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Generative AI Literacy and Office Administration Competence: Preparing Vocational Students for Intelligent Workplaces

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Abstract: *Generative artificial intelligence is reshaping administrative work by accelerating drafting, summarization, information retrieval, data interpretation, scheduling support, document preparation, and digital communication. This study develops an integrative framework explaining how generative AI literacy can strengthen office administration competence and prepare vocational students for intelligent workplaces. An integrative literature review synthesized peer-reviewed research published between 2022 and 2025, prioritizing Scopus-indexed studies on AI literacy, vocational education, digital competence, employability, human-AI collaboration, and workplace readiness together with relevant Indonesian evidence. The synthesis identifies five interconnected literacy dimensions: conceptual understanding of generative AI, effective interaction and prompting, critical verification, ethical information governance, and reflective human-AI collaboration. Office administration competence is conceptualized through digital document management, professional communication, information coordination, data processing, scheduling, confidentiality, problem-solving, and adaptive technology use. Findings indicate that AI literacy becomes vocationally valuable when students can integrate intelligent tools into authentic administrative workflows while preserving accuracy, privacy, professional tone, and human accountability. Project-based learning, workplace simulations, internships, teacher AI competence, and competency-based assessment can strengthen this conversion. However, hallucination, bias, overreliance, privacy risks, unequal access, and rapid technological change require explicit safeguards. The framework positions generative AI literacy as an employability capability that complements rather than replaces administrative expertise and recommends continuous learning, verification routines, ethical judgment, and industry-aligned practice for future-ready vocational education. Overall the evidence supports generative-AI literacy critical verification digital communication ethical judgment adaptive problem-solving human-AI collaboration professional confidence transferable responsible vocational preparation for intelligent administrative workplaces.*

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INTRODUCTION

Generative artificial intelligence is changing office administration from a primarily software-mediated occupation into a human-AI collaborative domain. Administrative workers can increasingly use large language models to draft correspondence, summarize meetings, organize information, generate templates, support scheduling, and interpret

routine data. Yet these capabilities do not remove the need for administrative expertise because generated outputs can be inaccurate, incomplete, biased, or inappropriate for organizational contexts. Chiu et al. (2024) distinguish AI literacy from AI competency by emphasizing not only knowledge of artificial intelligence but also beneficial application, confidence, collaboration, ethics, and self-reflection. This distinction provides a useful foundation for vocational office education because students must learn both what generative AI can do and how to use it responsibly in professional workflows.

The need for AI literacy builds on broader digital competence challenges in vocational education. Cattaneo et al. (2022) show that vocational teachers' digital competence is shaped by attitudes toward technology, frequency of digital-tool use, workload, and curricular support. These conditions matter because students' access to meaningful AI learning depends partly on teachers' ability to integrate emerging technologies into occupationally relevant tasks. In office administration, instructors must connect generative AI with document production, communication, records, information processing, and coordination rather than treating it as an isolated innovation. Teacher competence therefore becomes an enabling condition for students to develop transferable AI literacy and administrative capability.

Access to technology also shapes vocational digital learning. Habibi et al. (2023) demonstrate that motivational, material, skills, and usage access influence digital technology integration in Indonesian vocational education. Generative AI introduces another layer of access because students need reliable connectivity, suitable devices, appropriate platforms, and guidance on safe use. Unequal access may produce unequal opportunities to practice prompting, verification, and AI-assisted administrative work. Institutions should therefore consider infrastructure and instructional design simultaneously. Technology availability alone cannot guarantee competence; learners need structured opportunities to apply AI to realistic office problems and receive feedback on accuracy, efficiency, privacy, and professional judgment.

AI literacy must extend beyond operational prompting. Stolpe and Hallström (2024) argue that AI literacy for technology education should combine technological knowledge with socio-ethical understanding, including recognition of AI, systems thinking, ethics, and the role of humans. For office administration, these dimensions are especially important because students may handle confidential correspondence, personal data, internal records, and decision-support information. Effective generative AI literacy therefore includes knowing when AI assistance is appropriate, what information should not be disclosed, how generated content should be checked, and when human judgment should dominate. This broader conception aligns AI education with professional responsibility rather than technological novelty.

Project-based learning provides a promising route for developing applied AI capability. Kong et al. (2024) find that a project-based AI literacy course improved students' problem-solving ability, metacognitive strategies, empowerment, and ethical understanding. Office-administration programs can adapt this approach through authentic projects involving correspondence, meeting preparation, records, scheduling, information synthesis, and digital collaboration. Students can use generative AI where appropriate but must document prompts, verify outputs, revise errors, and justify final decisions. Such learning makes AI use observable and assessable while preserving the occupational reasoning that administrative professionals require.

Office-administration employability also depends on digital confidence and readiness. Winarno et al. (2024) report that digital literacy and self-efficacy significantly influence job

readiness among Office Administration Education students. This evidence suggests that generative AI literacy should be integrated with existing administrative competence rather than taught as a separate technical topic. Students need confidence to experiment with new tools, but that confidence must be calibrated by verification and professional standards. Vocational curricula can progressively increase task complexity so learners develop both capability and judgment, preparing them to adapt as workplace technologies change.

Recent vocational evidence strengthens the connection between AI literacy and professional preparation. Hong (2025) develops and validates a competency-based ladder pathway for AI literacy among higher vocational students, emphasizing systematic progression for AI-driven professional environments. Lin et al. (2025) further show that AI literacy is associated with digital learning sustainability and practice achievement among vocational college students. These studies indicate that AI literacy should develop progressively from conceptual awareness toward practical, reflective, and ethically responsible application. For office administration, progression should culminate in authentic performance where students use AI to support administrative tasks without surrendering accountability for final outputs.

Despite rapid growth in AI literacy research, a specific framework linking generative AI literacy with office administration competence remains underdeveloped. Existing studies frequently focus on general AI literacy, teacher competence, digital access, employability, or vocational readiness separately. This study addresses that gap by integrating these streams around the needs of intelligent administrative workplaces. It proposes that vocational students require conceptual AI understanding, effective interaction, critical verification, ethical information governance, and reflective human-AI collaboration, all embedded within established office competencies. The resulting framework shifts vocational education from tool familiarity toward accountable performance and provides a basis for curriculum design, competency assessment, internship alignment, and future empirical testing.

THEORITICAL FOUNDATION

The theoretical framework combines human capital theory, competence-based vocational education, and human-AI complementarity. Human capital theory explains why investment in AI and administrative competencies can increase productivity and employability. Competence-based vocational education emphasizes observable performance in authentic occupational tasks, while human-AI complementarity recognizes that intelligent systems and human professionals contribute different strengths. Generative AI literacy is defined as the ability to understand, interact with, evaluate, govern, and reflect on generative AI systems. Office administration competence includes document management, professional communication, information coordination, data handling, scheduling, confidentiality, problem-solving, and adaptive technology use. The framework assumes that AI literacy creates value when it enhances these occupational capabilities rather than replacing the professional reasoning on which they depend.

Five literacy mechanisms structure the proposed model. Conceptual understanding enables students to recognize AI capabilities and limitations. Interaction competence supports effective prompting and iterative communication with generative systems. Critical verification requires checking facts, calculations, tone, completeness, and source quality. Ethical governance addresses privacy, confidentiality, bias, transparency, and accountability. Reflective collaboration enables students to allocate tasks appropriately between humans and AI and learn from errors. These mechanisms interact with teacher

AI competence, digital access, project-based learning, internships, and industry alignment. The expected outcome is not merely frequent AI use but reliable office administration performance in which intelligent tools increase efficiency while students retain professional responsibility for the quality and consequences of administrative work.

RESEARCH METHODS

This study employed an integrative literature review and conceptual synthesis to develop a framework linking generative AI literacy, office administration competence, and readiness for intelligent workplaces. Peer-reviewed studies published from 2022 to 2025 were prioritized, with emphasis on Scopus-indexed research in artificial intelligence literacy, vocational education, educational technology, digital competence, employability, and workplace readiness together with relevant Indonesian evidence. Search concepts included generative AI literacy, AI competency, vocational students, office administration, digital competence, employability, work readiness, human-AI collaboration, and intelligent workplaces. The qualitative analytical process followed the principles of data reduction, categorization, interpretation, and conclusion development described by Sugiyono (2022). Sources were retained when they directly informed AI literacy, vocational capability, administrative work, or professional readiness.

The synthesis proceeded through three analytical stages. First, studies were coded for generative AI literacy dimensions, including conceptual understanding, prompting and interaction, critical evaluation, ethics, privacy, collaboration, and reflection. Second, evidence was coded for office administration competence, including document production, records, professional communication, scheduling, information coordination, data processing, confidentiality, and adaptive problem-solving. Third, findings were compared to identify mechanisms through which AI literacy can strengthen administrative performance and workplace readiness. The proposed relationships are conceptual rather than statistically estimated because no fabricated primary dataset was introduced. Published empirical studies provide evidence for individual mechanisms, while their integration generates a framework for future quantitative, experimental, and workplace-based validation.

Source quality was assessed through publication recency, peer-review status, relevance, journal credibility, and DOI traceability. International evidence was triangulated with Indonesian vocational and office-administration studies to strengthen contextual relevance. Because generative AI changes rapidly, the framework emphasizes transferable literacy rather than proficiency with one commercial platform. Future research can operationalize generative AI literacy through knowledge, interaction, verification, ethics, and reflection; office administration competence through authentic performance tasks; and workplace readiness through internship evaluation, self-efficacy, employer assessment, and employment outcomes. Structural equation modeling, competency experiments, longitudinal curriculum studies, and performance-based assessment are appropriate approaches for testing the proposed relationships and identifying the strongest pathways from AI literacy to vocational readiness.

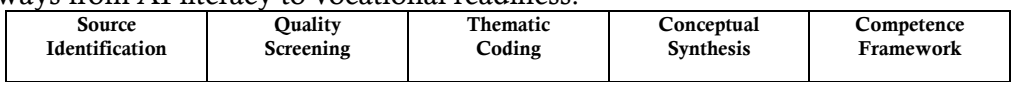


Figure 1. Integrative Review and Framework Development Process

RESULT AND DISCUSSION

The first finding is that generative AI literacy should be defined as applied competence rather than simple awareness. Chiu et al. (2024) distinguish knowing about AI from using

AI beneficially with confidence, ethics, collaboration, and self-reflection. This distinction is highly relevant to office administration because vocational students may understand that generative systems can draft documents without knowing how to evaluate professional suitability. Training should therefore assess whether learners can choose appropriate tasks, formulate useful instructions, recognize limitations, verify outputs, and take responsibility for final documents. AI literacy becomes occupationally meaningful when knowledge is converted into reliable administrative performance. Overall the evidence supports generative-AI literacy critical verification digital communication ethical judgment adaptive problem-solving human-AI responsible vocational preparation for intelligent administrative workplaces.

Second, AI literacy for vocational students requires technological and socio-ethical understanding. Stolpe and Hallström (2024) show that technology education should address what AI is, how it can be recognized, systems thinking, ethics, and the role of humans. Office administration provides a strong context for applying these ideas because administrative professionals routinely manage information that has organizational and personal consequences. Students should understand that AI outputs are probabilistic rather than authoritative and that sensitive data require careful governance. Learning activities can ask students to identify suitable and unsuitable uses of generative AI within office workflows. Overall the evidence supports generative-AI literacy critical verification digital communication ethical judgment adaptive problem-solving human-AI collaboration professional confidence transferable responsible vocational preparation for intelligent administrative workplaces.

Third, project-based learning can convert AI concepts into problem-solving competence. Kong et al. (2024) report improvements in AI problem-solving, metacognitive strategies, empowerment, and ethical understanding after a project-based literacy course. Vocational office programs can use realistic projects in which students prepare correspondence, summarize meetings, organize schedules, analyze routine information, and coordinate shared documents. Generative AI may support selected tasks, but learners should explain prompts, corrections, and final decisions. This process makes human reasoning visible and allows teachers to assess whether AI assistance actually improves quality. Project-based learning also encourages transfer because students encounter integrated workflows rather than isolated software functions. Overall the evidence supports generative-AI literacy critical verification digital communication ethical judgment adaptive responsible vocational preparation for intelligent administrative workplaces.

Fourth, AI literacy should be assessed across generic, domain-specific, and ethical dimensions. Laupichler et al. (2024) propose a holistic AI literacy assessment matrix that goes beyond cognitive knowledge to include behavior, attitudes, domain-specific application, and ethics. This approach is particularly useful for office administration because generic AI knowledge does not guarantee competent handling of professional documents or confidential information. Assessment can therefore combine conceptual questions with authentic performance tasks. Students might generate a draft, identify factual or stylistic problems, revise the output, explain privacy considerations, and justify whether AI should be used at all. Overall the evidence supports generative-AI literacy critical verification digital communication ethical judgment adaptive problem-solving human-AI collaboration professional confidence transferable responsible vocational preparation for intelligent administrative workplaces.

Fifth, teacher competence remains a critical condition for meaningful AI integration. Cattaneo et al. (2022) show that vocational teachers' digital competence depends on

attitudes, technology use, workload, and curricular support. Generative AI increases these demands because teachers must evaluate rapidly changing tools and redesign assignments to preserve learning. Instructors need enough AI literacy to distinguish productive augmentation from inappropriate substitution. They should also understand privacy, bias, verification, and assessment integrity. Institutional professional development can help teachers design office simulations in which AI use is transparent and accountable. Without competent teachers, students may receive inconsistent guidance or learn superficial prompting practices that do not strengthen administrative expertise. Overall the evidence supports generative-AI literacy critical responsible vocational preparation for intelligent administrative workplaces.

Sixth, equitable technology access is necessary for vocational AI literacy. Habibi et al. (2023) find that motivational, material, skills, and usage access shape digital technology integration in Indonesian vocational education. Generative AI training can reproduce digital inequality when some learners have reliable devices, connectivity, and premium tools while others have limited access. Institutions should therefore provide structured access to approved platforms and design tasks that can be completed under comparable conditions. Access should also include guidance because availability without competence can encourage unsafe or ineffective use. Overall the evidence supports generative-AI literacy critical verification digital communication ethical judgment adaptive problem-solving human-AI collaboration professional confidence transferable office competence workplace readiness sustainable employability generative-AI literacy responsible vocational preparation for intelligent administrative workplaces.

Seventh, digital literacy and self-efficacy provide an important foundation for office-administration readiness. Winarno et al. (2024) find that both variables significantly influence job readiness among Office Administration Education students. Generative AI literacy can build on this foundation by adding interaction, verification, and ethical judgment. Students need confidence to explore unfamiliar AI systems, but confidence should be grounded in demonstrated competence rather than uncritical trust. Progressive assignments can begin with low-risk drafting tasks and advance toward complex scenarios involving multiple sources, sensitive information, or stakeholder communication. Feedback should address both technical effectiveness and professional reasoning. Overall the evidence supports generative-AI literacy critical verification digital communication ethical judgment adaptive problem-solving human-AI collaboration professional confidence transferable responsible vocational preparation for intelligent administrative workplaces.

Eighth, workplace exposure remains important because AI literacy must transfer beyond classroom demonstrations. Naufalin et al. (2024) show that internship experience and digital literacy contribute to Generation Z work readiness in diploma education. Vocational institutions can extend this logic by aligning internships with responsible AI-supported administrative practice where organizational policies permit. Students can observe how employers govern AI, identify tasks suitable for augmentation, and compare classroom assumptions with workplace realities. Reflective logs can document what tools were used, which outputs required correction, and how confidentiality was protected. Overall the evidence supports generative-AI literacy critical verification digital communication ethical judgment adaptive problem-solving human-AI collaboration professional confidence transferable office competence workplace readiness sustainable employability generative-AI responsible vocational preparation for intelligent administrative workplaces.

Ninth, AI-supported instruction can itself contribute to employability development. Aditya et al. (2024) find meaningful engagement with an AI teacher delivering employability and transferable-skills learning across students in three countries. This suggests that generative systems can support practice, explanation, and feedback when learning goals are clearly structured. In office administration, AI tutors could help students rehearse professional communication, time management, problem-solving, or document revision. However, teachers should supervise quality and ensure that students remain active decision makers. The educational value lies in expanding opportunities for guided practice, not in removing human teaching. When combined with authentic assessment, AI-supported learning can strengthen both administrative capability and confidence. Overall the evidence supports generative-AI literacy critical responsible vocational preparation for intelligent administrative workplaces.

Tenth, systematic progression is necessary for vocational AI literacy. Hong (2025) validates a competency-based ladder pathway for higher vocational students, reflecting the need to develop AI capability in stages. Office-administration curricula can similarly progress from basic awareness to responsible interaction, domain application, critical verification, and adaptive collaboration. Early learning should establish concepts and limitations; intermediate learning should integrate AI into documents and information tasks; advanced learning should require students to redesign workflows while justifying human oversight. Progression makes competence visible and prevents students from equating frequent chatbot use with professional mastery. Overall the evidence supports generative-AI literacy critical verification digital communication ethical judgment adaptive problem-solving human-AI collaboration professional confidence transferable office competence workplace responsible vocational preparation for intelligent administrative workplaces.

Eleventh, AI literacy is associated with sustained digital learning and practice achievement in vocational education. Lin et al. (2025) report relationships among artificial intelligence literacy, sustainability of digital learning, and practice achievement among vocational college students. This evidence supports treating AI literacy as part of ongoing professional learning rather than a temporary response to one technology cycle. Office-administration students should develop habits of evaluating new tools, updating skills, and transferring principles across platforms. Continuous learning is especially important because administrative technologies change faster than formal curriculum revision. Overall the evidence supports generative-AI literacy critical verification digital communication ethical judgment adaptive problem-solving human-AI collaboration professional confidence transferable office competence workplace readiness sustainable employability generative-AI responsible vocational preparation for intelligent administrative workplaces.

Twelfth, vocational teacher preparation must evolve toward AI-integrated pedagogical competence. Setiyawan et al. (2025) validate an AI-TPACK instrument for vocational education, demonstrating that meaningful AI integration requires technological, pedagogical, and content knowledge. For office-administration teachers, this means understanding both intelligent tools and the occupational logic of administrative work. Teachers should know when AI enhances learning and when it removes necessary cognitive practice. They also need assessment designs that distinguish student competence from machine-generated output. AI-aware pedagogy can therefore protect learning quality while enabling innovation. Overall the evidence supports generative-AI literacy critical verification digital communication ethical judgment adaptive problem-solving human-AI collaboration professional confidence transferable office competence workplace readiness

sustainable employability generative-AI literacy critical verification responsible vocational preparation for intelligent administrative workplaces.

Thirteenth, vocational employability depends on interconnected digital capabilities. Kholifah et al. (2025) analyze Indonesian vocational graduates and find that digital communication and collaboration play an important mediating role within digital employability skills. This result is highly relevant to office administration because administrative work coordinates people, information, and organizational processes. Generative AI literacy should therefore be integrated with communication and collaboration rather than taught as individual chatbot use. Team-based simulations can require students to share AI-assisted drafts, verify information collectively, manage document versions, and communicate final decisions. Such tasks reveal whether learners can use intelligent tools within social workflows. Overall the evidence supports generative-AI literacy critical verification digital communication ethical judgment adaptive problem-solving human-AI responsible vocational preparation for intelligent administrative workplaces.

Fourteenth, generative AI competence requires explicit teacher and learner development around prompting, data protection, and critical assessment. Schmitt and Brutzer (2025) report a vocational teacher-training framework that combines AI functionality, data protection, multimedia applications, future developments, and prompt engineering. Their findings indicate that structured guidance and hands-on practice are important for building competence. Office-administration education can adopt the same principle for students. Prompting should be taught as iterative task communication rather than a collection of tricks, while data protection should constrain what information can be entered. Learners should also compare multiple outputs and document corrections. Overall the evidence supports generative-AI literacy critical verification digital communication ethical judgment adaptive problem-solving human-AI collaboration professional confidence responsible vocational preparation for intelligent administrative workplaces.

Fifteenth, the combined evidence supports a curriculum model in which generative AI literacy strengthens office administration competence through authentic and accountable application. Chiu et al. (2024) provide a broad competency framework, Hong (2025) demonstrates the value of staged vocational progression, Lin et al. (2025) connect AI literacy with digital learning and practice achievement, and Kholifah et al. (2025) show how interconnected digital employability capabilities support workforce readiness. Together, these studies indicate that vocational programs should integrate AI with document management, communication, coordination, data handling, verification, privacy, and reflection. The educational objective is not automated task completion alone but future-ready administrative judgment. Overall the evidence supports generative-AI literacy critical verification digital communication ethical judgment responsible vocational preparation for intelligent administrative workplaces.

Table 1. Generative AI Literacy–Office Administration Competence Framework

AI literacy dimension	Administrative application	Required safeguard	Workplace outcome
Conceptual understanding	Select appropriate AI-supported tasks	Recognize capability limits	Informed tool use
Interaction and prompting	Draft, summarize, organize information	Clear task context and iteration	Administrative efficiency
Critical verification	Review facts, tone, completeness, calculations	Human checking and source validation	Reliable outputs
Ethical governance	Handle records and communication	Privacy, confidentiality, bias awareness	Trusted administration

Reflective collaboration	Allocate tasks between humans and AI	Professional accountability	Adaptive employability

CONCLUSION

This study concludes that generative AI literacy can strengthen office administration competence when vocational students learn to integrate intelligent systems with established professional skills. Effective preparation requires more than prompting or frequent chatbot use. Students need conceptual understanding, effective interaction, critical verification, ethical information governance, and reflective human-AI collaboration. These capabilities should be applied to authentic administrative tasks involving documents, communication, information coordination, scheduling, data handling, confidentiality, and problem-solving. The resulting competence positions AI as an augmentation resource while preserving human responsibility for accuracy, context, professional tone, and organizational consequences.

The review also shows that successful implementation depends on complementary educational conditions. Teacher AI competence, equitable technology access, project-based learning, internships, self-efficacy, competency-based assessment, and industry alignment influence whether AI literacy becomes workplace capability. Vocational institutions should therefore redesign learning around integrated administrative workflows rather than isolated AI demonstrations. Students should repeatedly generate, evaluate, revise, and justify AI-supported outputs under realistic professional constraints. Such practice can build confidence without encouraging overreliance and can help learners transfer principles across changing platforms. Privacy, bias, hallucination, and accountability should be embedded within ordinary administrative learning rather than treated as optional ethical topics.

Future research should empirically test the proposed framework across vocational schools, higher vocational institutions, office-administration programs, internships, and employer settings. Generative AI literacy can be measured through conceptual knowledge, interaction, verification, ethics, and reflection, while office administration competence can be assessed through authentic performance tasks. Longitudinal studies could examine whether AI literacy predicts internship quality, employer evaluations, job readiness, and adaptation after graduation. Experimental studies could compare conventional office training with AI-integrated project learning, while structural equation modeling could test direct and mediated relationships among literacy, competence, self-efficacy, and employability. Such evidence would support curriculum decisions that remain responsive to intelligent workplace transformation.

REFERENCES

1. Aditya, D., Silvestri, K., & Otermans, P. C. J. (2024). Can AI teach me employability? A multi-national study in three countries. Frontiers in Artificial Intelligence, 7, 1461158. https://doi.org/10.3389/frai.2024.1461158
2. Cattaneo, A. A. P., Antonietti, C., & Rauseo, M. (2022). How digitalised are vocational teachers? Assessing digital competence in vocational education and looking at its underlying factors. Computers & Education, 176, 104358. https://doi.org/10.1016/j.compedu.2021.104358
3. Chiu, T. K. F., Ahmad, Z., Ismailov, M., & Sanusi, I. T. (2024). What are artificial intelligence literacy and competency? A comprehensive framework to support

them. Computers and Education Open, 6, 100171. https://doi.org/10.1016/j.caeo.2024.100171

4. Habibi, A., Sofyan, S., & Mukminin, A. (2023). Factors affecting digital technology access in vocational education. Scientific Reports, 13, 5682. https://doi.org/10.1038/s41598-023-32755-6
5. Hong, L. (2025). Development and validation of a competency-based ladder pathway for AI literacy enhancement among higher vocational students. Scientific Reports, 15, 29898. https://doi.org/10.1038/s41598-025-15202-6
6. Kholifah, N., Nurtanto, M., Sutrisno, V. L. P., Majid, N. W. A., Subakti, H., Daryono, R. W., & Achmadi, A. (2025). Unlocking workforce readiness through digital employability skills in vocational education graduates: A PLS-SEM analysis based on human capital theory. Social Sciences & Humanities Open, 11, 101625. https://doi.org/10.1016/j.ssaho.2025.101625
7. Kong, S.-C., Cheung, M.-Y. W., & Tsang, O. (2024). Developing an artificial intelligence literacy framework: Evaluation of a literacy course for senior secondary students using a project-based learning approach. Computers and Education: Artificial Intelligence, 6, 100214. https://doi.org/10.1016/j.caeai.2024.100214
8. Lin, X., Xu, G., & Xiong, B. (2025). Artificial intelligence literacy, sustainability of digital learning and practice achievement: A study of vocational college students. PLOS ONE, 20(10), e0332175. https://doi.org/10.1371/journal.pone.0332175
9. Naufalin, L. R., Indriayu, M., & Sulistyandari. (2024). Work readiness Generation Z's on diploma programme: The influence internship program and digital literacy. Jurnal Pendidikan Vokasi, 14(2), 208-219. https://doi.org/10.21831/jpv.v14i2.73642
10. Schmitt, C., & Brutzer, A. (2025). Generative artificial intelligence in vocational education and training: A framework for sustainable teacher competence development. Vocational Training: Research and Realities. https://doi.org/10.54844/vte.2025.0940
11. Setiyawan, A., Soeharto, S., Wijaya, T. T., Korenova, L., & Lavicza, Z. (2025). Measuring teachers' competencies for AI integration: Development and validation of the AI-TPACK in vocational education. Computers and Education Open, 9, 100319. https://doi.org/10.1016/j.caeo.2025.100319
12. Stolpe, K., & Hallström, J. (2024). Artificial intelligence literacy for technology education. Computers and Education Open, 6, 100159. https://doi.org/10.1016/j.caeo.2024.100159
13. Winarno, W., Ninghardjanti, P., Subarno, A., & Umam, M. C. (2024). The effect of digital literacy and self efficacy on the job readiness: A case of Office Administration Education students. Jurnal Pendidikan Progresif, 14(2), 1269-1279. https://doi.org/10.23960/jpp.v14.i2.202491
14. Sperling, K., Stenberg, C.-J., McGrath, C., Åkerfeldt, A., Heintz, F., & Stenliden, L. (2024). In search of artificial intelligence (AI) literacy in teacher education: A

scoping review. Computers and Education Open, 6, 100169. https://doi.org/10.1016/j.caeo.2024.100169

15. Chinedu, C. C., & Olabiyi, O. S. (2023). Integrating artificial intelligence and digital skills into vocational education and training curricula. *Journal of Vocational Education & Training*, 75(4), 512–530. https://doi.org/10.1080/13636820.2023.2189342
16. Holmes, W., & Tuomi, I. (2022). State of the art and practice in AI in education. *European Journal of Education*, 57(4), 542–570. https://doi.org/10.1111/ejed.12533
17. Zhao, Y., & Watterston, J. (2021). The changes we need: Education post COVID-19. *Journal of Educational Change*, 22(1), 3–12. https://doi.org/10.1007/s10833-021-09417-3
18. Ilomäki, L., Paavola, S., Lakkala, T., & Kantosalo, A. (2016). Digital competence–an emergent conceptualization for 21st century schooling. *Education and Information Technologies*, 21(3), 655–679. https://doi.org/10.1007/s10639-014-9346-4
19. Laupichler, M. C., Aster, A., Schirch, J., & Raupach, T. (2024). Developing a holistic AI literacy assessment matrix: Bridging generic, domain-specific, and ethical competencies. Computers and Education Open, 6, 100177. https://doi.org/10.1016/j.caeo.2024.100177
20. Sugiyono. (2022). Metode penelitian kuantitatif, kualitatif, dan R&D (2nd ed.). Alfabeta.