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Adoption of Artificial Intelligence in Vocational High Schools: A Systematic Review of Teachers' Perspectives

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Abstract: The purpose of this study is to examine Vocational High School teachers' perceptions of the adoption of artificial intelligence (AI) in vocational education. Using a systematic literature review (SLR) approach with the PRISMA 2020 protocol, 1,346 articles were identified from six main databases: ACM, IEEE Xplore, ScienceDirect, Google Scholar, and Semantic Scholar. Of the 1,346 articles identified, 263 were excluded at an early stage because they did not meet basic criteria, such as authorship, publication language, and document type. A total of 1,083 articles were screened, yielding 208 reports for in-depth screening. After the screening and feasibility assessment, 29 studies were included in the final analysis. The analysis showed that 72% of studies reported positive results, 24% reported moderate results, and 3% reported exploratory results. The dominant factors influencing teachers' perceptions included infrastructure readiness, digital competence, institutional support, the relevance of the vocational curriculum, and ethical and privacy issues. These findings emphasize the need for a holistic strategy for implementing AI in vocational schools that encompasses teacher training, education policy, and ethical considerations.

Keywords: AI, Adoption, Vocational school, Teacher, Education, Systematic literature review

INTRODUCTION

The development of artificial intelligence (AI) technology has revolutionized education, including vocational education, particularly at the vocational high school level. Vocational High School teachers are the primary key to adopting AI in learning, because their perception and readiness determine the success of integrating AI technology into the curriculum and learning practices (Al-abdullatif, 2024). Vocational education itself has unique learning characteristics, namely its focus on practical skills and work-readiness, so the application of AI is not only viewed from a pedagogical perspective but also in relation to the needs of industry and the world of work, which continue to change over time (Syahria et al., 2025).

Various studies indicate that vocational school teachers generally hold a positive attitude toward the use of AI, though this varies with context, readiness, and institutional support. For example, research in the United Arab Emirates found that science teachers' acceptance of AI was influenced by factors such as self-efficacy, ease of use, and expected benefit (Al Darayseh, 2023). A study in Indonesia showed that vocational school English teachers believe Generative AI can increase creativity and motivation, despite infrastructure challenges (Apoko, 2025). These changes also require teachers to develop new competencies and make pedagogical adjustments. Therefore, understanding teachers' perceptions, acceptance, readiness, and concerns about AI in learning has been an important research focus in recent years.

Technology in the vocational curriculum. Research in Nigeria confirms that self-efficacy and the relevance of AI are key factors in determining teachers' intentions to use AI in learning (Ayanwale et al., 2022). Similar findings in South Africa underscore the importance of context- and locality-oriented AI-based professional development. This shows that individual and institutional factors interact in shaping teachers' perceptions of AI (Adekunle et al., 2024).

However, the adoption of AI is not limited to technical and pedagogical considerations. Ethical challenges, privacy, and algorithmic bias are also concerns for teachers. Studies in Indonesia on citizenship education highlight the need for a balance between technology and the human role in preserving human values

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(Baihaqi & Fitriawati, 2024; Filiz et al., 2025). Similarly, phenomenological research in Turkey reveals that teachers perceive AI as a supportive technology, but one that raises significant ethical concerns (Balıkçı et al., 2024). These concerns underscore that AI integration must be carried out carefully, with attention to moral, cultural, and social factors. Teachers also expressed concerns about the risk of students misusing AI and the potential decline in human values if interaction between teachers and students decreases drastically (Delcker et al., 2025; Lee et al., 2024). The study notes that the majority of teachers in Ghana support the use of artificial intelligence (AI), such as ChatGPT, in learning. However, its application in learning is still hampered by a lack of teacher training in AI, inadequate infrastructure, privacy-related ethical issues, and the absence of clear government policies (Ampong, 2024). These findings emphasize that AI integration must be carefully implemented, with attention to the moral, social, and cultural aspects of education.

On the other hand, several studies also highlight that teachers' perceptions and acceptance of AI are greatly influenced by their level of digital literacy (AI Literacy) and technical abilities. Teachers with stronger digital competencies and experience with AI tend to have a positive attitude and confidence in using AI (Chear & Norman, 2024). In the context of vocational education in Indonesia, particularly in vocational high schools, research shows that teachers consider AI relevant to the development of practice-based learning, but they face several obstacles, such as limited facilities and a lack of curriculum integration with AI in school learning (Gumelar et al., 2025; Baihaqi & Fitriawati, 2024). Structural factors such as institutional/school support, continuous training, and school infrastructure readiness are crucial to the successful integration of AI in school learning (Habibulloh et al., 2025; Nurkhin et al., 2024).

Overall, the literature confirms that teachers' perceptions of AI in vocational education are shaped by interactions among individual factors (digital competence, self-efficacy), institutional factors (training, policy support), pedagogical factors (curriculum relevance), and social ethics (fairness, privacy). Thus, this study is important because it provides a comprehensive picture of how vocational school teachers view AI, the factors that support or hinder AI adoption, and how education policies can be designed to support the sustainable integration of this technology.

Based on several previous studies, the purpose of this study is to answer the main Research Question (RQ) :

RQ 1: What is the perception of vocational school teachers about the use of artificial intelligence (AI) in learning at school?
RQ 2: What are teachers' expectations and concerns regarding AI-based learning technology?
RQ 3: To what extent does the current vocational high school curriculum support or hinder the implementation of AI in the learning process at vocational high schools?
RQ 4: What ethical and institutional factors influence the opportunities and obstacles to AI adoption by vocational high school teachers, including infrastructure, policy support, algorithmic bias, and privacy issues?

This study uses a systematic literature review (SLR) to combine findings across fields, identify thematic patterns, and provide practical recommendations for developing AI-based vocational education policies. With this approach, the study not only contributes to the development of theory regarding technology adoption in education but also provides practical guidance for policymakers, teachers, schools, governments, and industry to ensure that AI truly supports the goals of vocational education and improves the quality of learning in the digital age.

METHOD

This study employed a Systematic Literature Review (SLR) approach, following the PRISMA 2020 protocol. This approach was chosen because it provides a systematic, transparent, and verifiable framework for identifying, selecting, and analyzing literature. Using PRISMA, each stage, from journal search, screening (filtering), feasibility analysis, to inclusiveness, is carried out in a structured and well-documented manner, thereby minimizing bias and increasing the validity of the study results.

The primary focus of this study is to identify, evaluate, and synthesize empirical studies on vocational school teachers' perceptions of the adoption of artificial intelligence (AI) in vocational education. Through this approach, the study seeks to explore thematic patterns across quantitative, qualitative, and mixed-methods contexts to provide a comprehensive picture of the factors influencing teachers' acceptance, readiness, and attitudes toward AI in learning. Thus, the research design not only summarizes prior findings but also synthesizes them to inform policy development, training, and AI implementation strategies in vocational education.

Data Sources And Search Strategy

Several journals used as research materials for this study were obtained from six major academic databases, namely ACM Digital Library, IEEE Xplore, ScienceDirect, Google Scholar, and Semantic Scholar, as well as through additional searches of cross-references in the bibliographies of relevant studies. The selection of these databases was based on the reputation of the journals and their broad scope in scientific publications related

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to educational technology, so that they would hopefully provide a complete representation of the available references (literature).

The query used is ("vocational school" OR "SMK") AND ("AI in education" OR "artificial intelligence") AND ("teacher" OR “educator”) AND ("teacher perception" OR "acceptance"). The query was designed to search for various term variants used in research on teachers' perceptions of AI adoption in vocational high schools (vocational education).

The journal publication period used as the reference for the study was 2022-2025, as this period reflects the most recent trends in AI adoption in the vocational education sector. The focus of this research is to present a picture that is relevant to technological developments and ongoing education policies. With this strategy, the journal reference search is conducted systematically and purposefully, yielding a collection of journals aligned with the research objectives, namely, empirical findings on vocational high school teachers' perceptions of AI adoption for learning.

Inclusion And Exclusion Criteria

This study applies inclusion and exclusion criteria during the literature selection process to determine study eligibility and ensure the relevance of included studies. The data includes:

A. Inclusion

Inclusion criteria are applied to ensure that the journals obtained are relevant and have a strong methodological basis (Kitchenham, n.d.). Empirical research methods include quantitative, qualitative, and mixed-methods designs, with a specific population of vocational school teachers or prospective vocational teachers. The research focuses on teachers' perceptions, readiness, intentions, and experiences with AI. Journals used as references are those written in English or Indonesian.

B. Exclusion

Exclusion criteria were applied to filter out inappropriate data. We excluded journals identified as duplicates and non-research publications, such as literature reviews, editorials, community service journals, and studies not relevant to vocational education, particularly in vocational high schools.

Prisma Flowchart

The study selection process in this research followed a systematic flow based on the PRISMA 2020 protocol, comprising the stages of identification, screening, eligibility assessment, and final inclusion.

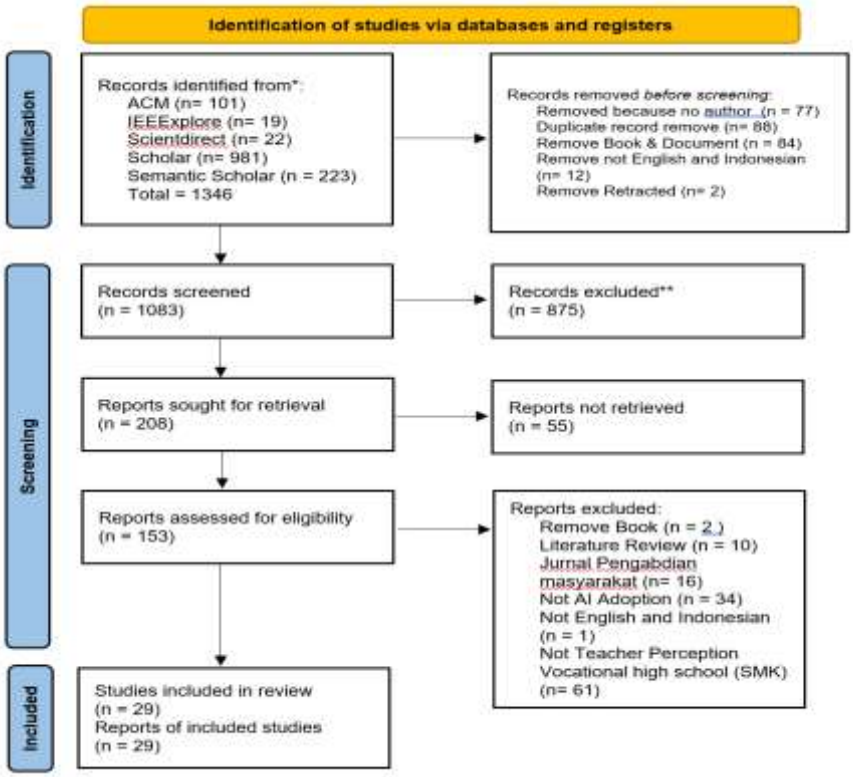

Figure 1 PRISMA Flowchart

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RESULTS

This section summarizes the findings from the 29 studies analyzed, grouping them by factors that influence vocational school teachers' perceptions of AI adoption. The results will provide an overview of the challenges and opportunities of integrating artificial intelligence (AI) in vocational education.

Data Extraction

Data extraction was conducted for all articles that passed the selection process, yielding 29 studies for analysis in this SLR. Data extraction was done manually and carefully to ensure consistency, accuracy, and suitability of information. Each article was evaluated using predetermined variables, including factors that influence the perception and adoption of AI by vocational school teachers, such as self-efficacy, digital literacy (AI Literacy), suitability with the curriculum, institutional/school support, and issues related to ethics and privacy. The extracted data were then grouped into several categories that reflect common patterns in the literature. The information collected during data extraction includes the author's name, title, year of publication, finding/key result, and conclusions. The classification data from the 29 articles are presented systematically in Table 1.

Table 1. Data Extractions

Author, Year	Finding / key result	Result	Conclusion
(Al Darayseh, 2023)	High acceptance is influenced by benefits, ease of use, and self-efficacy, with no demographic differences.	Positive	Science teachers accept AI positively, influenced by ease of use and self-efficacy.
(Apoko, 2025)	EFL teachers are positive about Gen-AI despite access constraints.	Positive	Gen-AI has the potential to transform English in vocational schools, but teachers need training and infrastructure support.
(Ayanwale et al., 2022)	Self-efficacy drives teacher readiness.	Positive	Teacher readiness is the key to successful AI implementation in learning.
(Adekunle et al., 2024)	AI technology integration increases teacher readiness, focusing on ethics, learning context, and support.	Positive	Social factors, attitudes, and self-efficacy significantly influence teacher readiness to use AI.
(Baihaqi & Fitriawati, 2024)	AI can improve learning, but is constrained by issues of privacy and algorithmic bias.	Positive	AI has been proven to improve learning efficiency and student learning outcomes. However, its application must be conducted ethically, taking into account ethical considerations, data privacy, and potential bias. Teachers remain the primary guides in learning.
(Balıkçı et al, 2024)	Perceptions of AI vary widely, emphasizing the need for integration in the wise use of AI in education.	Descriptive & Exploratory	Teachers have diverse perceptions about AI. AI is considered beneficial but raises ethical concerns, necessitating AI literacy, a clear curriculum, and the ethical application of AI in school learning.
(Chear & Norman, 2024)	Most teachers at Dato Permaisuri, Miri, Malaysia, accept AI and consider it easy to use.	Moderate	Teachers have a positive acceptance of AI with social influence and support, but still need further technical training on AI.
(Delcker et al., 2025)	Across the six dimensions of AI competency, teachers indicate that the imbalance between AI mastery and use in learning requires continuous AI training.	Positive	Teachers' AI competency is multidimensional: Theoretical Knowledge of AI (TH), Legal and Ethical Framework (LF), Implications of AI (IP), Attitudes toward AI (AT), Teaching and Learning with AI (TL), and Continuous Professionalization (PF) thus require an understanding of ethics, continuous

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			training, and professional development to support more effective and responsible AI integration in education.
(Lee et al., 2024)	Teachers appreciate AI in learning, but emphasize that it requires practical, contextual, and relevant training.	Positive	Teacher professional development in AI education is very important, including practical training, direct application in the classroom, long-term support, curriculum adjustments to ensure relevance, and evaluation of teacher competencies to ensure effective and sustainable AI integration in learning.
(Nurkhin et al., 2024)	The results of the study show that only perceived usefulness ($p=0.000$; $t=9.016$; $\beta=0.639$) has a significant and positive effect on teachers' intentions to use AI.	Positive	Only perceived usefulness influenced accounting teachers' intention to use AI in learning. However, increased digital literacy (AI Literacy) and ongoing training are needed to support its application in learning.
(Filiz et al., 2025)	AI integration can enrich knowledge in learning and teacher performance. However, teachers need readiness, training, and ethical guidelines on the use of AI in learning.	Positive	AI has the potential to transform education through efficiency and improved learning, but its success depends on teacher training, technical support, curriculum adjustments, and appropriate ethical and cultural guidelines.
(Gumelar et al., 2025)	Prospective vocational school teachers feel sufficiently prepared to integrate Gen-AI, although their confidence in using AI still needs to be improved.	Positive	Prospective vocational school teachers majoring in mechanical engineering show a high level of readiness to integrate GenAI, driven by PU, PEOU, and BI. However, they still need to improve their SE through technical training, strengthening AI ethics and governance, and collaboration with industry.
(Habibulloh, 2025)	AI has been shown to improve education, but it still requires regulation and ongoing training.	Positive	AI has the potential to improve the quality of education, but its implementation should be gradual and balanced between technology and human expertise.
(Kim & Kim, 2022)	AISS improves STEM learning and student creativity, but poses challenges for integration and teacher readiness.	Positive	Teachers hold a positive perception of AISS, which supports scientific writing, improves argumentation, logical thinking, and student reasoning. The integration of AI into learning still requires professional training and a deep understanding of AI to be implemented effectively.
(Konecki et al., 2024)	Teachers hold a positive view of AI but still require further training.	Positive	Teachers have a positive attitude toward the use of AI in education, but still require additional training to implement it effectively and ethically.
(Lin et al., 2022)	AI teaching design is highly effective and encompasses interactive design, mastery of AI pedagogical knowledge, social ethics, and continuous reflection and collaboration to enhance learning.	Positive	It can provide new insights into how teachers can overcome challenges in teaching using AI, integrate social values, and develop more effective design approaches to support AI learning at the K-12 level.

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(Cabrera-lanzo & Fabi, 2025)	Regression analysis indicates that knowledge of AI and general data-use skills are the primary predictors of AI adoption among teachers in schools.	Moderate	Teacher adoption of AI is influenced by data literacy and knowledge. Therefore, the development of AI literacy, training, and ethical guidance is key for teachers in adopting AI in learning.
(Lucas et al., 2025)	Confidence and relevance of AI are the most influential factors on teachers' readiness and intention to use AI in learning.	Moderate	The success of AI-based learning depends on teachers' readiness and confidence in using AI, with AI's relevance as a key factor supporting the implementation and development of effective education policies.
(Meyne et al., 2025)	The research produced a framework, collaboration network, and ethical guidelines that support the integration of AI in learning.	Positive	It emphasizes the importance of international collaboration, the development of AI competencies and ethics, and the adoption of innovative policies to support the sustainable integration of AI into vocational education.
(Rosemary et al., 2024)	The acceptance of AI in learning increases through positive attitudes, perceptions of benefits, and institutional support from teachers.	Positive	The successful integration of AI in education depends heavily on the availability of adequate resources, institutional support, and teachers' positive perceptions of and readiness to use AI to improve student learning outcomes and learning quality.
(Nugroho et al., 2024)	Science teachers in vocational schools have a limited understanding of AI, low levels of AI use, and a need for training and institutional support.	Moderate	Artificial intelligence (AI) has the potential to improve science learning in vocational schools. Still, its success requires a comprehensive strategy, including clear ethics and privacy policies, ongoing teacher training and professional development, curriculum development that supports AI integration, adequate technological infrastructure, and collaboration between teachers and stakeholders to ensure effective implementation aligned with educational needs.
(Oh & Ahn, n.d.)	AI is effective in assisting with administrative tasks and personalized learning, but is limited in social-emotional interactions.	Positive	AI has significant potential to support teachers in personalized learning and administrative tasks, but its social-emotional limitations must be considered in its application in education.
(Putra, 2025)	Teachers are enthusiastic about the use of AI in learning, but require support from institutions, ongoing training, and technology relevant to the Merdeka Curriculum.	Positive	AI has the potential to enhance teacher effectiveness in the Merdeka Curriculum by providing support such as training and contextual curriculum integration tailored to the educational environment, ensuring the ethical use of AI, improving teachers' digital competencies, and providing adequate infrastructure and policies that support the sustainable application of AI in Indonesian education.

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(Runge & Hebibi, 2025)	The use of AI increases AI-TPACK and Perceived Usefulness, which play an important role in shaping acceptance and intention to use AI in learning by pre-service teachers.	Moderate	AI courses increase AI-TPACK and Perceived Usefulness, which significantly influence pre-service teachers' acceptance, intention, and use of AI in learning.
(Syahputra, 2023)	Language teachers in Indonesia support the integration of ChatGPT by considering its benefits, dispelling concerns, and emphasizing balanced teaching strategies.	Positive	Class size determines teaching strategies, and ChatGPT is considered useful for improving language skills. However, it raises concerns about ethics and the accuracy of the results obtained, so it is necessary to emphasize the importance of balanced AI integration with human (teacher) interaction, as well as the need for teaching strategies that adjust to class size (in terms of the number of students in a class) to make learning more intensive and inclusive.
(Tlili et al., 2023)	ChatGPT can facilitate interactive learning, but it still requires supervision, teacher competence, and appropriate AI usage policies.	Moderate	ChatGPT has the potential to support classroom teaching, material preparation, and student feedback. However, challenges such as cheating, ethical concerns, inaccuracies in the data produced, and critical thinking need to be addressed through training, guidance, and further research.
(Untari et al., 2024)	The results of the study show that 75% of respondents are very satisfied with AI, 90% rate AI as easy to use, 100% rate AI as effective and interesting, and 95% support further training despite technological constraints.	Positive	Teachers and students rate the AI application ELSA Speak as effective in improving pronunciation and motivation. However, there are still technical constraints and infrastructure support, as well as further training needed for the implementation of AI to run more optimally.
(Yao & Wang, 2024)	Digital literacy (AI Literacy) increases the perceived usefulness of AIEd and perceived ease of use, which in turn influence teachers' intentions. Self-efficacy does not have a direct effect on AI use.	Positive	Digital literacy (AI Literacy) and perceptions of AIEd's usefulness determine teachers' intentions to use AI; therefore, training is needed to improve the integration of AIEd in education.
(Yasa et al., 2025)	Teachers consider ChatGPT helpful for improving learning, but there are concerns about dependence on AI; therefore, limits must be set, and the ethics of AI use emphasized.	Moderate	ChatGPT has the potential to improve student learning and motivation when used wisely. However, teachers also need to understand the potential and limitations of AI, and schools need to establish clear policies and gradually implement measures to prevent excessive AI use.

Based on data extracted from 29 studies that passed the final selection, the study results were categorized to provide an overview of trends in studies on vocational school teachers' perceptions of adopting artificial intelligence (AI). These categories comprise three main groups: positive, moderate, and descriptive & exploratory. The grouping was based on a summary of the core findings in each study, including reports on readiness levels, teachers' acceptance of AI, critical attitudes, and ethical issues highlighted in each article. Based on the results of this grouping, the distribution of the number of articles per category was obtained, as shown in Table 2.

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Table 2. Distribution Of Study Result Categories

Category	Number of Articles	Percentage
Positive	21	72,40%
Moderate	7	24,10%
Descriptive & Exploratory	1	3,40%

The results of the percentages come from the basic concept formula of Descriptive Statistics (Sholikhah, 2016):

$$\text{Percentage} = \frac{\text{number of category}}{\text{Total Articles}} \text{ X } 100\%$$

So it can be written as:

$$\text{Percentage} = \frac{21}{29} \text{ X } 100\%$$

$$= 72{,}4\%$$

The analysis results show that 21 of the 29 studies (72.4%) reported positive findings regarding the acceptance and use of AI among vocational school teachers, indicating that AI is perceived as enhancing creativity, effectiveness, and efficiency in vocational learning. A total of 7 studies (24.1%) fell into the moderate category, indicating that although AI technology offers significant potential, its implementation still faces obstacles, including technological readiness, teachers' digital skills, and institutional support. Only 1 study (3.4%) was descriptive and exploratory, indicating that there remain few preliminary empirical studies evaluating the impact of AI.

The pie/bar diagram in Figure 2 shows the dominance of the positive category, reinforcing that teachers' perceptions in the AI literature generally favor AI. However, it still requires training for vocational school teachers, ethical guidelines for AI use, and more robust infrastructure to support the optimal implementation of AI.

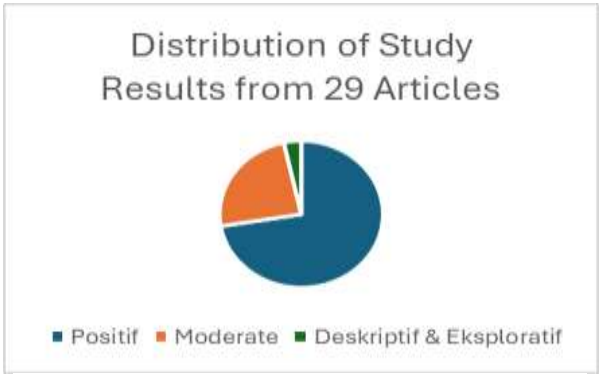

Figure 2 Distribution of study result from 29 articles

DISCUSSIONS

The results of a systematic review of 29 articles indicate that combinations of individual, ethical, pedagogical, and institutional factors influence vocational school teachers' adoption of artificial intelligence (AI). This discussion synthesizes findings across studies by highlighting common patterns, inconsistencies in results, and implications for the development of vocational education theory and practice. To answer the four questions that are used as Research Questions, the following conclusions can be drawn.

Teachers' Perceptions of AI: Optimism Coupled with Caution

Most studies confirm that teachers have a positive perception of AI's potential to improve teaching efficiency, personalize learning, and foster creativity (Al Darayseh, 2023; Apoko, 2025; Chear & Norman, 2024; Gumelar et al., 2025). Teachers believe that artificial intelligence (AI) can support the development of teaching materials, automate administrative tasks, and provide quick feedback.

However, this optimism is always accompanied by caution. Many teachers still view artificial intelligence (AI) as a technology that is both “helpful and threatening.” (Balıkçı et al ., 2024; Filiz et al., 2025). Some concerns that

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arise include a reduction in human interaction (between teachers and students) in the learning process (Delcker et al., 2025) :

The risk of AI misuse by students
The potential decline in moral and humanitarian values between teachers and students
Algorithm bias and data accuracy from AI results.

These conditions show that teachers tend to be hesitant or indecisive. However, they show positive results regarding pedagogical benefits.

Individual Factors: Self-Efficacy and Digital Literacy as Determining Factors

From a personal perspective, self-efficacy emerges as the most powerful factor in determining teachers' readiness to use AI. Studies in the UAE and Nigeria show that teachers with high levels of self-efficacy are more prepared to implement AI in learning (Al Darayseh, 2023; Ayanwale et al., 2022). This is reinforced by other studies that find that teachers with digital literacy are more accepting of new technology (Chear & Norman, 2024; Yao & Wang, 2024)

Pedagogical Factors: The Alignment of Vocational Curricula with AI Remains Weak

The vocational school curriculum requires practice-based learning, technical skills, and readiness to face the world of work. Several studies mention that AI can strengthen vocational practices through automation, simulation, adaptive learning, and competency monitoring (Gumelar et al., 2025). Several teachers revealed that:

- AI has not been formally structured in the curriculum.
- Most of the material for vocational schools is not yet in line with developments in industrial AI.
- Teachers do not yet have adequate implementation guidelines for AI.

As a result, many teachers still regard AI as merely an additional tool rather than an integral part of vocational learning. In the context of vocational education in Indonesia, the development of AI literacy among vocational school teachers is still in its early stages (Baihaqi & Fitriawati, 2024) (Online, 2025).

Institutional, Ethical, and Conceptual Framework Factors in the Adoption of AI by Vocational School Teachers

It was found that institutional factors proved to be the main obstacle to the adoption of AI by vocational school teachers, particularly related to the lack of training, supporting facilities and infrastructure, and the absence of formal policies for implementing AI in learning (Nurkhin et al., 2024; Rosemary et al., 2024). School infrastructure challenges, such as inadequate internet networks and digital devices, also slow down teacher readiness and prevent the even implementation of AI in vocational schools (Gumelar et al., 2025; Apoko et al., 2025). Ethical aspects also influence teachers' attitudes, as evidenced by concerns about data privacy, algorithmic bias, and the potential for student dependence on AI (Syahputra, 2023; Untari et al., 2024).

Theoretically, the acceptance of AI in teaching is consistently explained through the TAM and UTAUT models, in which perceived usefulness, ease of use, facilitating conditions, self-efficacy, and AI literacy are strong influences on AI use (Adekunle et al., 2024; Kim & Kim, 2022; Chear & Norman, 2024; Yao & Wang, 2024; Untari et al., 2024; Runge & Hebibi, 2025; Cabrera-lanzo & Fabi, 2025; Gumelar et al., 2025).

CONCLUSION

A literature review of 29 studies indicates that pedagogical, individual, institutional, and ethical factors influence vocational high school teachers' acceptance and adoption of AI in learning. Teachers generally perceive the benefits of AI for learning, but their readiness to use AI is strongly influenced by digital literacy, self-efficacy, and perceived ease of use. The integration of AI into learning at vocational high schools remains limited due to the absence of a clear curriculum, the lack of AI training for teachers, and constraints on school facilities and policies. In addition, concerns regarding algorithmic bias, data privacy, and the potential for decreased interaction between teachers and students require clear ethical guidelines. Thus, the successful use of AI in vocational education, especially in vocational high schools, requires institutional support, improved teacher competencies, strengthened policies on AI use in learning, and the integration of ethics to ensure effective and sustainable implementation.

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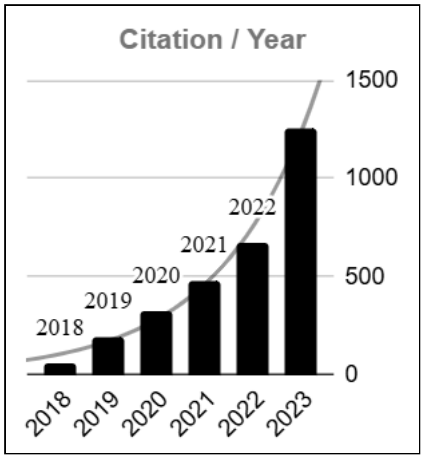

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