

# Artificial Intelligence (AI) Literacy among Teachers Positive Outlook: The Huge Potential Talent has Landed

Mohammed Afandi Zainal<sup>1</sup>, Mohd Effendi @ Ewan Mohd Matore<sup>2</sup>

<sup>1</sup>Faculty of Education, Universiti Kebangsaan Malaysia, UKM Bangi, Selangor, Malaysia,

<sup>2</sup>Research Centre of Education Leadership and Policy, Faculty of Education, Universiti Kebangsaan Malaysia, UKM Bangi, Selangor, Malaysia

Corresponding Author Email: [effendi@ukm.edu.my](mailto:effendi@ukm.edu.my)

To Link this Article: <http://dx.doi.org/10.6007/IJAREMS/v13-i4/23210> DOI:10.6007/IJAREMS/v13-i4/23210

Published Online: 02 November 2024

## Abstract

Artificial intelligence (AI) is increasingly influencing education and offers significant opportunities to improve both teaching and learning. Moreover, AI contributes significantly to advancing the Sustainable Development Goals (SDGs) by supporting scalable solutions with global impact. For educators to fully realize the potential of AI, developing AI literacy among teachers is essential. This study applies the SCORE framework, which evaluates Strengths, Challenges, Options, Responses, and Effectiveness to assess teachers' AI literacy. The analysis reveals important strengths, such as the ability to personalize learning and improve teaching effectiveness, but also considerable challenges, such as inadequate training and unequal resources. Several strategies are proposed to address these barriers, including professional development programs and integration into the curriculum. The findings emphasize the need for sustained institutional support and ongoing training to ensure that teachers remain equipped with the latest AI skills and tools. Future research could explore the long-term impact of AI literacy on teacher professional development and student outcomes, as well as their application in different educational settings.

**Keywords:** Artificial Intelligence, AI, Teachers' AI Literacy, SCORE Analysis.

## Introduction

Artificial intelligence (AI) has emerged as a transformative force in 21st-century education, reshaping teaching methodologies, administrative processes, and learning experiences. AI technologies are increasingly integrated into educational environments, from adaptive learning platforms to automated grading systems. As this trend accelerates, the need for teachers to develop AI literacy has become paramount. AI literacy for educators encompasses understanding AI principles and applications, as well as the ability to critically evaluate, effectively utilize, and ethically implement AI tools in educational contexts (Zawacki-richter et

al., 2019). This multifaceted competency is crucial for educators to navigate the complexities of modern classrooms and prepare students for a future where AI is ubiquitous.

The importance of AI literacy among educators cannot be overstated. As the primary facilitators of learning, teachers play a crucial role in preparing students for a world increasingly influenced by AI technologies. AI-literate teachers can harness its potential to personalize learning experiences, tailoring content and pacing to individual student needs through adaptive learning platforms (Luckin & Cukurova, 2019). They can also leverage AI-powered tools to automate administrative tasks, freeing up time for more meaningful student interactions. Moreover, AI-literate teachers are better equipped to provide data-driven insights into student performance, identifying areas of struggle early on and implementing targeted interventions (Holmes et al., 2019).

Beyond classroom applications, AI literacy empowers teachers to guide students in developing their own AI competencies, fostering critical thinking about AI's societal impacts, and navigating the ethical considerations surrounding AI use. This helps prepare students for future careers that will inevitably involve AI. As AI permeates various sectors, teachers with strong AI literacy can play a vital role in bridging the digital divide, ensuring that all students, regardless of background, have the opportunity to engage with and understand these transformative technologies.

However, despite its significance, the development of AI literacy among teachers faces numerous challenges. The rapid pace of technological advancements often outstrips the speed at which educational systems can adapt, leading to a constant need for upskilling and professional development. Additionally, the diverse needs of different educational settings, from urban to rural and primary to tertiary education, further complicate the implementation of AI literacy programs. The varying levels of technological proficiency among educators create a heterogeneous landscape where one-size-fits-all approaches to AI literacy are often ineffective.

Financial constraints pose another significant hurdle, as many educational institutions struggle to allocate resources for AI-related training and infrastructure. Additionally, there is the challenge of addressing teachers' apprehensions about AI, including fears of job displacement and concerns about the ethical implications of AI in education. These multifaceted challenges necessitate a comprehensive and strategic approach to developing and assessing teachers' AI literacy.

To comprehensively analyse this complex issue, this article employs the SCORE model – a strategic evaluation framework that examines Strengths, Challenges, Options, Responses, and Effectiveness. The SCORE model provides a structured approach to dissect the current state of teachers' AI literacy, identifying areas for improvement and proposing strategic solutions. By applying this model, we aim to offer a nuanced understanding of the landscape of AI literacy in education and provide actionable insights for policymakers, educational institutions, and teachers themselves. The Strengths component will explore the positive aspects of teachers' AI literacy, including existing successful programs and areas where teachers excel. The Challenges section will delve into obstacles hindering AI literacy development. Options will present strategies and solutions, while Responses will examine stakeholder engagement with AI literacy

initiatives. Finally, the Effectiveness section will assess the impact of current and proposed AI literacy programs, providing a basis for evidence-based decision-making.

This structured approach enables a thorough examination of the current state of AI literacy in education, while also offering forward-looking strategies for improvement. Ultimately, we aim to empower educators with the knowledge and skills to harness AI's potential in education, ensuring that students are well-prepared for an AI-driven future.

### SCORE Model – Strategy Based Assessment

The SCORE model stands for strengths, challenges, options, responses, and effectiveness. Strengths refer to existing capabilities and resources, challenges highlight the areas where additional capabilities and resources are needed, and options explore opportunities and risks. Responses pertain to the consequences of action or inaction, while effectiveness addresses the impact on dimensions such as efficiency, reliability, appropriateness, and integration in the given context.

Compared to the SWOT model, which is simpler and based on a two-axis matrix of 'good versus bad' and 'internal versus external,' the SCORE model offers deeper insights for strategic assessment. It provides a more versatile and comprehensive tool for evaluating strategies and tactics, where the results are measurable. The SCORE model assesses both pre- and post-action impacts, supporting continuous improvement. This model can be particularly useful when analysing educational frameworks and initiatives. For instance, it can be applied to evaluate the strengths, challenges, options, responses, and effectiveness of efforts to develop AI literacy among teachers. Stakeholders such as educators, policymakers, and administrators can utilize this approach to assess and improve AI literacy programs in schools. Researchers can also refer to the SCORE model to determine the best strategies for enhancing teachers' AI competencies while considering challenges that may hinder progress.



Figure 1 SCORE Model

Figure 1 illustrates the SCORE model and its usefulness in evaluating various aspects of educational strategies. In the context of this article, the SCORE model is applied to assess teachers' AI literacy by examining the strengths they bring, the challenges they face, the available options for improvement, the responses from various stakeholders, and the overall

effectiveness of AI literacy initiatives. This structured approach ensures a comprehensive analysis of AI literacy, providing actionable insights that can support continuous improvement in educational settings.

### **Strengths**

The development of AI literacy among teachers is demonstrating significant strengths, with many educators now able to integrate AI tools into their teaching practices to enhance student learning experiences. One of the primary strengths is the ability to personalize learning using AI-powered technologies, such as adaptive learning platforms and intelligent tutoring systems. These tools enable teachers to tailor educational content to the unique needs of each student, improving engagement and overall learning outcomes (Zhao et al., 2022). This customization allows students to learn at their own pace, which is particularly beneficial in diverse classroom settings. AI-literate teachers also benefit from increased efficiency, as AI tools can automate time-consuming administrative tasks such as grading, attendance tracking, and generating reports. This frees up valuable time, allowing teachers to focus more on personalized instruction and student support (Rütty-joy et al., 2023). The integration of AI in administrative functions not only reduces teacher workload but also enhances the accuracy of data collection and reporting, leading to better-informed decisions regarding student progress.

Moreover, professional development programs specifically designed to enhance AI literacy are becoming more common, emphasizing both the technical and ethical aspects of AI. These programs help teachers develop the skills necessary to responsibly integrate AI into their classrooms, ensuring that AI is used not only effectively but also ethically (Olari & Romeike, 2021). Institutional support for these initiatives is growing, with many educational systems recognizing the importance of preparing teachers to navigate the challenges and opportunities presented by AI technologies. Additionally, AI-literate teachers are better positioned to help students develop their own understanding of AI, both in terms of its technical applications and its societal impacts. Teachers who are proficient in AI can foster critical thinking among students, guiding them to explore ethical considerations and potential future uses of AI. This dual focus on technical skill development and ethical awareness is essential for preparing students for a world in which AI will play an increasingly significant role (Chan & Tsi, 2023).

In summary, the strengths of teachers' AI literacy lie in their ability to personalize learning, enhance efficiency, and prepare students for the ethical and technical challenges of AI. These strengths are supported by emerging professional development programs and growing institutional awareness of the importance of AI in education.

### **Challenges**

Despite the promising potential of AI literacy in education, teachers face numerous challenges in fully integrating AI into their teaching practices. One of the most significant obstacles is the rapid pace of technological change, as AI technologies evolve faster than many educational systems can adapt (Rütty-joy et al., 2023). Many teachers report that they lack adequate professional development opportunities to build the necessary skills for applying AI effectively in the classroom (Zhao et al., 2022).

Another critical challenge lies in the ethical concerns surrounding AI use in education. Teachers must not only understand AI's functionality but also navigate complex ethical issues such as

data privacy, bias, and the potential for student surveillance (Wang, 2023). These concerns are particularly challenging for educators, as they may lack the expertise or support necessary to address these issues effectively in classroom settings. The pressure to use AI responsibly, while addressing ethical dilemmas, adds another layer of complexity to teachers' roles.

A significant but often overlooked challenge is the difficulty in measuring teachers' AI literacy. While AI literacy is crucial, there are limited assessment tools specifically designed to evaluate teachers' understanding and application of AI. Existing instruments often focus on general digital literacy or basic computer skills, failing to capture the nuanced competencies required for AI proficiency, such as ethical AI usage or the integration of AI into pedagogical practices. The lack of validated, standardized instruments makes it difficult for schools and policymakers to assess progress in AI literacy development (Ng et al., 2024). Developing suitable tools to measure AI literacy is essential for identifying gaps in teachers' knowledge and providing targeted support.

Financial constraints also represent a significant hurdle. Implementing AI systems in schools often requires substantial financial investments in infrastructure, software, and teacher training. Many educational institutions, especially those in underfunded regions, struggle to allocate the resources needed to provide teachers with adequate access to AI tools and platforms (Tan et al., 2023). Without sufficient support, the integration of AI in education risks further exacerbating existing educational inequalities.

Another challenge relates to teacher apprehension about AI's role in the classroom. Some educators' express concerns about AI potentially displacing their roles or fundamentally changing the nature of teaching, leading to fear and resistance to adopting AI technologies (Andersdotter, 2023). Teachers may fear that AI will automate certain teaching tasks, reducing their authority or interaction with students. These concerns contribute to a general reluctance to embrace AI fully, despite its potential benefits.

Finally, the digital divide presents another significant challenge. While AI holds the promise of transforming education, access to AI tools and resources is not evenly distributed. Schools in low-income or rural areas often lack the technology infrastructure necessary to support AI-based learning. This disparity creates a risk of deepening inequalities between students who have access to AI and those who do not (Ng et al., 2022). Addressing this challenge requires both educational policy reform and concerted efforts to bridge the technological gap in underserved communities.

To summarize, the challenges facing teachers in building AI literacy include keeping up with rapid technological advancements, addressing ethical concerns, overcoming financial barriers, managing apprehension about AI's role in education, measuring AI literacy, and confronting the persistent digital divide. These challenges necessitate comprehensive solutions that involve policy support, ongoing professional development, and equitable access to resources.

### **Options**

There are several strategies available for enhancing teachers' AI literacy, each focusing on different aspects of professional development, resources, and support systems. One of the most promising approaches is the integration of AI literacy into teacher training curricula. Many

studies suggest that AI should be embedded into both pre-service and in-service teacher education programs, providing educators with a robust foundation in AI concepts, ethical concerns, and practical applications. For example, governments and educational institutions are encouraged to diversify the curriculum content, training methods, and practical resources to make AI literacy a central component of teachers' professional development (Zhao et al., 2022). Another crucial option is the development of focused measurement instruments specifically designed to assess teachers' AI literacy. Currently, many educational systems lack reliable tools for accurately measuring AI literacy in educators. A well-designed instrument would allow for assessing not just the technical understanding of AI but also the ability to apply AI in classroom settings, evaluate its ethical implications, and use AI to foster student engagement. By developing standardized tools for AI literacy measurement, educational institutions can better identify teachers' strengths and weaknesses, leading to more targeted training interventions (Ng et al., 2024).

Additionally, leveraging online platforms and AI-specific educational resources provides teachers with access to training tools and demos. A systematic review of existing AI teaching resources has revealed that many platforms already offer interactive learning experiences designed to promote AI literacy. However, these resources often lack built-in support for assessment and feedback, meaning that future resources should focus on offering more comprehensive and flexible learning experiences that accommodate the varying needs of teachers (Druga et al., 2022). Professional development programs can also focus on collaborative learning environments where teachers can share best practices and experiences related to AI in education. Programs that promote collaboration between teachers and AI experts have been found to increase teachers' confidence in using AI in the classroom. This method has been especially effective in fostering a culture of continuous learning and ethical reflection on AI's role in education (Rütty-joy et al., 2023).

Furthermore, integrating AI-powered tools into teachers' day-to-day activities is another option. For example, AI technologies such as chatbots and personalized feedback systems have been successfully used to reduce the administrative burden on teachers and provide them with real-time data on student performance. Implementing AI in classroom management and lesson planning not only allows teachers to become familiar with AI tools but also enables them to experience firsthand the benefits of AI in enhancing teaching effectiveness (Tan et al., 2023). Finally, fostering cross-disciplinary AI literacy programs is another effective approach. Teachers can benefit from participating in programs that not only focus on AI technology but also its applications in various subjects, such as language learning, science, and social studies. For example, using digital storytelling and game-based learning as pedagogical strategies have been shown to enhance teachers' and students' understanding of AI by embedding AI concepts into creative, real-world problem-solving activities (Ng et al., 2022).

In summary, options for improving teachers' AI literacy include integrating AI into teacher training programs, developing focused measurement instruments, leveraging online platforms and resources, fostering collaborative learning, incorporating AI-powered tools into teaching practices, and embracing cross-disciplinary approaches. These strategies provide a holistic framework for helping educators navigate the complexities of AI while enriching their pedagogical methods.



**Responses**

Efforts to improve teachers' AI literacy have prompted a range of responses from various stakeholders, reflecting both enthusiasm and challenges in the process of adoption. Teachers themselves have expressed a growing willingness to engage with AI technologies, especially where it enhances their teaching methods or reduces administrative burdens. Many teachers are open to learning how to integrate AI tools into their classrooms, recognizing the potential benefits of AI-powered systems like personalized learning platforms and automated grading. However, a significant portion of teachers also express concerns about the lack of proper training and support, leading to uncertainties about how to effectively use AI in ways that align with educational goals (Chan & Tsi, 2023). Educational institutions are responding by gradually incorporating AI literacy training into teacher development programs. Schools in well-resourced areas tend to offer structured AI training, helping teachers integrate AI into their pedagogical strategies. However, the availability of such programs remains inconsistent, particularly in rural or underfunded regions. Institutions that prioritize AI literacy have started forming partnerships with tech companies to provide teachers with the latest tools and hands-on training, but those with limited resources are still lagging behind (Rütti-joy et al., 2023).

Policymakers are also beginning to understand the critical role AI will play in education and are crafting initiatives to ensure teachers are equipped with the necessary AI skills. In some countries, government programs have been launched to fund AI literacy projects, providing financial support to educational institutions aiming to upgrade their technology infrastructure and offer AI-specific professional development (Zhao et al., 2022). However, the implementation of these policies can be slow, and many teachers report that they do not receive adequate support in their efforts to become AI-literate.

Parents and communities are also playing a role in responding to AI literacy efforts. As AI becomes more integrated into education, parents are becoming more aware of the importance of AI literacy for their children's teachers. Some parent groups advocate for schools to increase investments in AI-related teacher training to ensure that their children are receiving the best possible education in a future dominated by technology. Yet, there are concerns from certain parent groups about the ethical implications of AI, particularly around issues like data privacy and the potential for surveillance in classrooms (Tan et al., 2023).

Overall, the response to teachers' AI literacy initiatives is mixed. While there is clear recognition of the need for AI skills among educators, the level of support, resources, and policy implementation varies widely across different regions and institutions. Bridging these gaps will require coordinated efforts from governments, schools, and communities to ensure that all teachers are equipped to thrive in an AI-enhanced educational environment.

**Effectiveness**

The effectiveness of teachers' AI literacy is becoming increasingly evident as AI technologies are integrated into educational settings. Teachers with a solid foundation in AI literacy demonstrate greater confidence in applying AI tools in the classroom, enhancing both teaching efficiency and student engagement. A study by Zhao et al (2022), found that teachers who possessed higher levels of AI literacy were more adept at using AI to personalize learning experiences, tailor instruction to individual students, and implement data-driven approaches

to monitor student progress. This ability to apply AI effectively has been linked to improved learning outcomes and more dynamic classroom environments.

Furthermore, research by Rütting et al (2023), highlights the long-term impact of AI literacy on teachers' professional development. AI-literate teachers are better equipped to engage with technological advancements, making them more adaptable to changes in educational tools and methods. AI literacy helps integrate ethical considerations into technology use, fostering responsible AI aligned with educational goals and societal values. This supports sustainable teaching practices and future-proofs education against disruptions.

Teachers' AI literacy has also been shown to improve their overall teaching effectiveness. Lin (2022) found that teachers with a strong understanding of AI were better able to implement AI-driven tools such as intelligent tutoring systems and adaptive learning platforms. These technologies allow for real-time feedback and adjustments to learning pathways, ultimately leading to more individualized instruction and improved student outcomes. Teachers with higher AI literacy were also more confident in their ability to use AI to identify struggling students and provide timely interventions.

Additionally, AI-literate teachers have been shown to exhibit increased self-efficacy when using technology in the classroom. Chou et al (2023), found that teachers who were trained in AI-supported applications felt more confident in integrating AI into their teaching practices. This increase in self-efficacy not only enhances their teaching capabilities but also encourages them to explore new AI-driven innovations that can further benefit their students.

However, challenges remain in ensuring the long-term impact of teachers' AI literacy. Ng et al (2022), point out that while many teachers can demonstrate short-term improvements in AI competency after training, ongoing support and resources are crucial for maintaining and expanding these skills. Without continuous professional development and access to updated AI tools, teachers' AI literacy may stagnate, limiting its long-term effectiveness. Additionally, disparities in access to resources across schools can result in uneven outcomes, with teachers in underfunded areas struggling to keep pace with technological advances.

Overall, teachers' AI literacy has proven effective in enhancing teaching practices, promoting personalized learning, and boosting confidence in the use of AI technologies. However, sustaining these benefits requires continuous support, access to resources, and equitable opportunities for all educators to build and maintain their AI competencies.

### **Summary**

The SCORE Framework for Teachers' AI Literacy, illustrated in Figure 2, provides a comprehensive analysis of the strengths, challenges, options, responses, and effectiveness related to building AI literacy among educators. This model serves as a valuable tool for assessing the current state of teachers' AI literacy, identifying areas that require improvement, and suggesting actionable strategies to support its development. By offering an integrated view of these critical elements, the framework helps guide the implementation and ongoing enhancement of AI literacy initiatives in education.





Figure 2 SCORE Framework for Teachers' AI Literacy

Overall, these results indicate that enhancing teachers' AI literacy is critical for the effective integration of AI technologies into education. Teachers who possess a strong understanding of AI are better able to personalize learning experiences, increase teaching efficiency, and utilize data-driven insights to improve student outcomes. As AI becomes more embedded in educational systems, ensuring that teachers are AI-literate will play a pivotal role in preparing students for an AI-driven world.

Due to practical constraints, this paper does not provide a comprehensive review of the entire SCORE framework. Instead, it specifically focuses on applying the SCORE model to evaluate teachers' AI literacy, identifying key strengths such as personalized learning and teaching efficiency, as well as challenges like the lack of training and resource disparities. While this analysis highlights important areas, it does not explore broader aspects of AI literacy implementation across diverse educational settings. Other strategic models such as Strengths, Weaknesses, Opportunities, and Threats (SWOT), Strengths, Opportunities, Aspirations, and Results (SOAR), or Needs, Opportunities, Improvements, Strengths, and Exceptions (NOISE) could also be used to analyse AI's potential in education. These models offer different approaches, with SWOT focusing on internal and external factors, SOAR emphasizing aspirations and achievements, and NOISE identifying barriers and improvements.

This finding has important implications for educational institutions, policymakers, and other stakeholders. The identified challenges underscore the urgency of providing targeted professional development programs, equitable resource distribution, and stronger institutional support to enable teachers to develop AI literacy. A key focus should be on practical AI literacy that equips teachers with the ability to use AI tools for personalized learning, data analysis, and administrative efficiency, while also integrating ethical considerations into AI use. Schools must prioritize AI literacy as part of their core educational initiatives, ensuring that teachers receive ongoing training to stay up to date with evolving AI technologies. By fostering AI literacy, both senior and junior teachers can be empowered to adapt to technological changes, collaborate more effectively, and create more engaging and personalized learning environments for their

students. This, in turn, strengthens the overall capacity of the teaching workforce and helps future-proof educational practices.

Besides that, this finding could help in shaping future professional development frameworks by integrating AI literacy into teacher education programs, such as curriculum design for AI-enhanced learning, data-driven teaching strategies, and ethical AI usage. These programs should provide hands-on experience with AI tools that can be directly applied in the classroom, fostering both technical proficiency and pedagogical innovation. By understanding the specific strengths and challenges of teachers' AI literacy, education leaders can identify gaps in training and infrastructure, leading to more effective support systems. These support systems could include continuous professional development, access to AI tools and resources, mentorship programs, and technical assistance, ensuring that teachers have ongoing support as they adapt to AI technologies. Teachers who are confident in using AI can not only improve their own teaching practices but also play a significant role in fostering AI awareness among their students.

Future studies on the current topic are recommended. Further study could focus on the long-term effects of AI literacy on both teachers' professional growth and student outcomes. Additionally, the influence of different educational contexts, such as rural versus urban settings, on the success of AI literacy initiatives should be examined. Investigating the impact of AI literacy across various disciplines and its adaptation for specialized subjects would provide valuable insights for educators and policymakers.

### Acknowledgment

We gratefully acknowledge financial support from Universiti Kebangsaan Malaysia (UKM). This study was supported by the Faculty of Education at UKM under GG-2024-044 (SDG Research Grant). We thank to everyone who involved in Writing Masterclass: Score Assessment Bootcamp that provided insight and expertise that greatly assisted the research. We thank all my friends in Measurement and Evaluation course for constructive comments that greatly improved the manuscript.

### References

- Andersdotter, K. (2023). Artificial intelligence skills and knowledge in libraries : Experiences and critical impressions from a learning circle. *Journal of Information Literacy*, 17(3), 108–130. <https://doi.org/http://dx.doi.org/10.11645/17.2.14> This
- Chan, C. K. Y., & Tsi, L. H. Y. (2023). The AI Revolution in Education: Will AI Replace or Assist Teachers in Higher Education? *ArXiv:2305.01185*. <http://arxiv.org/abs/2305.01185>
- Chou, C.-M., Shen, T.-C., Shen, T.-C., Shen, C.-H., & Liu, T.-L. (2023). Promoting Pre-service Teachers' AI-Supported Application of Self-Efficacy. *2023 IEEE 3rd International Conference on Software Engineering and Artificial Intelligence (SEAI)*, 261–265.
- Druga, S., Otero, N., & Ko, A. J. (2022). The Landscape of Teaching Resources for AI Education. *Proceedings of the 27th ACM Conference on on Innovation and Technology in Computer Science Education* Vol. 1, 96–102. <https://doi.org/10.1145/3502718.3524782>
- Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education promises and implications for teaching and learning*. Center for Curriculum Redesign.

- Lin, H. (2022). Influences of artificial intelligence in education on teaching effectiveness: The mediating effect of teachers' perceptions of educational technology. *International Journal of Emerging Technologies in Learning (Online)*, 17(24), 144.
- Luckin, R., & Cukurova, M. (2019). Designing educational technologies in the age of AI: A learning sciences-driven approach. *British Journal of Educational Technology*, 50(6), 2824–2838. <https://doi.org/10.1111/bjet.12861>
- Ng, D. T. K., Luo, W., Chan, H. M. Y., & Chu, S. K. W. (2022). Using digital story writing as a pedagogy to develop AI literacy among primary students. *Computers and Education: Artificial Intelligence*, 3(October 2021), 100054. <https://doi.org/10.1016/j.caeai.2022.100054>
- Ng, D. T. K., Wu, W., Leung, J. K. L., Chiu, T. K. F., & Chu, S. K. W. (2024). Design and validation of the AI literacy questionnaire: The affective, behavioural, cognitive and ethical approach. *British Journal of Educational Technology*, 55(3), 1082–1104. <https://doi.org/10.1111/bjet.13411>
- Olari, V., & Romeike, R. (2021). Addressing AI and Data Literacy in Teacher Education: A Review of Existing Educational Frameworks. In *ACM International Conference Proceeding Series* (Vol. 1, Issue 1). Association for Computing Machinery. <https://doi.org/10.1145/3481312.3481351>
- Rütty-joy, O., Winder, G., & Biedermann, H. (2023). Building AI Literacy for Sustainable Teacher Education. *ZFHE*, 18(4), 175–189. <https://doi.org/10.21240/zfhe/18-04/10>
- Tan, K., Pang, T., Fan, C., & Yu, S. (2023). Towards Applying Powerful Large AI Models in Classroom Teaching: Opportunities, Challenges and Prospects. *ArXiv:2305.03433*.
- Wang, H. (2023). Formation Mechanism and Practice Path Model of Teachers' Intelligent Literacy in the Context of Artificial Intelligence. *2023 2nd International Conference on Artificial Intelligence and Computer Information Technology (AICIT)*, 1–6.
- Zawacki-richter, O., Marín, V. I., & Bond, M. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators? *International Journal of Educational Technology in Higher Education*, 16(1), 1–27. <https://doi.org/https://doi.org/10.1186/s41239-019-0171-0>
- Zhao, L., Wu, X., & Luo, H. (2022). Developing AI Literacy for Primary and Middle School Teachers in China : Based on a Structural Equation Modeling Analysis. *Sustainability*, 14(21), 14549. <https://doi.org/https://doi.org/10.3390/su142114549>