PENINGKATAN MUTU PENDIDIKAN MELALUI PEMBELAJARAN BERBASIS TEKNOLOGI

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Abstrak: Penelitian ini bertujuan untuk mengetahui Peningkatan Mutu Pendidikan Melalui Pembelajaran Berbasis Teknologi, Metode yang digunakan dalam penelitian ini adalah penelitian kepustakaan (library researh). penelitian kepustakaan adalah kegiatan penelitian yang dilaksanakan dengan mengumpulkan data berupa buku, jurnal, dan hasil penelitian sebelumnya untuk mendukung penelitian ini. Metode pengumpulan data menggunakan bantuan internet untuk menelusuri berbagai referensi buku maupun jurnal penelitian terdahulu yang sesuai dengan topik pembahasan penelitian berupa dokumentasi dari beberapa buku-buku, tesis, maupun jurnal online selanjutnya diolah dan dianalisis kemudian diambil kesimpulan. Adapun hasil penelitian ini dijelaskan bahwa dengan adanya perkembangan teknologi informasi dapat dimanfaatkan pada bidang Pendidikan dan akan membantu para guru dan siswa dalam menjalankan proses pembelajaran. Penelitian ini juga berkontribusi dalam memberikan contoh-contoh teknologi dengan berbagai macam fitur kegunaan dalam menunjang peningkatan mutu pendidikan antara lain dengan menggunakan *Flipped classroom, Learning Management Systems (LMS), Game (game-based learning)* seperti aplikasi *Duolingo, Augmented Reality (AR)* dan *Virtual Reality (VR,* dan *Khan Academy).*

Kata-kata Kunci: Peningkatan Mutu Pendidikan dan Pembelajaran Berbasis Teknologi

IMPROVING THE QUALITY OF EDUCATION THROUGH TECHNOLOGY-BASED LEARNING

Abstract: Technology-based learning in improving the quality of education based on previous research still has to achieve success indicators towards better education by completing the gap between theoretical concepts and practical implementation. Research gaps may lie in the lack of understanding of optimal strategies for integrating technology into the education curriculum, challenges in overcoming inequality of technology access among students, as well as limitations in evaluating the long-term impact of technology-based learning on the quality of education holistically. Literature review is a research activity carried out by collecting data in the form of books, journals, and previous research results to support this research. The data collection method uses the help of the internet to trace various references to books and previous research journals that are in accordance with the topic of research discussion in the form of documentation from several books, theses, and online journals and then processed and analyzed and then drawn conclusions.

The results of this study explain that this study analyzes the challenges that arise in integrating technology into learning, such as access to devices, training for educators, and changing learning paradigms. with the development

of information technology can be utilized in the field of education and will help teachers and students in carrying out the learning process. This research also contributes in providing examples of technology with various features of usefulness in supporting the improvement of the quality of education, among others by using Flipped classroom, Learning Management Systems (LMS), Games (game-based learning) such as Duolingo application, Augmented Reality (AR) and Virtual Reality (VR, and Khan Academy). Then in this research, evaluate and synthesize the theory comprehensively on the implementation of technology-based learning on the quality of education.

Kata-kata Kunci: *Education Quality Improvement, Learning Innovation, Technology-Based Education.*

INTRODUCTION

Technology and learning media today are almost inseparable, the use of technology that is so in the interest of many people, making technology as one of the learning media that is quite effective for students to receive messages from teachers besides being able to facilitate teachers and students, technology can also increase teacher creativity. In this era, the development of technology is very fast, and humans are required to be able to apply it, especially with all technology-based systems, education also continues to follow technological developments, therefore the use of technology as a learning medium is a must in the current era (Suminar, 2019).

The nature of the need for education is very important for a country in maintaining and improving the quality of its human resources, the importance of education according to (Fitriani, 2021a): Education has a very important role in creating intelligent human resources that focus on intellectual, emotional, and spiritual aspects. Education is expected to be able to maintain and improve the quality of education.

Education is gradually changing in line with the development of the era, especially the current 4.0 era, Technology has brought major changes in various aspects of life, especially in improving the quality of education, Improving the quality of education is a long-term investment that has a positive impact not only on individuals, but also on social, economic, and cultural development. Quality education can produce individuals who are able to compete. Of course, to achieve this, improving the quality of education is something that needs attention. Therefore, one approach that can be used to improve the quality of education is technology-based learning.

The relationship between technology and educational development according to (Maslin, 2021): Technology plays a very important role in our life because technology makes our work much easier and less time consuming. The impact of technology can be felt in every field, one of the fields is Education. The impact of technology can be felt in every field one of which is Education. In general, the use of technology in education, especially for learners, can help learners create learning communities using digital communication channels, this way while increasing learner collaboration in digital-based interactive education.

The utilization of technology in educational units through the development of modern technology-based pedagogical concepts known as online learning takes place. Seeing how important the role of technology is to the quality of education, it is necessary to improve the quality of education that must utilize technology by adjusting the use of information and communication technology for the world of education, especially in the learning process.

Previous studies may have highlighted the benefits of technology-based learning in improving education quality, but there is still a need to bridge the gap between theoretical concepts and practical implementation. Research gaps may lie in the lack of understanding of optimal strategies for integrating technology into the education curriculum, challenges in addressing inequalities in technology access among students, as well as limitations in evaluating the long-term impact of technology-based learning on education quality holistically.

The atmosphere of an interesting learning process will create an active classroom atmosphere in students (student-centered learning) so that it requires educators to use a variety of learning models and media. Many educators utilize supporting devices and applications in the form of technology in their learning to foster motivation and desire to learn from students in overcoming learning obstacles. Efforts to apply technology in the field of education began with the presence of technology-based media in educational institutions. The use of technology-based learning media is a must in terms of supporting the era of global competition. Learning media that are often used in the learning process are audio, audio-visual, presentation, and internet media. The application of technology-based learning media in educational institutions will be a solution to improve learning outcomes and the quality of education at all levels of educational units, from basic education to higher education (Sugiarto et al., 2023).

Based on the above phenomenon, the objectives of writing this journal are 1) To review previous studies to

identify gaps between theory and practice in the use of technology to improve the quality of education. 2). Analyze the challenges that arise in integrating technology into learning, such as access to tools, training for educators, and changing learning paradigms. 3). Specify technology-based learning models that can improve the quality of education by taking into account the social context, culture and available technological infrastructure. 4). Conduct a comprehensive evaluation of the implementation of technology-based learning on the quality of education in the long run.

The research question that needs to be discussed further is, How to improve the quality of education through technology-based learning that continues to develop comprehensively?

METHOD

The method used in this research is literature review, what is meant by literature research is research activities carried out by collecting data in the form of books, journals, and previous research results to support this research. The data collection method uses the help of the internet to browse various book references and previous research journals that are in accordance with the topic of research discussion. Analysis is carried out by sorting out the meaning of various relevant sources to obtain clarity of research results. The focus of this research is on the discussion of improving the quality of education through technology-based learning in general.

After obtaining data sources as references, it is continued with the analysis of literature review data carried out using content analysis. Content analysis is where the researcher examines a text objectively to get a picture of the content as it is, without the intervention of the researcher. In this case, the researcher will conduct an in-depth discussion of the content of information on data sources that need time to read and examine the data so that there is a result. These results are then expected to answer the problem and be used as a consideration to improve the quality of education through technology-based learning.

RESULTS AND DISCUSSION

Results

1. Definition of Education Quality

Quality means quality, degree, level. Terminology quality has quite diverse meanings, containing many interpretations and contradictions. Quality in a relative sense (standard) is applied in the world of education in Indonesia, among others, as evidenced by the existence of a national curriculum that provides details of objectives, formulation of competency standards, content standards, assessment standards including national exams (Kuntoro, 2019).

The quality of education is one of the pillars of human resource development (HRD) which is very important for building a country. It can even be said that the future of a country lies in the existence of quality education at this time, quality education will only grow if there are quality educational institutions. To ensure the quality and quality of education requires serious attention, both by education providers, government, and society. Because in today's national education system, the concentration on quality and quality is not solely the responsibility of higher education and government but is a synergy between various components including the community. To implement quality assurance, systematic and planned activities are needed in the form of quality management.

The quality of education is about two very important sides, namely the process and results (Tanjung et al., 2022). Quality in the education process involves various inputs such as teaching materials (cognitive, affective, or psychomotor), methodology (varies according to the ability of the teacher), facilities and infrastructure of educational institutions, administrative support, various resources, and efforts to create a fair and comfortable atmosphere for learning.

Quality according to Juran in (Tanjung et al., 2022) is a match with needs. It is further argued that quality is an absolute and relative concept. Absolute quality is quality whose ideals are high and must be fulfilled, high standards, with high prestige product properties. Relative quality is not an end, but as a tool that has been set or services are assessed, namely whether they meet the standards that have been set.

Improving the quality of education in a school requires a change in attitude and behavior of all school components, namely: principals, teachers and administrative staff including parents and the community in

viewing, understanding, assisting as well as monitors who carry out monitoring and evaluation in school management and supported by the management of a valid and representative information system, where the end of all that is aimed at the success of schools to provide quality education for the community. A management approach is needed in managing the entire organization of the school.

2. Concept of Technology-Based Learning

According to (Andriani, 2015) the concept of technology-based learning is an evolution of the traditional learning concept that utilizes information and communication technology to support the learning process. Conceptually, technology-based learning still refers to the basic principles of learning, such as clear objectives, structured planning, and continuous evaluation. However, the use of technology provides an additional dimension that allows learning to be more interactive, flexible, and effective.

The concept of technology-based learning utilizes various media and digital learning tools to present learning content in a more interesting and understandable manner. By utilizing multimedia elements such as video, customize learning materials according to students' individual needs and learning styles. This helps to increase student engagement and maximize their learning potential.

Scope the use of learning analytics to monitor student progress in real-time. With proper data analysis, teachers can provide more timely and relevant feedback and identify areas where students need additional help. The concept also expands the accessibility of education by providing access to online learning resources. This helps students from different social and geographical backgrounds to get quality education without being limited by location or physical limitations.

The scope of technology-based learning includes the use of technology in all aspects of learning, from content presentation to evaluation, with the aim of comprehensively improving the quality and accessibility of education.

According to Hamdani in an article compiled by (Belva Saskia Permana et al., 2024), media can be divided into three main categories. First, there is visual media, which can only be seen with the sense of sight, often used by teachers to convey subject matter, divided into two types, namely those that cannot be projected and those that can be projected. Second, audio media, which conveys messages in the form of sound or audio that can only be heard, is often used to improve students' listening skills. Third, audio-visual media, which is a combination of audio and visual elements, makes the presentation of subject matter more comprehensive and optimal, and can even replace the role of the teacher in certain situations as a learning facilitator. Examples include instructional video or television programs, as well as sound slide programs.

3. Utilization of Technology-Based Learning to Improve Education Quality

The development of information and communication technology has a rapid impact on the world of education. Global demands require the world of education to always adjust technological developments and constantly to efforts in improving the quality of education in the 21st century. The rapid development of information technology in this era of globalization is inevitable its influence in the world of education. In addition, the use of information and communication technology can accelerate effective and efficient management and education systems. The benefits of technology-based learning to improve the quality of education are:

a. Supporting the learning process, i.e. technology can make it easier for teachers to deliver the material being taught.

b. Providing new nuances, in the sense that it can provide new experiences for students who are too saturated with conventional learning models used by teachers.

c. The development of information and communication technology can provide the possibility of teachers and students interacting with learning resources widely, in the sense that they are not only fixated on conventional material sources such as books.

d. Learning becomes more flexible in terms of time and place.

Information and communication technology can be utilized for learning purposes so that it will support the learning process. This is because utilizing technology-based media can make it easier for teachers to convey the material being taught. The use of technology-based media can also provide new experiences for students who are

too bored with the conventional learning model used by the teacher (Fitriani, 2021b)

According to the Ministry of Education and Culture in (Fitriani, 2021b) The development of information and communication technology has formed a network that can provide the possibility for students to interact with learning resources widely. The internet and web networks have opened access for everyone to obtain information and knowledge as well as teaching materials. Various efforts have been made to improve the quality of education, one of which is to improve the quality and quality of learning using technology-based media because these are interrelated and support each other. Because the use of technology as often as possible will maximize good learning outcomes, in accordance with the times and following standards in this digital era.

The development of science has brought technology into the digital world. One form of digital technology is the internet. Currently, internet-based learning, such as online learning with zoom meetings, web-learning, e-learning has been widely practiced. Especially when the learning system in schools became online learning during the increasing

number of Covid-19 Pandemic cases. These lessons utilize the internet as a medium. In addition to learning being more flexible in terms of time and place, students can also access the information needed in learning freely. However, internet-based learning also has disadvantages, one of which is that many parties complain that the internet costs used are more expensive and if the network conditions are bad then online learning cannot be done. In addition, to support the utilization of technology in the world of education, it is necessary for teachers or teachers who are certainly familiar with it. So that they can guide students to learn with the help of technology.

In addition, teachers must also be wiser and become role models for students, to reduce the misuse of technology, especially for elementary school students. Because the position of the teacher is an important part in the implementation of learning. In addition, teachers must also race against time by making personal learners. Various methods, techniques, approaches, and learning models are very necessary to learn. Not only that, but teacher creativity is also needed to create new things. (Azzahra, 2022).

Information Technology as an Education Quality Improver The use of information technology in improving the quality of education consists of three things that must be realized in (Hanannika & Sukartono, 2022):

To maximize the use of technology in education, teachers need those who master the technology and can guide students in learning. Teachers must also be wise in the use of technology and become role models for students, as well as have creativity in applying learning methods and models in accordance with the times. In line with the rapid development of information technology, the view of learning in the classroom and outside the classroom has shifted significantly. Improving the quality of education using information technology requires equitable access to technology, quality materials, and teachers' knowledge and skills in using digital tools and resources.

4. The Role of Technology in Education in Indonesia

Based on the results of research (Mustafa & Suryadi, 2022) The role of information technology in the world of education in Indonesia includes: (1) Information and communication technology as skills and competencies, (2) Information and communication technology as learning infrastructure, (3) Information and communication technology as learning resources, (4) Information technology as educational tools and facilities, (5) Information technology as educational management.

In addition, the application of learning technology, especially learning based on various sources and media, both mono and multimedia to support independent learning completeness, is very important. Learners should be able to learn to use technology as a tool for learning through guidance from educators. So many roles of education and learning technology.

If it is concluded that the essence of the role of education and learning technology is an effort to improve the quality of education and learning from time to time, it must be able to facilitate learning in various conditions and backgrounds of students, easily, and widely, and create learning that is fun, flexible in the dimensions of time, space, and develop the potential of students individually and in groups.

5. Benefits of Technology in Education

If we have used learning media that is in accordance with the abilities, characters of students, the atmosphere of the class, and mastering how to apply it, the learning media will be able to bring the following benefits. a) the learning system becomes more interesting; students will focus on the learning media that the teacher brings which in turn students can understand the mandate or message conveyed by the teacher. b) the learning system becomes more active, meaning that the learning system here makes the learning atmosphere mutually mutually. c) save time and energy, with the existence of learning media, especially technological media, it can save time and energy where we don't have to go somewhere to see a phenomenon, but we can watch the phenomenon in the projector. d) teachers become more productive; this way teachers will more often create new media to be used as learning media. e) improve the quality of learning outcomes, with the media and the selection of appropriate media can produce good quality learning outcomes, these learning outcomes can be seen in three aspects, namely, cognitive, affective, and psychomotor. f) can be done anywhere and anytime, meaning that by using technological media, it can use distance learning methods and anytime can be done, not necessarily in the classroom or in the school environment but can be in their respective homes or wherever. (Suminar, 2019).

6. Opportunities, Challenges and Expectations on the Utilization of Technology-based Learning for Learning

Based on research conducted (Siahaan, 2015), it is said that opportunities for the utilization of technology-based learning for learning activities are increasingly wide open from time to time.

a. The rationale underlying this statement is that: (1) the cost of procuring Communication Technology equipment has become relatively affordable, (2) Communication Technology equipment has also become relatively easy to obtain by the community (its availability is no longer limited to big cities but has gradually begun to reach areas that are relatively far from big cities), (3) the development of the internet network which has become more widespread so that the community is increasingly facilitated to utilize it (government policy in the field of internet in the village), (4) the support of the School Committee for efforts to improve the school, and (5) the policy of the Ministry of Education and Culture that not only facilitates schools to be connected to the National Education Network (Jardiknas) but also encourages school principals to use School Operational Cost (BOS) funds to equip schools with Communication Science Technology devices.

b. In addition, another opportunity that can also be pursued by schools is the submission of proposals to companies to obtain special funds for the benefit of educational development. Every company generally allocates a certain percentage of company funds for social development as corporate social responsibility (CSR), including in the field of school education.

c. Another opportunity is the existence of several computer course institutions that offer cooperation with schools in terms of gradual procurement of computer equipment followed by the provision of training. The training offered is for teachers and education personnel in schools in terms of utilizing computer equipment and the internet with various applications including maintenance and maintenance of Communication Science Technology devices.

d. The availability of various educational/training institutions in the government and private sector engaged in the field of Communication Science Technology is an opportunity that schools can take advantage of. One of these institutions is the Center for Information and Communication Technology for Education and Culture-Ministry of Education and Culture (Pustekkom-Kemendikbud).

Basically, various opportunities are available for teachers to utilize technology in learning activities. The problem is the extent to which each teacher responds to the opportunities, whether to seize the opportunities and then take advantage of them or let the opportunities go to waste.

If teachers do not take action and miss out on opportunities, it may indicate constraints or barriers faced by teachers. Such constraints include limited access, resistance to change in implementing learning, limited time to prepare for using technology in learning, limited self-development through technology training, and limited technical support in utilizing technology (Siahaan, 2015).

Expectations related to the utilization of technology in learning activities in a planned, integrated and regular

manner are important to note. First, the utilization of technology as a learning medium has great potential to facilitate teaching and learning activities. The availability of technological devices is no longer limited to people in big cities, so that the implementation of learning with technology can be more conducive, improve student learning outcomes, and ultimately improve the quality of education. Experience shows that interesting and enjoyable learning motivates learners to study hard and regularly, and enjoy quality education. Teachers' openness to technological advances opens up opportunities for change and renewal in their professional duties, which in turn can improve the quality of education. With teachers' increased education and opportunities to utilize technology, it is expected that they can contribute to renewal in learning activities, which in turn will improve the overall quality of education. Improving teachers' technological competence is no longer a burden as there are various institutions ready to equip them with the necessary knowledge and skills. Synergy between institutions that play a role in technology development is expected to improve the quality of education and expand access to education services through the use of technology (Siahaan, 2015).

7. Implementation of Technology-based Learning to Improve Education Quality

Based on the results of research (Zainuddin et al., 2019), the design of a flipped learning instructional model for teaching Islamic Studies courses at a higher education institution in Indonesia. The flipped learning model developed is based on Bloom's taxonomy of educational objectives, with a bottom-up approach. The Schoology platform was used as a Learning Management System (LMS) to present pre-class video lectures to students. The three main out-of-class activities proposed are Watching, Summarizing, and Note-taking (WSN), while the main in-class activities are giving and receiving conversations. This research implies that the flipped learning model can be implemented with great potential for Islamic Studies courses in higher education institutions in Indonesia, with the aim of improving students' highest cognitive domains and independent learning skills.

The implications of this research include the importance of considering the flipped classroom as a contemporary teaching model in the higher education curriculum, particularly for Islamic Studies courses and other courses. This has relevant implications for the Ministry of Research, Technology and Higher Education, as well as the Ministry of Religious Affairs of the Republic of Indonesia, and policy makers in updating teaching approaches in higher education institutions in Indonesia.

The implementation of technology-based learning based on the second research according to (Mahrawi et al., 2023), namely, the process of developing Bio-Meta learning media: Integrated Digital Book with Augmented Reality and Virtual Reality is carried out through five stages in class XII IPA SMAN 2 Kota Serang: 1). Analysis, a stage that involves analyzing the curriculum to determine the teaching material to be delivered. 2). Design, a stage that determines the learning media to be used and makes learning media designs in the form of storyboards and flowcharts. 3). The Bio-Meta development stage is carried out as well as validation by material experts and media experts. 4). Bio-Meta is implemented to students and teachers. 5). Evaluation and revision are carried out based on input from user trials. The applications used in the development process include Canva, Sketchfab.com, 3DVista, WebAR Zappar, and Heyzine Flipbooks. The analysis results from the expert test showed the average value of the media expert team of 88.3% and from the material expert team of 84.2%, with the media category being very good. The results of the response test from students showed a media feasibility interpretation score from the use of the System Usability Scale (SUS) instrument of 81.3, meeting the criteria for an interpretation score of more than 80.3. This means that Bio-Meta: Digital Book Integrated with Augmented Reality and Virtual Reality is a good media and well received by students as a medium that is worth using to help understand hydroponic material.

Further previous research according to (Ali, 2009) explains that the results of the analysis of the increasing role of information and communication technology in seven aspects of education, such as increasing productivity, learning media, access to information, education management, research and community service, collaborative work, and entertainment, using a qualitative descriptive approach to describe the contribution of information communication technology-based learning in improving the quality of education and learning at Yogyakarta State University (UNY). The learning media used are conventional learning media services in the form of blackboards, tape recorders, OHPs, Slide Projectors, Movie Projectors, to practicum teaching aids can be provided with the same or at least close quality by using a computer. The grant program report confirms that the use of information and

communication technology in education can improve learning outcomes and learning motivation, which is reflected in the various achievements UNY has made over the past 5 years.

Based on the results of research according to (Jusuf, 2016), the development of ICT technology has changed the landscape of the gaming industry, encouraging educators to be more creative in designing the learning process. Many game designers are now delving deeper into psychology and other fields that understand human motivation and behavior. The gamification approach, which uses elements from games or video games to enhance learning motivation and increase student engagement, has become a trend. Examples such as Foursquare, SimCity, and Pokemon represent gamification systems that utilize geographic location. In the context of gamification, there are a number of necessary features, such as points, badges, levels, leaderboards, challenges, rewards, acceptance and engagement cycles. By applying gamification in learning, the learning process becomes more interesting, fun and effective. The importance of gamification is not just in creating games, but in building engagement and fun in learning without the learners realizing it.

Research according to (Ulansari et al., 2023) which reviews innovation in vocational education by utilizing information technology, conducted by PGRI 3 Malang Vocational High School to improve the quality of education. The main focus of the research is the form of information technology-based innovation in the school as well as the obstacles and support encountered in its implementation. The results showed several forms of innovation, such as the provision of Information Technology-based educational facilities, developing the ability of teaching staff in the field of Information Technology, cooperation with industry, utilization of tablet computers in learning, and student participation in Information Technology competitions. Significant supporting factors include support from the school principal, availability of Wi-Fi networks, and good cooperation with industry. On the other hand, inhibiting factors include the uneven ability of teaching staff in the use of IT as well as the inevitable possibility of disruption in technological equipment.

Discussion

The results of the research by Zainuddin and Mahrawi show differences in the approach and scope of the research conducted. Zainuddin focused on the design of a flipped learning instructional model for Islamic Studies courses in higher education, while Mahrawi discussed the development of Bio-Meta learning media with augmented reality and virtual reality technology in secondary schools. On the other hand, Ali and Jusuf's research focuses on the role of information technology in improving the quality of education in general, with Ali highlighting the contribution of technology in various aspects of education at Universitas Negeri Yogyakarta, while Jusuf reviews the use of gamification in the learning process.

Despite having different focuses, there are similarities in the efforts to improve the quality of education through the application of technology. Both Zainuddin and Mahrawi explore the potential of technology in supporting more interactive and student-oriented learning. Ali and Jusuf also recognize the importance of technology in enriching the learning experience and increasing student engagement.

The strength of Zainuddin and Mahrawi's implementation lies in their ability to develop innovative learning models and make good use of technology to achieve learning objectives. Zainuddin showed that the flipped learning model can be implemented with great potential to improve the quality of Islamic Studies learning, while Mahrawi successfully developed learning media that was well received by learners. On the other hand, Ali noted that the utilization of information and communication technology at UNY has contributed positively to learning outcomes and learning motivation. Jusuf, in his research on gamification, highlighted the advantages of increasing engagement and fun in learning.

Nevertheless, each study also has implementation shortcomings that need to be considered. Zainuddin and Mahrawi may face obstacles related to the lack of training or technical readiness of teaching staff and students. Ali highlighted that not all technological facilities are equally available at UNY, while Jusuf may face challenges related to an immature understanding of the gamification concept among educators. On the other hand, Ulansari found that the uneven ability of teaching staff in the use of information technology as well as possible disruptions in technological equipment were obstacles in the implementation of innovations at PGRI 3 Malang Vocational High School.

Synthesized from the literature review, improving the quality of education through technology-based

learning involves several key steps. First, quality content development becomes the focus. Technology allows the integration of multimedia elements such as video, animation, and simulation, which makes learning content more interesting and easily understood by students. Then technology also expands the accessibility of education by providing access to online learning resources. This helps students from various backgrounds to get quality education without being limited by location or physical limitations.

Secondly, a personalized approach to learning becomes more possible through technology. By using machine learning algorithms, learning platforms can customize learning materials according to students' individual needs and learning styles. Technology integration also enables the effective use of learning analytics. By monitoring students' progress in real-time, teachers can provide faster and more precise feedback and identify areas where students need additional help.

Thirdly, interactive features in technology-based learning, such as simulations, educational games, and collaborative platforms, can increase students' engagement in learning. This creates a dynamic learning environment and stimulates students' interest in active learning. And continuous training for teachers in the use of technology for learning is key. Educational institutions need to provide continuous training to ensure that teachers understand the latest technology tools, effective teaching strategies and technology integration in the curriculum.

With a comprehensive and continuous approach to developing technology-based learning, the quality of education can be continuously improved to meet the demands of the times and prepare students for an increasingly digital future.

CONCLUSIONS

Conclusions

Education is an important foundation in the development of a country's human resources. The high quality of education is the main key to the progress of a country. In today's digital era, technological developments have a major impact on improving the quality of education. The existence of technology allows the creation of effective technology-based learning.

The utilization of technology in education has great potential to support the learning process. Teachers can easily deliver materials, provide new experiences for students, and expand access to learning resources through various digital platforms. In addition, technology also makes learning more flexible in terms of time and place, allowing students to learn anytime and anywhere.

The implementation of technology-based learning such as flipped learning, the development of augmented reality and virtual reality learning media, and the use of gamification have shown positive results in improving the quality of learning. These models deliver more interactive, fun and student-oriented learning, thus improving students' overall engagement and learning outcomes.

Advises

1. It is important to continue to encourage the development and implementation of technology-based learning at various levels of education, both in higher education and in secondary schools, by providing sufficient training and support to educators and students.

2. There is a need to improve access to technology for all parties involved in the education process, as well as a deeper understanding of the concepts and benefits of technology in learning.

3. Continuous evaluation is needed to understand the long-term impact of implementing technology in education on the overall quality of education, as well as to identify areas for improvement or further development.

DAFTAR PUSTAKA

Ali, M. (2009). Peningkatan Kualitas Pendidikan dan Pembelajaran melalui Teknologi Informasi dan Komunikasi di Universitas Negeri Yogyakarta. *Prosiding SENTIA 2009*, C1–C5. http://elektro.uny.a.cid/muhal,

Andriani, T. (2015). Sistem Pembelajaran berbasis Teknologi Informasi dan Komunikasi. *Sosial Budaya : Media Komunikasi Ilmu - Ilmu Sosial Dan Budaya*, 12(1), 127–150.

Azzahra, A. (2022). *Pemanfaatan Teknologi Dalam Meningkatkan Mutu Pendidikan*.

Belva Saskia Permana, Lutvia Ainun Hazizah, & Yusuf Tri Herlambang. (2024). Teknologi Pendidikan: Efektivitas Penggunaan Media Pembelajaran Berbasis Teknologi Di Era Digitalisasi. *Khatulistiwa: Jurnal Pendidikan Dan Sosial Humaniora*, *4*(1), 19–28. https://doi.org/10.55606/khatulistiwa.v4i1.2702

Fitriani, F. (2021a). Analisis Penilaian Pembelajaran Berbasis Teknologi Informasi dan Implikasinya Terhadap Peningkatan Kualitas Pendidikan SD/MI. *Genderang Asa: Journal of Primary Education*, *2*(2), 18–30.

Fitriani, F. (2021b). Analisis Penilaian Pembelajaran Berbasis Teknologi Informasi dan Implikasinya Terhadap Peningkatan Kualitas Pendidikan SD/MI. *Genderang Asa: Journal of Primary Education*, *2*(2), 18–30.

Hanannika, L. K., & Sukartono, S. (2022). Penerapan Media Pembelajaran Berbasis TIK pada Pembelajaran Tematik di Sekolah Dasar. *Jurnal Basicedu*, *6*(4), 6379–6386. https://doi.org/10.31004/basicedu.v6i4.3269

Jusuf, H. (2016). Penggunaan Gamifikasi dalam Proses Pembelajaran. *Journal Technology of Information and Communication*, *5*(1), 1–6. https://www.researchgate.net/publication/320920734

Kuntoro, A. T. (2019). Manajemen Mutu Pendidikan Islam. *Jurnal Kependidikan*, *7*(1), 84–97. https://doi.org/10.24090/jk.v7i1.2928

Mahrawi, M., Marianingsih, P., Saputro, A. A. N. P., Pardede, P. I., Cahyani, A. R., & Chaerunisa, R. (2023). Pengembangan Bio-Meta: Buku Digital Terintegrasi Dengan Augmented Reality dan Virtual Reality. *Jurnal Ilmiah Wahana Pendidikan*, *9*(3), 317–329.

Maslin, N. M. (2021). Impact of Modern Technology. *HF Communications*, *3*, 165–182. https://doi.org/10.1201/b12574-14

Mustafa, P. S., & Suryadi, M. (2022). Landasan Teknologis sebagai Peningkatan Mutu dalam Pendidikan dan Pembelajaran: Kajian Pustaka. *Jurnal Pendidikan Dasar (FONDATIA)*, *6*(3), 767–793. https://doi.org/10.36088/fondatia.v6i3.2130

Siahaan, S. (2015). Pemanfaatan Teknologi Informasi dan Komunikasi dalam Pembelajaran : Peluang, Tantangan dan Harapan. *Jurnal Teknodik*, *19*(3), 321–332.

Sugiarto, T., Ambiyar, A., Wakhinuddin, W., Purwanto, W., & Saputra, H. D. (2023). Efektivitas Penggunaan Media Pembelajaran Berbasis Teknologi Informasi dan Komunikasi terhadap Hasil Belajar: Metaanalisis. *Edukasi: Jurnal Pendidikan*, *21*(1), 128–142. https://doi.org/10.31571/edukasi.v21i1.5419

Suminar, D. (2019). Penerapan Teknologi sebagai Media Pembelajaran pada Mata Pelajaran Sosiologi. *Prosiding Seminar Nasional Pendidikan FKIP*, *2*(1), 774–783.

Tanjung, R., Supriani, Y., Mayasari, A., & Arifudin, O. (2022). Manajemen Mutu Dalam Penyelenggaraan Pendidikan. *Jurnal Pendidikan Glasser*, *6*(1), 29. https://doi.org/10.32529/glasser.v6i1.1481

Ulansari, L. U., Hayat, A., & Anggraeni, N. L. V. (2023). Inovasi Sekolah berbasis Teknologi Informasi dalam Meningkatkan Mutu Pendidikan Kejuruan (Studi pada Sekolah Menengah Kejuruan PGRI 3 Malang). *Jurnal Administrasi Publik (JAP)*, *3*(11), 1851–1856.

Zainuddin, Z., Hermawan, H. D., Nuraini, F., Prayitno, S. M., & Probowasito, T. (2019). Flipping the classroom with a LMS: Designing a technologybased learning model. *Journal of Education and Learning (EduLearn)*, *13*(3), 309–317. https://doi.org/10.11591/edulearn.v13i3.12886