, where learning not only uses technology as a tool, but also as a learning medium. A personalized approach to learning, with the use of artificial intelligence, allows for the adaptation of learning materials and styles to suit each student's needs. In addition, the article discusses the development of 21st century skills, which is a major highlight in modern education. Education in the era of society 5.0 emphasizes collaboration between industry and educational institutions, ensuring the relevance of practical skills needed in an ever-changing job market. While opportunities abound, challenges such as infrastructure, teacher training and data security are also raised. In conclusion, this article highlights the importance of collaboration, personalization, and a focus on 21 century skills as key elements in creating relevant and effective education systems for the future.

Keywords : *Modernization, Education, Society 5.0*

PENDAHULUAN

In the era of society 5.0, which is characterized by the integration of artificial intelligence (AI), internet of things (iot) technology, and sophisticated data processing, the education sector is experiencing a deep transformation (Haqy & Wijayati, 2019). This article discusses the modernization of education amidst the increasingly advanced development of a digital society. Rapid changes in technology have fueled the evolution of society, requiring education to adapt to create individuals capable of facing future challenges. Society 5.0 emphasizes human collaboration with technology to improve the quality of life, and education has a key role in realizing this vision (Vygotsky, 1978). In the educational modernization approach, technology is not only used as a tool, but also as a learning medium (Prensky, 2001).

Online learning platforms, virtual simulations, and the use of artificial intelligence are becoming integral elements to create more dynamic and interactive learning experiences (Darling, 2017). Society 5.0 emphasizes the uniqueness of each individual, and this is reflected in the modernization of education with a personalized learning approach. Intelligent learning systems can adapt material, level of difficulty, and learning style according to the needs of each student, creating an inclusive learning environment (Fullan, 2013; European, c, 2019). Education in the era of society 5.0 focuses on developing relevant skills to face global challenges (Dillenbourg, 2013).

In addition to academic knowledge, modern education emphasizes skills such as problem solving, creativity, communication, and critical thinking skills that are needed in a rapidly changing world of work (ISTE Standards for education, 2021). Educational modernization also involves close collaboration between educational institutions and industry (Mishra & Koehler, 2006). Internship programs, industrial training, and strategic partnerships between schools and companies help prepare students with practical skills and knowledge that match the demands of the job market (Anderson & Williams, 2001).

Although the modernization of education in the era of society 5.0 brings many opportunities, there are also challenges that need to be overcome (Siemems, 2005). Infrastructure availability, teacher training, and data security are important focuses to ensure that this transformation provides maximum benefits (Johnson., et al, 2015). The modernization of education in the era of society 5.0 places humans at the center of development, combining artificial intelligence and advanced technology to create a generation that is ready to face global change (Hattie & Timperley, 2007). Collaboration, personalization, and a focus on 21st century skills are the main foundations for creating a relevant and effective education system in the future (Dede, 2010).

METODE

Identify research topics that focus on the modernization of education in the era of society 5.0, with an emphasis on technology integration, personalization of learning, and collaboration between industry and education. Literature searches use academic databases,

digital libraries, and related library sources to identify the latest articles, books, journals, and publications relevant to the research topic. Selection of keywords such as "society 5.0", "educational modernization", "technology integration", and the like. Determination of inclusion criteria to select literature that suits the research objectives. Removal of literature that is irrelevant or does not meet specified quality standards. Literature analysis with in-depth review of selected literature to understand key concepts such as technology integration in education, personalization of learning, and industry-education collaboration. Identifying trends, findings and critical perspectives in relevant literature, in assessing the quality of the literature, evaluating the credibility, methodology and relevance of selected literature. Meanwhile, the synthesis of findings was carried out by combining findings from the literature to form a holistic understanding of educational modernization in the era of society 5.0. Meanwhile, preparing journal articles is based on findings found during literature analysis.

HASIL DAN PEMBAHASAN

Integration of technology in learning

The integration of technology in education has created fundamental changes in the way students acquire knowledge (Inan & Lowther, 2010). The use of online learning platforms, virtual simulations, and artificial intelligence opens the door to more interactive and dynamic learning experiences (Cuban, 2001). This approach not only increases the efficiency of the teaching and learning process but also encourages active student involvement. In a number of studies, it was found that the use of online learning platforms and interactive educational applications significantly increased student engagement (Tondeur & Valcke, 2007). The use of visual elements, simulations and interactive activities creates a more interesting learning environment, making the learning process more fun and effective (Zhao, 2018).

The use of online learning platforms, interactive educational applications, and technology such as virtual simulations provides a significant boost to student motivation (Puentedura, 2006). Visual elements, educational games and online challenges encourage students to be actively involved in the learning process. Technology integration allows personalization of learning according to the needs and level of understanding of each student (Bates & Sangra, 2011). Intelligent learning systems can adapt learning materials and provide immediate feedback, creating a learning environment that suits individual ability levels and interests. The use of online collaboration tools, such as joint projects using digital platforms, increases interaction and engagement between students (Abbas, 2023).

Online discussions, team projects, and project-based activities allow students to learn from each other, develop social skills, and feel deeper involvement in learning (Kaczorowski, et al, 2023). The application of virtual simulations in learning, especially in complex or abstract subjects, helps students understand concepts in a more concrete way (Alshuwaikhat, 2008). Simulations provide visual and interactive experiences that allow students to “feel” concepts, thereby increasing their engagement in understanding the material (Atebek, 2019).

Although technology integration increases student engagement, challenges arise related to the level of individualization. Students have different levels of learning pace, and it

is necessary to consider how technology can be arranged to provide appropriate challenges (Allen & Valden, 2012). Time management and supervision to ensure productive use of technology are also concerns, especially in distance learning environments. It is important to have an effective evaluation and progress monitoring system to ensure that technology is truly improving student understanding and engagement. The use of data analysis tools can help teachers and educational institutions to understand the true impact of technology integration in efforts to increase student engagement (Tripath, 2023).

In the context of technology integration, it is necessary to pay attention to aspects of inclusivity and access. Not all students have the same access to devices and internet connections. Therefore, there is a need for strategies to ensure that the benefits of technology integration can be enjoyed by all students, without leaving disadvantaged groups behind (Hattie & Timperley, 2007). Increasing student engagement through technology integration requires deep teacher understanding and skills. Therefore, training and professional development of teachers is important to ensure that they can utilize technology effectively and guide students towards better learning experiences (Darling et al, 2020). By deepening this understanding, the integration of technology in learning is not just limited to the use of tools, but involves deep thinking about how technology can increase student engagement in a holistic and inclusive manner (Fullan, 2013).

Personalize learning

The literature highlights that personalized approaches to learning, especially leveraging artificial intelligence, can produce better learning outcomes. The ability to adapt learning materials, level of difficulty, and teaching methods according to individual needs has a positive impact on student motivation and understanding (European, 2019). Through the application of artificial intelligence in personalizing learning, students experience significant improvements in understanding the material. Intelligent learning systems can automatically adjust the level of difficulty and learning style according to the needs of each student, creating a more efficient and effective learning experience (Dillenbourg, 2013).

Personalization of learning through technology integration allows the adaptation of learning materials according to the needs of each student. Intelligent learning systems can analyze student progress and adjust difficulty levels or provide additional material to strengthen understanding. Technology integration facilitates deeper understanding of student learning styles (ISTE Standards for education, 2021). By using data and analysis, intelligent learning systems can identify students' learning preferences, whether through visual, auditory, or tactile (Siemems, 2005). Thus, learning methods can be adjusted to increase effectiveness. The application of technology makes it possible to provide instant and personalized feedback.

Students can receive immediate feedback regarding their answers or quiz results, which helps them understand their strengths and weaknesses. This not only improves understanding of concepts, but also provides a motivational boost as results can be seen quickly. Personalization opens the door for students to choose materials and learning approaches that suit their interests and goals. Students can be given the option to choose topics or projects that are relevant to their daily lives, creating greater engagement as the learning material becomes more relevant and meaningful (Anderson & Williams, 2001).

Although technology enables personalization, challenges arise related to determining effective personalization methods. The process of analyzing data and implementing artificial intelligence to customize learning requires a deep understanding of students' individual characteristics (Puentedura, 2006). Therefore, further research is needed to find the most effective personalization methods. The success of personalized learning depends on student involvement. Increased personalization can be achieved optimally when students are actively involved in understanding their own learning styles and interests. Therefore, efforts need to be made to increase students' awareness of the personalized learning process and explore their preferences (Alshuwaikhat, 2008).

In the context of personalized learning, it is necessary to pay attention to aspects of inclusivity and access. Not all students have the same access to technology or similar learning needs. Therefore, there is a need for strategies that ensure that personalization can be implemented without leaving certain groups behind. Personalization of learning encourages the development of self-evaluation skills in students (Zhao, 2018). Self-evaluation and reflection are important in supporting personalized learning. Support and guidance need to be provided so that students can understand and evaluate their own development. By detailing the results of this research, personalization of learning through technology integration emerges as a potential strategy to improve student understanding (Darling et al, 2020). Although challenges regarding implementation and inclusivity exist, further understanding and continued research can help overcome these obstacles (Allen & Valden, 2012).

Development of 21st century skills

In society 5.0, education does not only focus on imparting academic knowledge, but also emphasizes the development of 21st century skills. Creativity, problem solving and critical thinking skills are recognized as key to preparing young people to face the challenges of the future. Education in this era seeks to create graduates who are not only academically intelligent, but also ready to face dynamic changes in the world of work (Dede, 2010). The literature highlights that curricula that emphasize skills such as creativity, problem solving, and critical thinking skills encourage innovation in education. Schools that integrate 21 century skills into daily learning report increased student motivation and better preparation for real-world challenges (Allen & Valden, 2012).

Education that focuses on 21st century skills, such as creativity, problem solving, and critical thinking skills, has a positive impact on student understanding. A curriculum designed to develop these skills creates a learning environment that is more relevant to the demands of the dynamic world of work. Educational innovation can be seen through the integration of 21st century skills in existing subjects (Dede, 2010). Teachers integrate creative elements and problem-based projects into traditional subject matter, helping students to develop skills that are not only academic but also practical and applied. Improved collaboration and communication skills through a learning approach that emphasizes 21st century skills (Allen & Valden, 2012).

Group activities, collaborative projects and presentations allow students to hone their interpersonal skills, which are important in the context of modern work and society. Education that focuses on 21 century skills aims to create graduates who are ready to face

the challenges of the future. Students are trained to be creative, innovative thinkers and able to adapt to change. This creates better readiness to face unformed jobs and complex global challenges. Although research shows increased understanding and development of 21st century skills, challenges arise in measuring these soft skills. Skills such as creativity and collaboration are difficult to measure quantitatively (Allen & Valden, 2012).

Therefore, research needs to continue to be carried out to develop accurate evaluation methods for these skills. It is important to understand how to integrate 21st century skills in existing curricula. Teachers and educational institutions need to implement appropriate and effective approaches to align the development of these skills without neglecting core subject matter. Innovation in education can be strengthened by involving industry in curriculum design. Collaboration between educational institutions and companies ensures that the skills taught are relevant to the needs of the job market, creating graduates who are better prepared to enter the world of work (Allen & Valden, 2012).

Teacher training needs to be improved to ensure that they have a deep understanding of 21 century skills and how to teach them. Professional development programs that focus on innovation in teaching methods can provide teachers with the tools necessary to successfully implement these skills in the classroom. By deepening this understanding, the focus on 21st century skills is not just an educational trend, but as a driver of innovation that can form a generation that is better prepared to face challenges and lead change in the future (Firman, 2018).

Industry and education collaboration

Collaboration between industry and educational institutions was found to be an effective strategy in preparing students for the world of work. Internship programs, industrial training and strategic partnerships provide students with hands-on experience and practical skills that match the demands of the job market. Case studies show that internship programs and partnerships between schools and companies produce students who are better prepared to enter the world of work. Students gain hands-on experience in the field, apply their theoretical knowledge, and develop practical skills that are highly sought after by industry. Internship programs and industrial training have become effective methods for integrating students into the world of work (Tondeur & Valcke, 2007).

This collaboration provides students with practical opportunities to apply their theoretical knowledge in real work settings. Strategic partnerships between industry and educational institutions play an important role in designing curricula that are relevant to industry needs. Company participation in curriculum development ensures that students are trained with skills that match the demands of the world of work. Collaborative projects between educational institutions and industry create space for innovation. Research highlights that this collaboration often results in innovative projects, new technological developments, and solutions to actual industry challenges (Kaczorowski et al, 2023). This collaboration acts as a bridge that connects the world of education with the world of work. Internship programs, industry visits, and guest speakers from industry give students direct insight into the expectations and realities of the world of work, helping them make more informed decisions regarding future careers (Tripath, 2023).

1. Collaboration between industry and education can increase student engagement. Students involved in internships or collaborative projects have a better understanding of the practical application of their academic knowledge, increasing motivation and readiness to enter the world of work. Although industrial and educational collaboration brings many benefits, challenges arise in the integration of collaboration results into the curriculum (Inan & Lowther, 2010). Good coordination is needed between educational institutions and industry to ensure that the results of collaboration can be smoothly integrated into the educational process. A rapidly changing industry requires dynamic collaboration. Education needs to quickly adapt the curriculum and teaching methods to the latest developments in the industrial world (Mishra & Koehler, 2006).
2. By actively involving companies, educational institutions can be more responsive to developing needs. The role of teachers as facilitators of collaboration between students and industry is very important. Teachers need to act as connectors who direct students toward collaboration opportunities, ensuring that classroom learning is connected to needs and trends in the industry. By deepening this understanding, collaboration between industry and education is not only about connecting students with jobs, but also creating strong ties between the world of education and the world of work to support the formation of a generation that is ready and relevant to the challenges of the future (Puentedura, 2006).

There are challenges in modernizing education in the Society era. 5.0:

1. Infrastructure challenges

The challenges of infrastructure, especially in less developed areas, are still obstacles in implementing comprehensive modernization of education. Teacher training is a critical factor for optimizing the potential of technology in learning. Therefore, further investment in the development of teacher skills and infrastructure improvement is an important step (Firman, 2012). The results showed that infrastructure challenges are still an obstacle, especially in less developed areas. Further investment in improving digital infrastructure needs to be a priority to ensure evenly access to educational technology. In addition, teacher training on the use of technology in learning is crucial to increase the effectiveness of implementation (Bates & Sangra, 2011).

Research identifies that the main infrastructure challenges are the uneven availability of internet access and a shortage of devices in some areas. Students and teachers need reliable connectivity and adequate devices to support online learning and technology integration. Physical facilities such as computer laboratories, interactive classrooms, and resource centers need to be upgraded and maintained regularly. Limitations in maintaining and improving physical facilities are an obstacle in providing a modern and supportive learning environment. Most teachers face challenges in integrating technology into the learning process due to a lack of technological skills and understanding (Tondeur & Valcke, 2007).

Intensive training is required to equip teachers with the skills necessary to utilize technology effectively. Educational modernization often involves changes in the curriculum to accommodate the integration of technology and focus on 21st century skills. Challenges arise in ensuring that teachers understand and can implement the new curriculum effectively.

To overcome infrastructure challenges, significant investment is needed in developing educational infrastructure. Governments, educational institutions and industry partners need to work together to ensure that internet access is equitable, adequate devices are available and physical facilities are updated. Teacher training should not only focus on technological aspects, but also involve the introduction of new concepts in the curriculum (Hattie & Timperley, 2007).

2. Infrastructure challenges

Training programs need to be designed holistically to ensure that teachers have the necessary technology skills and curriculum understanding. Ongoing support and monitoring systems need to be implemented to support teachers after undergoing training. Support initiatives can take the form of teacher-to-teacher mentoring, online learning resources, and technical guidance to overcome obstacles that may arise during implementation. It is important to involve all stakeholders, including government, educational institutions, industry, and society in overcoming these challenges. Collaboration and involvement of all parties is needed to create an educational environment that supports modernization and effective learning. By deepening this understanding, improving infrastructure and teacher training is not just a technical matter, but involves inter-institutional collaboration and ongoing commitment to creating an adaptive and innovative education system (Tondeur & Valcke, 2007).

3. Ethics and data security

In the context of technology integration, the ethical sustainability of data use and information security are critical concerns. Discussions about ethics and data security need to be expanded in the literature to ensure the application of technology in educational institutions remains safe and in accordance with ethical values. Discussions of ethics and data security in the literature should expand to include the potential implications of student data collection. Further research is needed to understand and address potential risks related to data privacy and security in the context of digital education. Research highlights that educational modernization often involves collecting student data to assess performance, learning preferences, and individual progress (Prensky, 2001).

Challenges arise in ensuring student privacy is strictly protected and data is collected and used with sound ethics. With the increasing use of technology in education, data security risks also increase. Cyberattacks and data security breaches can threaten sensitive student and teacher information. Sophisticated security measures are required to protect data from these threats. The importance of establishing a clear privacy policy in the use of educational technology. Educational institutions and governments need to work together to formulate policies that ensure student privacy is strictly protected, including limits on data collection and strict security procedures. Awareness and training on ethics and data security are needed among both students and teachers (Vygotsky, 1978).

Equipping them with an understanding of the importance of privacy and how to protect personal data can form a culture of responsible technology use. Implementing encryption technology and advanced data security measures is a must. Innovations in security technology need to be implemented to protect student and teacher data from ever-evolving cyber threats. Regular monitoring and auditing of data collection and use practices

is necessary to ensure that educational institutions comply with established privacy policies. This involves regular reviews of data management practices and the development of continually updated systems. By going deeper, the challenges of ethics and data security in the modernization of education not only involve protecting individual privacy, but also building public trust in the use of technology in the educational context. These steps will form a strong basis for the development of safe, ethical and sustainable education (Fullan, 2013).

4. Access and inclusion gaps.

Gaps in access to technology can increase inequalities in learning. Therefore, the discussion involves potential solutions to ensure digital inclusion, including policies that support technology access for all levels of society, so that the benefits of educational modernization can be enjoyed equally. Research highlights the importance of paying attention to gaps in technology access (Haqy & Wijayati, 2019). Solutions such as subsidy programs or government initiatives to provide internet access in remote and low-income areas can help reduce these gaps, so that the benefits of educational modernization can be enjoyed by all students (Anderson & Williams, 2001). Research shows that gaps in access to technology are the main obstacle in the modernization of education. Students in remote or low-income areas may not have equal access to digital devices and internet connections, resulting in disparities in online learning participation (Mishra & Koehler, 2006).

Challenges arise in the digital skills gap among students. Students who are unfamiliar with technology or lack training in digital skills can feel left behind in the use of modern learning tools, resulting in inequities in academic achievement. Curriculum that is not designed with the principle of inclusion in mind can leave some students outside of learning. Limitations in providing materials that are accessible to all students, including those with special needs, can deepen access gaps and reduce the effectiveness of learning. To overcome the access gap, subsidy programs or government initiatives are needed to provide devices and internet access in remote and low-income areas (Inan & Lowther, 2010).

This step is important to ensure that the benefits of educational modernization can be enjoyed by all students. The development of inclusive digital skills training programs is important. Students from all walks of life need to be provided with training to ensure that they have sufficient digital skills to engage in online learning and use technology effectively. Curriculum design must pay attention to inclusion from the start. Learning materials must be designed to be accessible to all students, including those with special needs. The use of technology must also be adapted to the diversity of students' skills and learning styles. Partnerships with local communities and nonprofit organizations can be a means of addressing gaps in access and inclusion (Anderson & Williams, 2001).

Local programs can provide support and access to students who may be marginalized in the context of online learning or technology. By deepening this understanding, addressing access and inclusion gaps in educational modernization requires a holistic approach involving joint efforts from government, educational institutions and society. This will form a more equitable and inclusive foundation for education in the digital era (Inan & Lowther, 2010).

5. The importance of continuous evaluation

Continuous evaluation in modern education is a necessity to ensure the effectiveness and sustainability of implemented changes. This evaluation is not only related to academic achievement, but also assesses social impact, student welfare, and the effectiveness of technology use. Continuous evaluation allows for continuous monitoring of individual student progress (Vygotsky, 1978). Adaptive evaluation systems can provide an accurate picture of the development of each student's skills and understanding, allowing for timely adjustments to learning. It is important to evaluate the impact of technology use in learning. This evaluation involves analysis of how technology impacts student engagement, motivation, and learning outcomes. In this way, it can be seen to what extent technology contributes to achieving educational goals. Continuous evaluation includes assessing aspects of learning inclusivity. It is important to ensure that all students, regardless of background or special needs, have access to and benefit from educational innovation. This evaluation helps identify potential gaps and improves accessibility. Challenges in continuous evaluation (Anderson & Williams, 2001):

a. Comprehensive measurement method. The main challenge is the development of comprehensive measurement methods. Ongoing evaluation should cover a variety of aspects, including 21 century skills, student well-being, and teaching effectiveness. Developing an evaluation instrument appropriate to this complexity requires in-depth research and development.
b. Holistic data integration. Integration of data from various sources is key in continuous evaluation. Challenges arise in combining academic data, student engagement data, and other information into a holistic view of educational progress. An efficient and integrated data management system is needed to overcome these challenges.
c. Involve stakeholders. Ongoing evaluation must involve key stakeholders, including teachers, students, parents, and the community. Challenges arise in creating participatory mechanisms that allow all parties to be involved in the evaluation process. Effective and transparent communication is the key to involving all stakeholders.

As for the application of continuous evaluation (Vygotsky, 1978):

a. Development of innovative evaluation models. Developing an innovative evaluation model is an important step. Evaluation models that can capture the dynamics of modern learning, including the impact of technology, 21 century skills, and social aspects, are needed to provide an accurate picture of educational effectiveness.
b. Teacher training in the evaluation process. Teacher training in the continuous evaluation process is essential. Teachers need to understand how to engage students in evaluations, use evaluation data to adapt learning, and utilize evaluation results for their professional development.
c. Active involvement of stakeholders. Active involvement of stakeholders, including students and parents, needs to be increased. By creating participatory mechanisms, ongoing evaluation can reflect the needs and expectations of all parties involved in the educational process.

Continuous evaluation is not just a monitoring tool, but an integral part of the educational process that can help improve the quality of learning, design more adaptive curricula, and provide a better understanding of the impact of technology in achieving educational goals. The discussion highlights the need for continuous evaluation of the implementation of educational modernization (Zhao, 2018). Further research is needed to monitor long-term impacts and improve the approaches that have been adopted. This evaluation can help identify areas that require improvement and refine strategies to achieve stated educational goals. Continuous evaluation of the implementation of technology in education is needed to measure long-term impacts and identify areas for improvement. Further research must be carried out to measure the sustainability and effectiveness of the methods that have been implemented in achieving educational goals in the era of society 5.0 (Puentedura, 2006).

By considering these results and discussion, it can be concluded that modernizing education in the era of society 5.0 requires a holistic approach involving stakeholders, improving infrastructure, and paying attention to aspects of ethics and inclusion to create an adaptive and inclusive education system. It appears that the integration of technology, personalization of learning, and a focus on 21 century skills are making positive contributions to the modernization of education. However, infrastructure challenges, ethical aspects, inclusion and ongoing evaluation are important points that need to be considered to ensure long-term success.

SIMPULAN

Modern education is needed to shape an adaptive and inclusive educational future, several key aspects need in-depth attention. Technology integration, while presenting abundant opportunities, also poses challenges regarding infrastructure and teacher training. The emergence of 21st century skills as the main focus in learning shows a positive impact on student understanding, but requires adjustments in the curriculum and teaching approaches. Close collaboration between industry and educational institutions has proven to be a successful policy, ensuring that learning is up to date and relevant to the needs of the world of work. Meanwhile, protecting student privacy and data security is an important focus, emphasizing the need for strong ethics in the use of technology in education. Gaps in access and inclusion pose serious challenges, with expanded technology access, digital skills training and more inclusive curriculum approaches becoming essential. Continuous evaluation stands out as a pillar of assessment, covering not only academic achievement, but also social impact and student well-being. Joint efforts from all stakeholders are required to design and implement a comprehensive evaluation model. Overall, to achieve successful modern education, a holistic approach is needed that combines technology with ethics, an inclusive curriculum with continuous evaluation. Involving all stakeholders and committing to creating equitable and sustainable learning environments, we can open the door to an education that prepares generations to face the future with confidence and relevant skills. With these steps, we can open the door to a more relevant, equitable, and empowering educational future for students and a solid foundation to face the future with confidence and relevant skills.

UCAPAN TERIMA KASIH

Thank you to the lecturer who teaches this course, namely Prof. Dr. Firman., M.S., Cons. and Dr. Maizatul Mardian Harun who has guided the author in writing and conducting research in this article. Don't forget to also express my deepest gratitude to my parents, namely Mr. Syafrizal Can and Mrs. Erita, who have provided moral and material support.

DAFTAR PUSTAKA

Abbas, T. (2023). Ethical Implications of AI in Modern Education: Balancing Innovation and Responsibility. *Social Sciences Spectrum*, *2*(1), 51-57.

Allen, J. P., & Van der Velden, R. K. W. (2012). Skills for the 21st century: Implications for education.

Alshuwaikhat, H. M., & Abubakar, I. (2008). An integrated approach to achieving campus sustainability: assessment of the current campus environmental management practices. *Journal of cleaner production*, *16*(16), 1777-1785.

Anderson, K., & Williams, M. "Industry-Education Collaboration: Enhancing Relevance in Curriculum Development." Journal of Applied Education Research, 15(4), 321-340.

Atabek, O. (2019). Challenges in integrating technology into education. *arXiv preprint arXiv:1904.06518*.

Aulia, D. (2022). Penyusunan Program BK di Tingkat SMA. *Education & Learning*, *2*(2), 92-97.

Bates, A. T., & Sangra, A. (2011). *Managing technology in higher education: Strategies for transforming teaching and learning*. John Wiley & Sons.

Bates, T. (2019). "Teaching in a Digital Age: Guidelines for Designing Teaching and Learning." Tony Bates Associates Ltd.

Cuban, L. (2001). *Oversold and underused: Computers in the classroom*. Harvard university press.

Cuban, L., Kirkpatrick, H., & Peck, C. (2001). High access and low use of technologies in high school classrooms: Explaining an apparent paradox. *American educational research journal*, *38*(4), 813-834.

Darling-Hammond, L. (2017). Teacher education around the world: What can we learn from international practice?. *European journal of teacher education*, *40*(3), 291-309.

Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. (2020). Implications for educational practice of the science of learning and development. *Applied developmental science*, *24*(2), 97-140.

Dede, C. (2010). Comparing frameworks for 21st century skills. *21st century skills: Rethinking how students learn*, *20*(2010), 51-76.

Firman. (2012). Tanggung Jawab Profesi Guru dalam Era Teknologi Informasi. *Pedagogi, 9(1), 89-100.*

Firman, F. (2018). Peningkatan Kualitas Pendidikan Melalui Perbaikan Kualitas dan Kesejahteraan Guru di Sumatera Barat.

Fullan, M. (2013). Stratosphere: Integrating technology, pedagogy, and change knowledge. *Alberta Journal of Educational Research*, *62*(4), 429-432.

Haqqi, H., & Wijayati, H. (2019). *Revolusi industri 4.0 di tengah society 5.0: sebuah integrasi ruang, terobosan teknologi, dan transformasi kehidupan di era disruptif*. Anak Hebat Indonesia.

Hattie, J., & Timperley, H. (2007). "The Power of Feedback." Review of Educational Research, 77(1), 81-112.

Inan, F. A., & Lowther, D. L. (2010). Laptops in the K-12 classrooms: Exploring factors impacting instructional use. *Computers & Education*, *55*(3), 937-944.

Kaczorowski, T., McMahon, D., Gardiner-Walsh, S., & Hollingshead, A. (2023). Designing an inclusive future: Including diversity and equity with innovations in special education technology. *TEACHING Exceptional Children*, *55*(5), 376-383.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers college record*, *108*(6), 1017-1054.

Prensky, M. (2009). H. sapiens digital: From digital immigrants and digital natives to digital wisdom. *Innovate: journal of online education*, *5*(3).

Siemens, G. (2005). "Connectivism: A Learning Theory for the Digital Age." International Journal of Instructional Technology and Distance Learning, 2(1), 3-10.

Tondeur, J., Van Braak, J., & Valcke, M. (2007). Curricula and the use of ICT in education: Two worlds apart?. *British Journal of educational technology*, *38*(6), 962-976.

Tripath, P. (2023). Challenges, impacts and the importance of digital technologies on modern education in 21st century. *European Chemical Bulletin,[S. l.]*, *12*, 17282-17293.

Vygotsky, L. S., & Cole, M. (1978). *Mind in society: Development of higher psychological processes*. Harvard university press.

Zhao, Y. (2012). *World class learners: Educating creative and entrepreneurial students*. Corwin Press.

Zhao, Y. (2017). What works may hurt: Side effects in education. *Journal of Educational Change*, *18*(1), 1-19.