

BUILDING VOCATIONAL HIGH SCHOOL STUDENTS EMPLOYABILITY SKILLS IN VOCATIONAL EDUCATION WITH AN ARTIFICIAL INTELLIGENCE (AI) APPROACH

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ABSTRACT

The application of artificial intelligence (AI) in vocational education, particularly in Vocational High Schools (SMK), has a significant impact on improving students' employability skills. This study aims to examine the impact of AI integration in vocational education, focusing on the development of technical skills (hard skills) and interpersonal skills (soft skills). Using a Systematic Literature Review (SLR) approach, this article analyzes various studies discussing the implementation of AI in vocational education, as well as the challenges and opportunities that exist. The findings indicate that AI can improve learning effectiveness through personalized materials, the use of industry-based simulations, and the development of communication and collaboration skills among students. However, challenges faced include limited infrastructure, a lack of technical skills among educators, and resistance to change from schools and students. This study also emphasizes the need for educational policies that support technological development, improve educator skills, and strengthen collaboration between education and industry to create curricula relevant to job market needs, so that vocational high school graduates can compete globally in an increasingly digital world.

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INTRODUCTIONS

The importance of developing employability skills in vocational education, particularly in Vocational High Schools (SMK), cannot be overstated. Vocational education plays a central role in equipping students with practical and cognitive skills needed to meet the demands of the job market (Muaddab et al., 2024). In the context of the Fourth Industrial Revolution, the industry increasingly requires graduates who possess not only technical competencies but also digital literacy, adaptability, and interpersonal skills (Sudja'i & Mardikaningsih, 2021).

The rapid change in technology has shifted the nature of work and required skill qualifications, thus vocational education is demanded to keep innovating. Therefore, vocational schools need to undergo a transformation in their learning system to ensure graduates are ready to compete in the digital and global job market (Ahmanda et al., 2022;

Hertin et al., 2024). One promising innovation to address such challenges is the integration of artificial intelligence (AI) in vocational learning processes.

The novelty of this research lies in the analysis of how the strategic implementation of AI can enhance the employability skills of vocational high school students through the integration of adaptive and project-based learning, while considering the challenges of teacher readiness and limitations of vocational education infrastructure in Indonesia. The present study is expected to contribute theoretically to the development of a contextual AI application model and provide practical implications for improving the relevance of vocational high school curriculum to meet the needs of the industrial world.

LITERATURE REVIEW

Artificial intelligence (AI) has emerged as a crucial tool in improving the employability skills of vocational high school students. AI has the potential to transform vocational education by providing a more interactive, adaptive, and personalized learning experience (Yatri et al., 2023). Through the application of AI in education, the learning process can be tailored to the needs and abilities of each student. This enables them to acquire relevant skills that align with industry developments (Ichsan et al., 2023; Mewengkang et al., 2021).

The application of AI in vocational education can be achieved through various methods, such as the use of interactive AI-based learning e-modules, adaptive training systems, and technology-based assessment tools that provide real-time feedback. AI-based e-modules enable students to learn independently with materials tailored to their level of understanding, while adaptive training systems ensure that the learning process consistently adapts to the students' developmental abilities (Mewengkang et al., 2021).

Furthermore, AI can also assist in developing students' technical skills (hard skills). By using practical simulations and relevant industry-based projects, students can gain hands-on experience in real-world work situations. These AI-based projects will provide deeper insights and more applicable skills, which can be used in the workplace (Riza & Yoto, 2023). In this context, students not only learn theory but also can apply technical skills practically.

The development of interpersonal skills (soft skills) has also received attention in the application of AI in vocational education. AI can be used to create social simulations that allow students to interact in contexts that mimic real-world workplace situations. Through these simulations, students can develop communication skills, teamwork, and the ability to negotiate and solve problems effectively. Project-based learning and collaboration between students can also be facilitated by this technology (Riza & Yoto, 2023).

However, the implementation of AI in vocational education is not without challenges. One of the biggest challenges is the gap in technical skills between teachers and students in using AI technology. Lack of training for educators on how to integrate AI into learning can be a significant barrier to effective implementation. Therefore, greater efforts are needed to provide training to educators so they can maximize the use of this technology (Muaddab et al., 2024; Rosiana Dewi et al., 2023).

Further, limited infrastructure and access to technology in various regions are also challenges that cannot be ignored. In some areas, particularly remote ones, access to adequate hardware and internet connections remains very limited. This can hinder the effective implementation of AI-based programs, given that this technology requires adequate infrastructure to be fully implemented (Ahmanda et al., 2022; Muaddab et al., 2024).

On the other hand, the application of AI offers significant opportunities to bridge the gap between educational outcomes and labor market needs. By leveraging analytical data generated from AI applications, vocational education can be more responsive to changing industry needs. This allows the curriculum taught in vocational schools to be continuously updated and relevant to technological developments and the ever-changing demands of the labor market (Tauhid et al., 2022).

Recent studies have shown that implementing AI in vocational education can improve student employability outcomes. With more innovative and technology-based learning strategies, vocational high school students will

possess not only theoretical knowledge but also practical skills ready to be applied in the workplace. Therefore, it is crucial for educational institutions, the government, and industry to collaborate in formulating policies that support the integration of AI in vocational education to produce competent graduates ready to compete in the digital age (Ichsan et al., 2023).

RESEARCH METHODS

The Systematic Literature Review (SLR) research method is a systematic and structured approach to collecting, analyzing, and synthesizing literature relevant to a research topic. In the context of this research, SLR is used to explore the integration of artificial intelligence (AI) in vocational education with a focus on developing employability skills in Vocational High School (SMK) students. This approach allows researchers to obtain a comprehensive overview of various published studies and evaluate the quality and relevance of related studies. The SLR process is carried out in an organized manner through a series of stages involving literature selection, analysis, and data synthesis.

Formulation of Research Questions

The first step in SLR is to formulate a clear and specific research question. This question serves as the basis for searching and selecting relevant literature. In the context of this study, research questions can cover various aspects, such as: how can AI be integrated into vocational education to develop employability skills in vocational high school students? What is the impact of AI use on the development of students' technical (hard) and interpersonal (soft) skills? With the right formulation of questions, this study can focus on searching for literature related to AI applications in vocational education and its impact on vocational high school students' readiness for the workforce (Roslin et al., 2022; Stracke et al., 2023).

Literature Search

Once the research question is defined, the next step is to search for relevant literature. This search is conducted using leading academic databases such as JSTOR, Google Scholar, Scopus, and others. The right keywords are crucial to ensure relevant search results, such as "AI integration in vocational education," "employability skills," "hard skills development through AI," and "the impact of AI on soft skills." Researchers can also use search filters such as publication year range (e.g., the last five years) to ensure the literature found remains relevant to the current research context (Mbithi & Maina, 2025; Stracke et al., 2023).

Inclusion and Exclusion Criteria

Inclusion and exclusion criteria are crucial elements in the process of selecting literature for inclusion in SLR research. Articles meeting the inclusion criteria must have been published in a peer-reviewed journal within the last five years, relevant to the topic of vocational education or AI, and focused on student employability skills. They must also have a clear and structured methodology and make a significant contribution to the research question. Conversely, articles that do not meet the inclusion criteria, such as those that do not focus on educational outcomes or employability, do not follow SLR methodology, or are written in a language inaccessible to the researcher, will be excluded from the analysis process (Familoni & Onyebuchi, 2024; Stracke et al., 2023).

In total, a selection of 35 indexed journal articles was identified during the initial phase of literature search conducted between January and March 2025. Following the application of inclusion and exclusion criteria, 22 articles were selected for further analysis. These articles were published between 2019 to 2025 to ensure the relevance of findings within the current technological and educational context. The primary sources originated from Scopus, Google Scholar, and JSTOR databases.

Evaluation of Quality and Relevance

After the literature has been selected, the next step is to evaluate the quality and relevance of each submitted article. This assessment aims to ensure that the analyzed articles have high validity and reliability. The evaluation is based on several criteria, such as research methodology, the quality of the data used, and the article's contribution to the understanding of the research topic. Assessment tools such as the Critical Appraisal Skills Programme (CASP) are

often used to assess the methodological quality of selected journals. This tool helps researchers assess whether the selected articles have an appropriate research design and reliable results (Gupta & Kaul, 2024; Stracke et al., 2023).

Data Analysis and Synthesis

After selecting and evaluating relevant articles, the data obtained from the literature was analyzed and synthesized. The purpose of this analysis was to identify emerging themes or patterns within the selected literature. Researchers looked for similarities or differences in research findings related to the use of AI in vocational education and its impact on vocational high school students' employability skills. Analytical techniques such as thematic analysis or pooled analysis are often used to identify interrelationships between findings across studies. This process allows researchers to gain deeper insights into how AI can support the development of students' technical and interpersonal skills (Familoni & Onyebuchi, 2024; Roslin et al., 2022).

Presentation of Results and Conclusions

After the data has been analyzed and synthesized, the next step is to present the SLR research results in a structured and clear format. The researcher will summarize the key findings from the analyzed literature and draw conclusions regarding the impact and potential of AI integration in vocational education, particularly in developing employability skills in vocational high school students. This presentation of results will not only include consistent findings but also address any differences or gaps in the studies. The conclusions drawn will contribute to a deeper understanding of the application of AI in vocational education and its implications for student skill development (Gupta & Kaul, 2024; Stracke et al., 2023).

Challenges in SLR Implementation

The application of the SLR method in this research context certainly faces several challenges. One is the limited literature specifically addressing AI integration in vocational education. Furthermore, varying research quality and methodology can also influence the analysis results. Researchers need to ensure that included articles adhere to SLR principles and provide relevant and reliable information. Given that this topic is still in its infancy, another challenge is the limited research directly linking AI to the development of employability skills in vocational high school students within the context of vocational education.

RESULT AND DISCUSSIONS

The application of artificial intelligence (AI) in vocational education, particularly in developing employability skills in vocational high school students, has demonstrated a significant impact on both technical skills (hard skills) and interpersonal skills (soft skills). Several studies have revealed that AI integration provides several key findings relevant to understanding its impact on educational outcomes, both in terms of practical and social skills needed in the workplace.

Table 1. Previous Studies on AI Application in Vocational Education

No.	Authors	Methodology	Research Sample	Main Findings	Relevance to the current Research
1	(Mewengkang et al., 2021)	Case Study	Vocational School (SMK) in Indonesia	The use of AI-based e-modules improves students' understanding of the material individually.	Support the use of technology for personalized learning.
2	(Fadillah et al., 2021)	Meta-analysis	Various Vocational Schools	Implementation of project-based learning with AI improves students' technical skills.	Proving the effectiveness of AI in developing students' technical skills.

3	(Riza & Yoto, 2023)	Experiment	Vocational High School Engineering Student	AI assists students in developing interpersonal skills such as communication and cooperation.	Showing that AI also contributes to non-technical skills.
4	(Rosiana Dewi et al., 2023)	Survey	Vocational teachers and students	The main challenges in implementing AI are lack of training for teachers and limited infrastructure.	Indicates barriers that need to be overcome in the implementation of AI in SMKs.

Source: Data 2025

From the results of several studies in Table 1, it is evident that the application of AI in vocational education has a positive impact both in Indonesia and in other countries. Research in Indonesia (Fadillah et al., 2021; Mewengkang et al., 2021) highlights the improvement of technical and interpersonal skills. These evidences suggest a common pattern that the effectiveness of AI is influenced by institutional readiness and teacher competence, not just the availability of technology.

Key Findings Regarding the Impact of AI on Student Skills

Improved Technical Skills (Hard Skills)

One significant impact of implementing AI in vocational education is the improvement of students' technical skills. AI enables students to engage in more interactive and realistic technology-based learning. AI platforms offer simulations that closely approximate real-world conditions, providing students with opportunities to practice technical skills in a safe environment. For example, in engineering, the use of AI-based automated design software allows students to create more accurate and faster technical designs or models. This not only accelerates their understanding of complex technical concepts but also hones practical skills needed in the workplace (Fadillah et al., 2021; Wahyudi et al., 2024). Through this technology, students can practice independently and gain more valuable experience in solving real-world problems they will encounter in the industry.

Furthermore, using AI, simulations can be tailored to students' ability levels, providing a more personalized and relevant experience. For example, students who take longer to grasp a particular concept can receive more in-depth feedback and the opportunity to practice more without feeling rushed. This technology can also detect students' deficiencies in specific technical skills and provide appropriate additional training to address weak areas. This type of learning increases the effectiveness of mastering skills that are essential in rapidly evolving industries, such as manufacturing, automation, and information technology (Fadillah et al., 2021).

These findings are aligned with research in Germany (Giering & Kirchner, 2025) which illuminates that the use of AI in technical training enhances design accuracy and learning process efficiency. Consequently, whether in Indonesia or in developed countries, the implementation of AI has been shown to strengthen vocational students' technical skills.

Interpersonal Skills Development (Soft Skills)

AI also plays a crucial role in developing students' interpersonal skills. While often considered more difficult to measure, these skills are essential in the workplace. Through interactions with AI-based systems, such as virtual tutors or chatbots that act as instructors or mentors, students can practice communicating, collaborating, and problem-solving with their peers. These systems can provide immediate feedback on how students interact in simulated situations that mimic social and professional situations, such as presentations, group discussions, or negotiations (Wahyudi et al., 2024).

For example, in several studies of Game-Based Learning utilizing AI, students not only learned the subject matter but also developed improved social and communication skills. This approach allows students to participate in games or simulations that simulate a work environment, where they must collaborate with other students to achieve a common goal. In this environment, students can practice important skills such as effective communication, conflict resolution, and teamwork, which are often more difficult to teach conventionally. Thus, AI not only introduces technology into learning, but also helps students build interpersonal relationships that are essential in their professional lives (Wahyudi et al., 2024).

Marengo et al. (2025) and Tan & Chong (2023) has also shed light that AI can enhance students' communication and collaboration skills through game-based learning. This means that the benefits of AI in developing soft skills are universal and not restricted to specific contexts.

Learning Effectiveness

The application of AI in vocational education has also been shown to increase the overall effectiveness of learning methods used in vocational schools. One way AI enhances this effectiveness is through personalized learning. AI technology can analyze students' learning styles and progress, then tailor course materials to better suit individual needs. This allows students to learn more efficiently, focusing on areas they find more difficult and moving on to more complex material only after mastering basic concepts. AI-based learning offers a more flexible and responsive experience to students' varying abilities and learning needs (Fadillah et al., 2021).

The use of technologies such as AI-powered project-based learning offers additional advantages. Using data generated by AI, project-based instruction can be further personalized to provide specific, immediate feedback on student skill development. For example, in project-based learning in engineering or design, AI can monitor student progress and provide suggestions or alerts related to the technical aspects of their projects, allowing students to correct errors or improve the quality of their work before the final stage. Thus, the learning process becomes more sustainable and in-depth, helping students to continue to develop technically and socially in relevant contexts (Maulina & Yoenanto, 2022).

Challenges in Implementing AI in Vocational Education

Infrastructure Limitations

One of the biggest challenges facing the implementation of AI in vocational education is the limited infrastructure available in many schools, especially in more remote areas. Although AI technology offers numerous benefits for learning, many vocational schools in Indonesia still struggle to provide adequate technological infrastructure. Limited internet access is a major obstacle, particularly in rural and remote areas, where internet connections are often unstable or unavailable. This limitation hinders the use of AI in learning, as many AI-based platforms and applications require a stable internet connection and sufficiently powerful hardware to run complex software. Furthermore, outdated or inadequate hardware in many schools also poses a significant barrier to optimally implementing AI-based technology (Maulina & Yoenanto, 2022).

These infrastructure limitations have the potential to create a gap between schools with full access to technology and those without. Schools with better infrastructure can easily integrate AI into their curricula, while others are hampered in keeping up with the developments in this educational technology. The government and educational institutions need to work together to improve access and provision of technology infrastructure in all schools so that the benefits of AI can be enjoyed evenly across all regions, especially in less developed areas (Maulina & Yoenanto, 2022).

Lack of Technological Skills Among Educators

In addition to limited infrastructure, many educators in vocational schools also face challenges in terms of technological skills. While most educators may possess adequate skills in teaching theoretical subjects, they lack training in integrating advanced technologies such as AI into their teaching. This is problematic because the success

of AI implementation depends heavily on the extent to which educators can leverage AI-based tools and platforms to enhance students' learning experiences. Without adequate training, educators will struggle to use this technology efficiently, thus reducing the effectiveness of AI implementation in vocational education.

Furthermore, ignorance about the full potential of AI in vocational education often leads educators to hesitate in adopting this new technology. They may feel intimidated by the technology's complexity or worry that AI-based tools will replace their role in the teaching process. Therefore, ongoing training for educators is essential to increase their understanding of the benefits of AI and innovative ways to integrate it into the classroom. Comprehensive, experience-based training programs will help educators feel more confident in using technology to enhance student learning (Upadianti & Indrawati, 2020).

Resistance to Change

In addition to limited infrastructure and skills, resistance to change is also a major challenge in implementing AI in vocational education. Not only are educators often anxious and reluctant to adopt new technologies, but students may also feel uncomfortable using tools and methods that differ from the traditional learning methods they are familiar with. Some students may feel more accustomed to textbook-based learning and teachers as the sole source of information, and they are reluctant to adapt to more independent, technology-based learning.

This resistance to change can also come from school management, who prefer traditional ways of managing the educational process. They may feel that changes involving new technologies will require significant time, resources, and investment. However, with the proper implementation of AI, learning can be more efficient and effective, as well as more relevant to the demands of technology-based industries. To overcome this resistance, it is crucial for relevant parties to provide clear information about the benefits of AI and how this technology can enrich the learning experience and improve vocational high school students' readiness for an increasingly digital and technology-driven workplace (Latif et al., 2023).

Limited Understanding of AI

Limited understanding of artificial intelligence (AI) is also a factor hindering the integration of this technology in vocational education. Many people, including educators and students, do not fully understand how AI can be used effectively to improve the quality of education. AI is often perceived as too complex or expensive to implement in the classroom. However, AI can be used in a variety of simpler and more affordable ways, such as in the creation of e-learning platforms, automated assessments, or providing personalized feedback to students. Therefore, it is crucial to improve technological literacy among educators and students so they can understand the benefits and immense potential of AI in vocational education.

Furthermore, developing a curriculum that emphasizes a basic understanding of AI at the vocational high school level is also necessary. By providing a better understanding of how AI works, students will be better prepared to adapt to this technology, both in educational contexts and in the workplace after graduation. Therefore, the curriculum must integrate the latest technological elements, including the basics of AI, which can improve students' readiness to face the world of work which is increasingly driven by technological advances (Wahyudi et al., 2024).

Similar barriers are also seen in India and Nigeria, where issues with infrastructure and teacher capacity serve as primary obstacles (Oyekunle et al., 2024). Yet, developed countries like Japan and Finland have effectively tackled these issues through continuous digital training for teachers. This highlights that Indonesia's challenges are part of a global pattern in the implementation of AI in vocational education.

Opportunities to Improve the Quality of Education

Strengthening Collaboration with the Business World

One of the greatest opportunities for implementing AI in vocational education is strengthening the relationship between education and the business world, through initiatives such as link and match. This program enables closer collaboration between schools and industry to ensure that the curriculum taught in vocational high schools (SMK)

aligns with labor market needs. With the support of AI technology, this process can be carried out more effectively. AI can analyze the evolving skills needs in industry and help vocational education adjust the curriculum to include relevant skills needed by the job market.

For example, by analyzing data on available jobs in the market, AI can help vocational education identify trends in skills demand in the manufacturing, technology, and service sectors. Based on these findings, the existing curriculum can be dynamically updated, ensuring that vocational high school students learn not only general skills but also specific skills that will better prepare them for the demands of the rapidly evolving industrial world (Fatmawati, 2021).

AI-powered link and match programs also allow students to gain hands-on experience through internships or industry-relevant internships. This kind of collaboration will open up opportunities for students to gain deeper knowledge about real-world industry practices, while also building professional networks that will be useful for entering the workforce after graduation (Fatmawati, 2021).

Improving Access to Education

The application of AI can also help improve access to education, especially for students in remote areas. In many areas in Indonesia, access to quality education remains limited, especially in areas far from urban centers. AI-based technologies, such as online learning, can be a solution to address this gap. With the help of AI-based platforms, students in hard-to-reach areas can access the same learning materials as students in schools with better facilities.

AI-powered online learning platforms can provide a variety of learning resources, practice exercises, and interactive simulations relevant to the vocational education curriculum. AI enables personalized learning, allowing each student to learn at a pace and method that suits their learning style. This not only improves the quality of learning for students in remote areas but also provides them with a fairer opportunity to develop skills needed for the workforce. This technology opens up significant opportunities to improve educational equity in Indonesia, narrowing the gap between developed and less developed regions (Maulina & Yoenanto, 2022).

The implementation of AI-based learning materials accessible online will enable students in remote areas to learn skills relevant to the world of work without sacrificing the quality of their education. Students can access learning materials anytime and anywhere, increasing flexibility in the learning process, especially for those hindered by physical or geographical limitations (Maulina & Yoenanto, 2022).

Improving Digital Skills for Vocational High School Students

One of the significant opportunities from the application of AI is improving the digital skills of vocational high school students. In a workplace increasingly reliant on digital technology, information technology skills are a key requirement for vocational high school graduates. Through the utilization of AI in learning, students not only learn the technical skills needed for their jobs but also develop crucial digital skills. AI can help students learn to use various technology-based software and tools they will encounter in the workplace.

For example, in the information technology sector, students can learn to use coding and programming software that utilizes AI algorithms, or they can be trained in computer programming and application development based on artificial intelligence. The application of AI in vocational education will ensure that vocational high school graduates are prepared to work in an increasingly digital-based sector and can adapt to rapid technological changes (Wahyudi et al., 2024).

In the context of vocational education, this emphasis on digital skills will strengthen the position of vocational high school graduates in the global labor market. Skills such as coding, big data management, and the use of AI-based software will be highly valued by industry. Hence, a vocational education curriculum that integrates AI will help students develop relevant skills, as well as prepare them for the digital and automated world of work (Maulina & Yoenanto, 2022).

Developing a More Flexible and Responsive Curriculum

The application of AI also opens up opportunities to create a curriculum that is more flexible and responsive to changing industry needs. AI can be used to monitor and analyze student learning outcomes and tailor course materials to individual student needs. This way, students with strengths in certain areas can be encouraged to develop further in those areas, while students who need additional support will receive more intensive guidance. This approach helps create a more inclusive and adaptive learning environment, where each student can learn in the way that is most effective for them (Maulina & Yoenanto, 2022).

This AI-based curriculum not only increases learning effectiveness but also makes education more relevant to the needs of the ever-changing labor market. AI enables vocational education to adapt quickly to the latest industry trends, ensuring that vocational high school graduates always possess the skills needed in the workforce. Through this responsive curriculum, students will be better prepared to face the challenges posed by technology- and automation-based industries (Fadillah et al., 2021). This approach is in line with Indonesia's link and match program, reflecting a global trend towards data-driven and collaborative vocational education.

Implications for Vocational Education Policy

The Importance of Policies for Educator Professional Development

The implementation of artificial intelligence (AI) in vocational education requires policies that support the professional development of educators. Integrating AI into vocational high school curricula will only be effective if educators have sufficient knowledge and skills to utilize this technology in learning. Therefore, education policies must include ongoing training programs to enhance educators' technical and pedagogical capabilities in optimally utilizing AI. This training should include not only instruction on how to use AI software but also on how to effectively integrate this technology into various subjects.

To ensure educators can use AI efficiently, education policies must provide the necessary resources and support, such as technology-based training courses, seminars, and workshops accessible to all vocational high school teachers. The government can also collaborate with higher education institutions, technology companies, and industry to provide relevant training programs, ensuring that educators not only master the technology but also know how to apply it in vocational education contexts that align with job market needs (Sari, 2023).

Investment in Technology Infrastructure

Education policy must also include significant investment in technology infrastructure. This infrastructure includes adequate hardware, stable internet access, and AI-based software that can be used across all schools. Without adequate infrastructure, the implementation of AI in vocational education will be hampered, especially in regions lacking adequate technology facilities. Therefore, clear and sustainable budget allocation for upgrading technology facilities in schools needs to be a top priority in education policy.

The government needs to ensure that schools, both in large cities and remote areas, have equal access to technology that supports AI-based learning. Furthermore, it is crucial for the government to address infrastructure issues, which are often a major obstacle to the implementation of new technologies. By providing adequate facilities and resources, the government can promote equitable distribution of AI-based education across Indonesia and provide equal opportunities for students in various regions (Maulina & Yoenanto, 2022).

Developing Partnerships with Industry

Education policy must also include efforts to build closer partnerships with industry to ensure that vocational education curricula align with the needs of the workforce. One way to achieve this is by strengthening the link and match between vocational education and industry. In this context, AI can act as a tool to facilitate collaboration between education and industry by providing relevant data and trend analysis on skills needed in the job market.

These partnerships can take various forms, such as providing internships, project-based learning programs, or collaborative research that combines knowledge from education and industry. By leveraging AI to align educational curricula with industry needs, vocational high school students can be equipped with the skills truly needed by the job

market, thereby increasing their competitiveness in the global workforce (Fatmawati, 2021). Furthermore, industry also benefits by providing a more prepared and skilled workforce.

Encouraging Innovation in Vocational Education Curricula

Policies supporting the implementation of AI in vocational education must encourage innovation in the curriculum. Existing curricula must be more responsive to rapid technological developments and emphasize the importance of digital skills and the ability to adapt to change. Education policies need to ensure that the curriculum implemented in vocational schools not only teaches the technical skills needed today but also provides a strong foundation for facing future technological changes.

AI enables a more flexible and adaptive curriculum. By using AI, the learning process can be tailored to the needs and pace of students, thus better aligning the curriculum with each student's abilities. AI can also help identify areas for improvement in the curriculum and provide data-driven recommendations for improvement. This not only accelerates student skill acquisition but also ensures that the curriculum remains relevant and responsive to ever-changing industry developments (Fadillah et al., 2021).

The Need for Policies that Integrate AI with National Education Policy to achieve the successful implementation of AI in vocational education, national education policy must incorporate the integration of this technology into the country's long-term education vision. The government needs to design policies that support digital transformation across the education system as a whole, including facilitating research and development of AI-based educational technologies that can be used at various levels of education. These policies should also focus on improving digital literacy among both educators and students, and promote the importance of technology in developing future-ready skills.

Policies supporting AI integration must be holistic, encompassing hardware and software development, educator training, and curriculum adaptation to incorporate future-ready digital skills. Therefore, the government's role in providing direction and support in terms of budgeting and policy is crucial for the successful implementation of AI-based vocational education transformation and its positive impact on vocational school graduates (Sari, 2023).

Cross-study findings reports that the implementation of AI in vocational education is effective when supported by integrated national policies, as seen in the cases of Finland and Singapore. Likewise, In Indonesia, a holistic approach that includes teacher training, infrastructure development, and curriculum adaptation will accelerate the transformation of vocational education towards readiness for the digital era.

CONCLUSION

The application of artificial intelligence (AI) in vocational education, particularly in Vocational High Schools (SMK), has a significant impact on developing students' employability skills. AI not only enhances technical skills (hard skills) through simulations and interactive learning, but also strengthens interpersonal skills (soft skills), which are essential for the workplace. By providing more personalized and relevant learning experiences, AI helps students prepare more effectively for the challenges of a workplace increasingly reliant on technology and automation.

However, the application of AI in vocational education is not without challenges. Limited technological infrastructure, lack of skills among educators, and resistance to change are key barriers that need to be addressed. Therefore, education policies that support infrastructure development, continuous training for educators, and increased technological literacy for students are essential. Furthermore, closer collaboration between education and industry will strengthen the curriculum's relevance to job market needs, ensuring that vocational high school students possess skills that meet industry demands.

The application of AI also offers significant opportunities to increase access to education, especially in remote areas, and to strengthen curricula responsive to industry changes. With policies that support investment in technology and the development of AI-based curricula, vocational education can make a greater contribution to preparing young

people to compete in the global job market. Through the integration of AI, vocational education can produce graduates with relevant skills and be prepared for a technology-driven future.

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