Leveraging Advanced Technologies to Enhance Learning Experiences in the Era 5.0

I Gede Dharman Gunawan[1], I Wayan Sindia Griya Danika[2,] Cryshna Selistya Ningsih[3]

[1,2,3]Institut Agama Hindu Negeri Tampung Penyang Palangka Raya

[1]dharman.gunawan@gmail.com, [2]dana.danikadas@gmail.com, [3]cryshnasn@gmail.com

ABSTRACT

Education is one of the sectors significantly influenced by technological advancements. In the era of 5.0, characterized by further integration of technology into everyday life, education faces new challenges and opportunities in creating better and more relevant learning experiences for the younger generation. Education plays a crucial role in shaping individuals, preparing them for the future, and building an advanced society. The rapid development of technology in the 5.0 era, marked by deeper integration of technology into daily life, presents new challenges and incredible opportunities for education. This study aims to explore the utilization of advanced technology in enhancing learning experiences in the 5.0 era. With a focus on artificial intelligence, virtual and augmented reality, intelligent tutoring systems, as well as the use of technology in assessment and feedback, this research illustrates the positive impact of advanced technology on student engagement, academic achievement, and skill development. Research findings indicate that successful implementation in educational environments has brought significant changes in students learning experiences. However, it is important to consider ethical considerations and responsible use of technology to ensure inclusive and sustainable adoption of advanced technology in education. Recommendations such as proper investment, teacher training and development, student-centered approaches, collaboration, ongoing evaluation, and partnerships with industries and the workforce serve as essential foundations in facing the future of education. Thus, this research provides valuable insights into the utilization of advanced technology in enhancing learning experiences and the future perspective of education.

Keywords: Advanced technology, Learning experience, Education in the era 5.0

I.   Introduction

Education is one of the sectors significantly influenced by technological advancements. In the 5.0 era, characterized by further integration of technology into everyday life, education faces new challenges and opportunities in creating better and more relevant learning experiences for the younger generation (Setyosari, 2015). Advanced technologies such as artificial intelligence, virtual

reality, augmented reality, natural language processing, and data analytics have fundamentally transformed the educational landscape. They hold the potential to revolutionize how we access, deliver, and analyze information. In this era, technology has evolved from being a mere tool to becoming a driving force in creating more interactive, personalized, and effective learning experiences (Ajizah, 2021).

The utilization of advanced technology in future education has significant positive impacts. Firstly, technology enables broader and more inclusive access to education. Through online learning platforms, students can access educational content from anywhere and at any time, overcoming geographical and social barriers. Technology also opens opportunities for distance education and cross-border collaboration, allowing students and teachers from different countries and cultures to share knowledge and experiences (Anggreini & Priyojadmiko, 2022). Additionally, the utilization of advanced technology allows for more interactive and immersive learning experiences. By utilizing virtual and augmented reality, students can explore places and situations that are difficult to access directly, such as dangerous scientific experiments or visits to historical sites. Technology can also enrich the learning experience with interactive elements, simulations, and games that enhance student engagement and facilitate better understanding. Data analytics and artificial intelligence also have tremendous potential in supporting personalized education. By leveraging data on individual preferences, progress, and learning needs, educational systems can provide tailored content recommendations and effective learning strategies for each student. This helps improve learning efficiency and creates more relevant and meaningful learning experiences for each individual.

Education plays a crucial role in shaping individuals, preparing them for the future, and building an advanced society. With the rapid development of technology in the 5.0 era, marked by deeper integration of technology into daily life, education faces new challenges and incredible opportunities (Ratnawati & Werdiningsih, 2020). Advanced technologies such as artificial intelligence (AI), virtual reality (VR), augmented reality (AR), natural language processing (NLP), and data analytics have fundamentally transformed the educational landscape.

These technologies offer significant potential to revolutionize how we access, deliver, and analyze information. In the context of education, technology has evolved from being a mere tool to becoming the primary driver in creating more interactive, personalized, and effective learning experiences (Watnaya et al., 2020).

The impact of using advanced technology in education can be highly significant. Firstly, technology enables broader and more inclusive access to education. Through online and distance learning platforms, students can access educational content from anywhere and at any time, overcoming geographical and social barriers. This opens the door to a more democratic education, where anyone, regardless of their background or geographic location, has an equal opportunity to acquire knowledge and skills. Advanced technology can also enhance the learning experience in unprecedented ways. For example, by using VR and AR, students can travel to hard-to-reach places, explore distant worlds, and experience real-life situations virtually. This allows for deeper and more interactive learning, which can enhance understanding and student engagement.

Technology also enables personalized learning, where students can learn at their own pace, style, and interests, helping to improve learning efficiency and effectiveness. Data analytics and AI can provide valuable insights into students' learning progress, learning preferences, and individual needs. By leveraging this data, educators can provide more effective feedback, design customized learning plans, and deliver timely support. This helps improve the quality of learning and creates more relevant and meaningful learning experiences for each individual (Dwi, 2020).

The importance of harnessing advanced technology to enhance the learning experience cannot be overlooked in the context of education in the 5.0 era. The rapid development of technology has transformed the way we live, work, and interact. Likewise, in education, advanced technology holds great potential for creating positive transformations in the learning process. Firstly, the use of advanced technology in education can overcome traditional limitations in learning. In conventional education models, students are often confined to limited classroom spaces and resources. However, with advanced technology, students can access unlimited educational resources from various sources around the world.

The internet, online learning platforms, and other digital resources enable students to acquire broader and deeper information and knowledge. This helps improve students' understanding and skills through wider access to educational content.

Secondly, advanced technology enables more interactive, engaging, and personalized learning. In conventional learning models, educators often face challenges in meeting the individual needs and interests of students in heterogeneous classrooms. However, advanced technologies such as AI, VR, AR, and NLP offer the possibility of creating customized learning experiences tailored to students' needs and interests. Through adaptive learning applications and technology-supported platforms, students can acquire more engaging, relevant, and personalized learning experiences that align with their learning styles. This helps enhance students' motivation, engagement, understanding, and facilitates the development of skills required for success in an ever-evolving world. Thirdly, the use of advanced technology in education can also help develop skills that are relevant to future needs. The 5.0 era is characterized by rapid changes, including technological advancements, globalization, and economic transformations. To address challenges and seize opportunities in this era, students need to be equipped with skills such as problem-solving, creativity, critical thinking, communication, collaboration, and digital literacy. Advanced technology can be an effective tool in developing these skills through interactive simulations, collaborative projects, game-based challenges, and project-based learning platforms. Harnessing advanced technology in education in the 5.0 era is not only a necessity but also a promising opportunity. By leveraging advanced technology, education can become more adaptive, inclusive, and relevant to the demands of the time. However, to fully realize the potential of advanced technology in enhancing the learning experience, collaboration is needed among educators, researchers, educational practitioners, and other relevant stakeholders (Darma et al., 2020).

Although the potential and benefits of advanced technology in education are substantial, there are still several challenges that need to be addressed. One major challenge is the digital divide. Not all students or educational institutions have equal access to advanced technology. Some areas may still lack the necessary

infrastructure to support such technology, while others may struggle to acquire devices or maintain stable internet access. This divide can exacerbate existing educational inequalities if not addressed with appropriate actions. Additionally, it is important to consider the ethical aspects of utilizing advanced technology in education. The use of student data for learning analytics and personalized learning needs to be handled carefully, ensuring student privacy and data security. Furthermore, it is crucial to consider the use of technology in a responsible and equitable manner, so that it does not become a source of inequality or social alienation. In this context, the article "Future Education: Leveraging Advanced Technology to Enhance the Learning Experience in the 5.0 Era" serves an important purpose. This article will serve as a platform for researchers, educational practitioners, and relevant stakeholders to share their knowledge, experiences, and latest findings in the application of advanced technology in education. Through discussion and collaboration, it is hoped that this proceeding will provide valuable insights into how advanced technology can act as a catalyst in creating innovative, effective, and relevant learning experiences in the 5.0 era (Marenden et al., 2021).

II. Discussion

1. The implementation of AI in personalized learning applications

a. The Role of Artificial Intelligence (AI) in Education

The utilization of Artificial Intelligence (AI) plays a significant role in the transformation of education in the current digital era. AI has opened up new opportunities for optimizing the learning experience, enhancing efficiency, and personalizing education for each individual. One of the primary roles of AI in education is in the development of adaptive learning systems. AI can analyze data on students' preferences, abilities, and needs on an individual basis. As a result, the learning system can be tailored to the pace and learning style of each student, providing relevant content and delivering pertinent feedback. This helps improve the effectiveness of learning, ensuring that every student can gain a solid understanding and grow according to their potential. AI also plays a

crucial role in educational data analysis. With AI's ability to process and analyze large amounts of data rapidly, decision-making can be based on accurate and evidence-based information. Educational data analysis can provide insights into students' learning patterns, success trends, and areas that require extra attention. This aids educators and school administrators in identifying issues, optimizing learning programs, and taking appropriate steps to enhance the quality of education (Ni Ketut Resi Yuliar, 2020).

The application of AI can also be seen in virtual assistants or chatbots that are capable of providing support and guidance to students. AI-powered virtual assistants can provide quick responses to students' questions, offer additional explanations, and assist in answering more complex inquiries. This helps enhance the accessibility of education, especially for students who require additional assistance outside of regular class hours. However, it is important to note that AI in education also presents some challenges. One of the main challenges is the ethics of AI usage, such as student data privacy and fairness in AI-based decision-making. Appropriate policies and regulations are needed to ensure that AI is used responsibly and safeguards the interests of students.

Overall, AI plays a significant role in education, ranging from adaptive learning and data analysis to virtual assistants. By harnessing the potential of AI wisely, education can become more personalized, efficient, and effective in meeting the evolving needs of students in the digital era. In addition to the aforementioned roles, AI also has a significant impact on developing interactive and engaging learning content. Through AI technology, learning material developers can create more captivating and challenging learning experiences for students. For example, the use of chatbots or AI storytelling agents can serve as characters in stories or learning simulations, making the learning process more engaging, allowing students to actively participate, and enhancing their understanding of concepts. Furthermore, AI can assist in automated assessment and feedback. AI systems can quickly process student

answers and work, provide instant feedback, and identify areas that require further attention. As a result, AI helps reduce the workload of teachers in assessing student assignments and efficiently providing constructive feedback. Moreover, AI can also be utilized in data management and educational administration. In complex educational environments, AI can aid in organizing and analyzing data, managing schedules, or generating reports automatically. This optimization of time and educational resources allows educators to focus on value-added activities such as teaching and mentoring.

It is important to remember that the role of AI in education is not to replace the role of educators but to support and enhance the learning experience. Teachers still have an irreplaceable role in guiding and fostering student development. Therefore, it is crucial for educators to understand and wisely leverage AI technology, maintaining a balance between technology and the vital human interaction in education. Overall, the role of AI in education is highly significant in improving the learning experience, developing learning content, automated assessment, and data management. With proper utilization, AI can help create a more adaptive, interactive, and efficient learning environment, providing significant benefits to students and educators in an ever-evolving educational era.

b. **Smart tutoring systems and adaptive learning platforms.**

Smart tutoring systems and adaptive learning platforms are concrete examples of AI technology implementation in education. Smart tutoring systems utilize artificial intelligence to provide individualized guidance and learning support to students. These systems can analyze data about students' abilities and needs, and provide customized learning materials based on their level of understanding. Moreover, smart tutoring systems can offer specific feedback and assist students in overcoming learning difficulties. With the presence of smart tutoring systems, educators can expand learning support, ensure that each student receives appropriate attention, and optimize the individual learning process (Syahria et al., 2021).

Meanwhile, adaptive learning platforms utilize AI to provide personalized and tailored learning experiences for each student. Through data analysis and algorithm modeling, adaptive learning platforms can adjust content, difficulty levels, and teaching styles based on the individual needs and progress of each student. This enables every student to have a relevant, challenging, and ability-appropriate learning experience. Adaptive learning platforms can also identify learning patterns and provide personalized development recommendations to help students reach their full potential. Both of these systems have a significant impact on enhancing the learning experience. They help create an inclusive, adaptive, and responsive learning environment that caters to individual needs. Students can learn at their own pace, receive assistance when needed, and feel supported in their learning journey. Furthermore, smart tutoring systems and adaptive learning platforms provide valuable data and insights for educators. This data can be used to monitor student progress, identify weaknesses, and develop more effective teaching strategies. Despite the immense potential offered by smart tutoring systems and adaptive learning platforms, there are still challenges to be addressed. These challenges include the reliability and validity of AI algorithms, student data privacy and security, and the integration of technology within the broader educational context. Therefore, it is crucial for developers and educators to collaborate in ensuring responsible use of AI technology and maximizing its benefits in enhancing students' learning experiences in the era of 5.0 (awaluddin, fariz rahmadan, 2021).

c. **The utilization of AI in assessment and feedback in learning**

The application of Artificial Intelligence (AI) in assessment and feedback in learning has made a significant contribution to enhancing efficiency, objectivity, and the quality of evaluation in the educational context. Here are some ways in which AI is utilized in assessment and feedback in learning (Nugroho, 2015):

- Automated assessment: By utilizing AI technology, automated assessment can be performed quickly and efficiently. AI can analyze

student responses in the form of text, images, or audio and provide automated grading based on pre-defined criteria. This reduces the workload for educators in grading assignments and exams, while enabling students to receive prompt feedback.

- Plagiarism detection: AI can be employed to detect plagiarism in students' written work. By analyzing the text and comparing it with existing reference sources, AI can identify similarities and issue warnings if plagiarism is detected. This helps promote academic honesty and ensures integrity in the assessment process.

- Data analysis for student understanding: AI can analyze comprehensive student assessment data. Using algorithms and data analysis techniques, AI can identify learning patterns, areas of weak understanding, and individual student needs. This information can be utilized by educators to provide targeted feedback, identify areas for reinforcement, and design more effective learning strategies.

- Adaptive feedback: AI can provide adaptive feedback tailored to the needs and progress of students. Based on data analysis, AI can provide specific feedback, design appropriate review activities or additional tasks, and offer targeted support to improve students' understanding. This enhances the effectiveness of feedback and accelerates students' learning progress.

- Sentiment analysis: AI can analyze the sentiment or emotions of students through text or verbal language. Using natural language processing techniques, AI can identify students' feelings towards specific learning materials or learning experiences. This information can help educators better understand students' emotional needs, provide appropriate support, and design a more positive learning environment.

The utilization of AI in assessment and feedback in learning has significant potential to enhance efficiency, objectivity, and relevance in educational contexts. However, it is crucial to consider privacy policies,

data security, and ethics in the use of AI technology in this regard. In this context, collaboration among educators, technology developers, and education experts is vital to develop systems that can provide better assessment and feedback in learning. Continuously applying AI technology advancements in assessment and feedback will yield significant benefits for students and educators in the era of 5.0, improving accuracy, speed, and relevance in the learning evaluation process.

In addition to the mentioned benefits, the utilization of AI in assessment and feedback in learning also has other positive impacts. With the adoption of AI technology, educators can gain deeper insights into individual students' progress and learning needs. This enables educators to design more targeted and differentiated learning plans based on each student's requirements. Moreover, AI can help improve consistency in assessment, reducing subjective biases that may arise in human evaluation. In the long run, the use of AI in assessment and feedback in learning can contribute to the development of more adaptive and personalized learning models. AI can collect and analyze data involving students' learning preferences, styles, and tendencies. With a deeper understanding of individual students, educators can create more relevant, engaging, and effective learning experiences.

There are several challenges and considerations that need to be taken into account in the utilization of AI in assessment and feedback in learning. Some challenges include concerns about student data security and privacy, the reliability and transparency of AI algorithms, and technological disparities among educational institutions. Additionally, the role of educators remains crucial in interpreting and applying AI assessment results, as well as providing the necessary human interaction for the holistic development of students. Overall, the utilization of AI in assessment and feedback in learning presents significant opportunities to enhance efficiency, objectivity, and effectiveness in education. With a wise approach and good collaboration among educators, technology

developers, and education experts, AI can help create a more adaptive, inclusive, and responsive learning environment in the era of 5.0.

2. **Ethical considerations and responsible use of technology in education**

When adopting and implementing advanced technology in education, it is important to consider ethical aspects and act responsibly. Here are some ethical considerations that need to be taken into account (Ratnawati & Werdiningsih, 2020):

- Data Privacy and Security: It is crucial to protect the privacy and security of student data. Personal information should be kept confidential and used only for relevant educational purposes. Strong security systems should be implemented to safeguard data from unauthorized access.

- Equality and Accessibility: Advanced technology should be accessible to all students, regardless of social, economic, or special needs differences. It is important to ensure that educational accessibility and equality are maintained in the use of technology.

- Transparency and Openness: The use of advanced technology should be transparent and provide clear information to students, educators, and other stakeholders about how data is collected, used, and stored. Good transparency builds trust and provides opportunities for students to control their personal data.

- Content and Perspective Diversity: When utilizing advanced technology, it is important to ensure diversity of learning content and perspectives. Technology should be used to expand access to diverse resources that reflect various cultures, backgrounds, and worldviews.

- Ethics of AI Usage: If artificial intelligence (AI) technology is employed, ethical considerations need to be taken into account. AI algorithms and models should be designed with ethical intelligence, avoiding bias or discrimination in decision-making. It is important to monitor and audit AI systems regularly.

- Balance Between Technology and Human Interaction: While advanced technology can enhance learning, it is important to maintain a balance between the use of technology and direct human interaction. Students also need to develop social and emotional skills through interactions with educators and peers.

- Evaluation and Continuous Improvement: It is crucial to continuously evaluate the impact of advanced technology in education and make ongoing improvements. This involves monitoring, gathering feedback, and making adjustments in the implementation of technology to ensure maximum benefits.

Taking these ethical considerations into account, educators and educational stakeholders can responsibly leverage advanced technology and create a safe, inclusive, and beneficial learning environment for all students.

3. **Future direction**

The future direction of utilizing advanced technology in education holds limitless potential. Here are some future directions and recommendations for effectively harnessing advanced technology in education (Watnaya et al., 2020):

- Deeper Integration: There is a need for deeper integration between advanced technology and the educational curriculum. Developing learning content that aligns with advanced technologies such as VR, AR, AI, and adaptive learning will enrich students' learning experiences. Additionally, educators should be trained in utilizing advanced technology to optimize its use in the learning process.

- Development of More Interactive Applications: Continuous development of interactive learning applications and platforms that captivate students is crucial. These applications should be designed with consideration for students' preferences and learning styles, providing relevant and insightful feedback. This way, advanced technology can serve as an effective tool to enhance student engagement and achievement.

- Emphasis on Creativity and Collaboration: The use of advanced technology in education should emphasize the development of students' creativity and collaboration skills. For instance, employing 3D design tools or collaborative platforms can enable students to work together on creative projects and solve complex problems as a team. This approach will help students develop essential skills such as creativity, problem-solving, and teamwork abilities.

- Inclusive Education and Equal Access: It is crucial to ensure that the use of advanced technology in education can benefit all students, including those with special needs. Technology should be easily accessible and designed with considerations for accessibility, allowing all students to reap its benefits. In implementing advanced technology, attention must be given to access gaps and efforts should be made to achieve inclusivity in education.

- Ongoing Research and Evaluation: Continuous research and evaluation are necessary concerning the use of advanced technology in education. By monitoring and analyzing the effectiveness of utilizing advanced technology, educators and policymakers can identify best practices, adjust learning strategies, and develop guidelines to optimize the use of technology in the educational environment.

By looking towards these directions and following these recommendations, the use of advanced technology in education can continue to evolve and provide significant positive impacts on students' learning experiences. With effective adoption and targeted strategies, advanced technology can become a powerful tool for enhancing the quality of education, developing students' skills, and preparing them to meet the demands of an ever-changing world. It is important to stay updated on technological advancements and adapt to the educational needs in the 5.0 era. However, in harnessing advanced technology, it is also important to maintain a balance between technology usage and relevant human interaction (Muhson, 2010).

Although technology can provide numerous benefits, the close relationship between educators and students remains a key factor in creating a meaningful learning environment. Therefore, educators must continue to engage students in the learning process, provide guidance, and offer necessary support (Fricticarani et al., 2023). Additionally, considerations for security and privacy aspects in the use of advanced technology in education are crucial. Student information must be well protected, and appropriate security measures should be implemented to safeguard data integrity and student privacy. Taking these steps will ensure that the utilization of advanced technology in education in the 5.0 era can yield significant positive impacts. With an emphasis on student engagement, academic achievement, skill development, creativity, and inclusivity, advanced technology will become a powerful tool to drive change and progress in the world of education.

III. Closing

The implementation of advanced technology has enhanced student engagement by providing access to rich and personalized learning resources. The use of AI in education enables in-depth data analysis, adaptive learning, and timely feedback. Intelligent tutoring systems and adaptive learning platforms assist students in individualized learning and improve academic performance. Advanced technology has also facilitated efficient assessment and provided faster feedback to students. Moreover, advanced technology has influenced the development of students' skills, such as critical thinking, creativity, collaboration, and problem-solving. The implementation of advanced technology has also brought advancements in data management, security, and transparency in education.

In adopting advanced technology, it is important to consider ethical considerations, privacy, and equity. Safeguarding student data privacy, ensuring equal access, and humanizing student engagement should be top priorities in utilizing this technology. Overall, leveraging advanced technology in education in the 5.0 era provides new opportunities and enhances students' learning experiences. In facing the future of education, it is crucial for educators and

educational stakeholders to continually update and integrate advanced technology with the aim of improving the quality of education and preparing students for success in an ever-evolving world.

In facing the future of education, there are several recommendations that can be considered. Making appropriate investments: Educators and educational institutions need to allocate adequate resources to adopt and implement advanced technology. This includes investing in infrastructure, hardware, software, as well as training and development for educators. Training and development for educators: It is important to provide proper training to educators so that they have the necessary knowledge and skills to integrate advanced technology into the learning process. Ongoing professional development programs should be provided to keep educators up-to-date with the latest technological advancements. Adopting a student-centered approach: The use of advanced technology should be based on a student-centered learning approach. Technology should be designed to support personalized and adaptive learning, allowing students to control and lead their own learning process. Collaboration and knowledge sharing: Educational institutions need to encourage collaboration and knowledge sharing among educators, researchers, and technology developers. This can be done through professional networks, conferences, and discussion forums to gain insights and experiences from practitioners and experts in the field of educational technology. Ongoing evaluation and research: It is important to continuously evaluate and conduct research on the impact of using advanced technology in education. This will help understand the effectiveness of technology, evaluate the success of implementation, and identify areas for further improvement. Strengthening partnerships with industry and the workplace: Educational institutions should forge close partnerships with industry and the workplace to identify skill needs that are relevant to advanced technology. This will help prepare students with the skills required in a rapidly evolving work environment. By adopting these recommendations, education can leverage the full benefits of advanced technology and enhance students' learning experiences. The responsible and innovative utilization of advanced technology will create new opportunities for students to develop skills and prepare them for an increasingly advanced and global future.

Bibliography

Ajizah, I. (2021). Urgensi Teknologi Pendidikan : Analisis Kelebihan Dan Kekurangan Teknologi Pendidikan Di Era Revolusi Industri 4.0. *Journal of Chemical Information and Modeling*, *4*(1), 25–36.

Anggreini, D., & Priyojadmiko, E. (2022). Peran Guru dalam Menghadapi Tantangan Implementasi Merdeka Belajar untuk Meningkatkan Pembelajaran Matematika pada Era Omricon dan Era Society 5.0. *Prosiding Seminar Nasional Pendidikan Guru Sekolah Dasar 2022*, 75–87.

awaluddin, fariz rahmadan, D. (2021). Peran Pengembangan dan Pemanfaatan Teknologi Pendidikan dan Pembelajaran Dalam Meningkatkan Kualitas Mengajar. *Peran Pengembangan Dan Pemanfaatan Teknologi Pendidikan Dan Pembelajaran Dalam Meningkatkan Kualitas Mengajar*, *2*(2), 1–12.

Darma, I. K., Karma, I. G. M., & Santiana, I. M. A. (2020). Blended Learning, Inovasi Strategi Pembelajaran Matematika di Era Revolusi Industri 4.0 Bagi Pendidikan Tinggi. *Prosiding Seminar Nasional Pendidikan Matematika*, *3*, 527–539.

Dwi, M. (2020). Pemanfaatan Teknologi Pendidikan Di Masa Pandemi Covid-19: Penggunaan Fitur Gamifikasi Daring Di Universitas Muhammadiyah Pringsewu Lampung. *Al-Jahiz: Journal of Biology Education Research*, *1*(1), 14. https://e-journal.metrouniv.ac.id/index.php/Al-Jahiz/article/view/2082

Fricticarani, A., Hayati, A., Hoirunisa, I., Rosdalina, G. M., & Bangsa, U. B. (2023). Strategi pendidikan untuk sukses di era teknologi 5.0. *Jurnal Inovasi Pendidikan Dan Teknologi Informasi*, *4*, 56–68.

Marenden, V., Tambunan, W., & Limbong, M. (2021). Analisis Pengembangan Sumber Belajar Digital Media Video Untuk Meningkatkan Mutu Sdm Guru Melalui Pemanfaatan Teknologi Pada Pembelajaran Tatap Muka Di Era New Normal. *Jurnal Manajemen Pendidikan*, *10*(2), 66–79. https://doi.org/10.33541/jmp.v10i2.3270

Muhson, A. (2010). Pengembangan Media Pembelajaran Berbasis Teknologi Informasi. *Jurnal Pendidikan Akuntansi Indonesia*, *8*(2). https://doi.org/10.21831/jpai.v8i2.949

Ni Ketut Resi Yuliar, S. W. H. (2020). Studi Literatur Pendekatan Pembelajaran Steam Menyongsong Era Society 5.0. *JPD: Jurnal Pendidikan Dasar*, 1–8.

Nugroho, M. A. (2015). Pemanfaatan Teknologi Informasi dalam Peningkatan Mutu Pendidikan Islam di Madrasah. *MUDARRISA: Journal of Islamic Education*, *6*(1), 30. https://doi.org/10.18326/mdr.v6i1.758

Ratnawati, S. R., & Werdiningsih, W. (2020). Pemanfaatan E-Learning Sebagai Inovasi Media Pembelajaran PAI di Era Revolusi Industri 4.0. *Belajea; Jurnal Pendidikan Islam*, *5*(2), 199. https://doi.org/10.29240/belajea.v5i2.1429

Setyosari, P. (2015). Tantangan Dan Peran Teknologi Pembelajaran Transformasi Pendidikan Di Era Digital. *Seminar Nasional Teknologi Pendidikan UM, 2015*,

484–496.
http://digilib.mercubuana.ac.id/manager/t!@file_artikel_abstrak/Isi_Artikel_
630989951170.pdf

Syahria, N., Irfan Rifai, Ferra Dian Andanty, & Salim Nabhan. (2021). Pemanfaatan Teknologi di Era New Normal Untuk Pembelajaran Speaking dan Listening bagi Guru -Guru SMA/SMK Kota Surabaya. *Jurnal Penamas Adi Buana*, *5*(01), 28–35. https://doi.org/10.36456/penamas.vol5.no01.a3623

Watnaya, A. kusnayat, Muiz, M. hifzul, Nani Sumarni, Mansyur, A. salim, & Zaqiah, Q. yulianti. (2020). Pengaruh Teknologi Pembelajaran Kuliah Online Di Era Covid-19 Dan Dampaknya Terhadap Mental Mahasiswa. *EduTeach : Jurnal Edukasi Dan Teknologi Pembelajaran*, *1*(2), 153–165. https://doi.org/10.37859/eduteach.v1i2.1987