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Knowledge, Implementation and Ethics of the Use of Artificial Intelligence (Ai) among Teachers: Issues and Challenges

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Abstract

The emergence of artificial intelligence (AI), particularly generative AI, has changed the way teachers plan, deliver and assess teaching and has called for a reassessment of teacher professionalism. This article discusses teachers' knowledge, implementation and ethics of AI use, as well as the issues and challenges faced, based on a review of past literature and guided by the Technology Acceptance Model (TAM) and Technological Pedagogical Content Knowledge (TPACK) frameworks. Previous studies show that the level of AI knowledge and use is reported to be uneven across contexts, that frequency of use does not necessarily reflect strong ethical practice, and that AI implementation depends on structured training and institutional support. Six main challenges are highlighted, namely uneven AI knowledge and literacy, the gap between readiness and implementation, time pressure and the absence of a pedagogical framework, uneven institutional support and infrastructure, the absence of clear ethical guidelines, and limited empirical evidence for the primary school context in Selangor. To address these challenges, this issue paper recommends integrated professional training, clear ethical guidelines, the preservation of the teacher's role and further empirical research.

Keywords: Artificial Intelligence (Ai), Teacher Knowledge, Ai Implementation, Ai Ethics, Teacher Professionalism

Introduction

Artificial intelligence or AI refers to systems capable of processing data and information in ways that resemble intelligent behaviour, typically involving reasoning, learning, perception, prediction, planning or control (UNESCO, 2021). In the field of education, Zawacki-Richter et al. (2019) classified AI applications into four categories, namely profiling and prediction, assessment and evaluation, adaptive systems and personalisation, and intelligent tutoring systems. Since ChatGPT was launched in November 2022, generative AI capable of producing new content such as text, images and computer code has become increasingly accessible to the wider public, including teachers and students. Kasneci et al. (2023) argued that artificial intelligence models have potential in education but teachers and students need to develop the competencies and literacy that enable them to understand the technology, its limitations and its ethical considerations.

In the context of teachers, AI has opened up a significant and tangible opportunity in day-to-day management at school. A systematic review by Celik et al. (2022) shows that AI offers opportunities to improve the planning of teaching and learning (T&L) through the identification of students' needs, the delivery of teaching such as instant feedback and teacher intervention, and the assessment of teaching through automated marking. The review also identified several challenges of using AI in teaching practice and showed that teachers have various roles in the development of AI technology. In Selangor, Khor and Surat (2026) reported that the level of ChatGPT use among the 248 teachers studied was very high (98.4%), reflecting the routine integration of the tool in teachers' daily tasks, including lesson planning, preparation of materials, assessment and teaching reflection.

However, frequency of use does not necessarily reflect the quality of its use. Khor and Surat (2026) stated that most current discussions about ChatGPT are more normative or conceptual in nature, while empirical evidence in the local teacher context remains very limited. In the same study, the relationship between ChatGPT use and teachers' professional ethical practice was found to be positive and significant, but at a small to moderate level ($r = 0.279$, $p < 0.001$) and did not imply cause and effect. AI use is also not uniform across all contexts. Lademann et al. (2025), citing the study by Cheah et al. (2025), reported that fewer than half of the teachers studied used AI tools in their daily practice.

Previous studies have examined this issue from several angles. Systematic reviews by Celik et al. (2022) and Xue et al. (2025) compiled the opportunities, challenges and acceptance of AI among teachers, while Lademann et al. (2025) evaluated the effects of a training programme on teachers' AI literacy and attitudes in Germany. In Malaysia, the empirical studies identified in this review examined separate variables in different populations. These were the level of knowledge and use of AI among 120 primary school Malay Language teachers in Muallim, Perak (Syakirah Che Dahalan & Mohd Syaubari Othman, 2025), the readiness of 107 Malay Language teachers in Gombak, Selangor (Nur Udhwa Ashikin Mohd Rani et al., 2025), and the relationship between ChatGPT use and professional ethical practice among 248 teachers in Selangor (Khor & Surat, 2026). Ethical challenges, meanwhile, were studied qualitatively among five higher education institution lecturers (Khairul Hamimah Mohammad Jodi et al., 2025).

However, several matters remain unanswered. First, these studies measured different constructs using different instruments, producing an inconsistent picture: moderate knowledge with low use in Muallim, high readiness in Gombak, and very high ChatGPT use in Selangor. These findings cannot be compared directly. Second, the relationship between ChatGPT use and professional ethical practice is only small to moderate ($r = 0.279$) and does not imply cause and effect (Khor & Surat, 2026). Frequency of use therefore cannot yet be taken as an indicator of the quality of implementation or of ethical practice. Third, the evidence on ethics identified in this review is limited to a single AI tool, ChatGPT, or to interviews with a small number of lecturers, whose findings cannot be generalised to primary school teachers. Fourth, based on the literature reviewed, no study has measured knowledge, implementation and ethics of AI use simultaneously among primary school teachers in Selangor, and the relationship between knowledge and implementation of AI has not yet been empirically tested.

This situation raises the question of the extent to which teachers possess adequate knowledge, implement AI meaningfully and use it ethically. Thus, the purpose of this issue paper is to discuss the issues and challenges of AI use among teachers in terms of knowledge, implementation and ethics, and subsequently to discuss the recommendations that need to be put forward to address these issues and challenges and to support professional and responsible AI use. This issue paper contributes to the literature in three ways. First, it compiles and synthesises findings that have thus far been reported separately into a single discussion encompassing the dimensions of knowledge, implementation and ethics. Second, it uses TAM and TPACK to distinguish teachers' acceptance of AI from their ability to use it meaningfully in pedagogical terms. Third, it formulates six main challenges and recommendations that can serve as a basis for empirical studies at the primary school level in Selangor.

Research Objectives and Questions

The research objectives and questions are formulated as the main guide in the discussion of the issues and challenges of AI use among teachers.

Objectives

I. To discuss the issues and challenges of AI use among teachers in terms of knowledge, implementation and ethics.
II. To discuss recommendations for overcoming the issues and challenges of AI use among teachers in terms of knowledge, implementation and ethics.

Research Questions

I. What are the issues and challenges of AI use among teachers in terms of knowledge, implementation and ethics?
II. What are the recommendations for overcoming the issues and challenges of AI use among teachers in terms of knowledge, implementation and ethics?

Literature Review Method

This paper is a conceptual issue paper based on a selective narrative literature review. This approach was chosen because the purpose of the paper is to discuss issues and challenges and to put forward recommendations, rather than to measure effects or estimate the magnitude of a finding. The paper does not claim to follow a systematic review protocol.

The literature was identified through Google Scholar searches using the keywords "AI literacy + teachers", "generative AI + teachers + implementation" and "AI ethics + teachers" in September 2026. Sources were selected purposively based on the following criteria: (i) empirical or review studies discussing AI or generative AI in education that involve teachers or educators; (ii) studies that address at least one of the three dimensions of this paper, namely knowledge or literacy, implementation or acceptance, and ethics; (iii) studies in the Malaysian context were prioritised to reflect local conditions, while international studies were included as comparison and supporting evidence; and (iv) foundational sources required for the theoretical framework and the ethics discussion, namely Davis (1989), Mishra and Koehler (2006), Long and Magerko (2020) and UNESCO (2021). Sources in Malay and English were included. Apart from these foundational sources, the other sources referred to were

published between 2019 and 2026. Studies that did not involve teachers or educators and were not related to the three dimensions were excluded.

Each source was read and classified according to the dimensions of knowledge, implementation or ethics, as well as by study context, namely country, education level and construct measured. The findings were then synthesised thematically by grouping similarities and differences across studies, and interpreted using TAM and TPACK. Issues and challenges were formulated from recurring themes and gaps identified across the studies. Because the constructs, populations and instruments of the studies differ, the findings were not combined quantitatively or compared directly, and the methodological quality of each study was not formally assessed.

This selective approach has limitations. The paper does not cover all available literature, and selection bias may have occurred. The local evidence referred to is also limited to a few studies and is largely concentrated on Malay Language teachers in TS25 schools and lecturers at higher education institutions. In addition, Cheah et al. (2025) is cited secondarily through Lademann et al. (2025). The findings discussed should therefore be interpreted as a preliminary picture that needs to be tested empirically, rather than as definitive conclusions.

Theoretical Framework: TAM and TPACK in Teachers' Use of AI

Technology Acceptance Model (TAM)

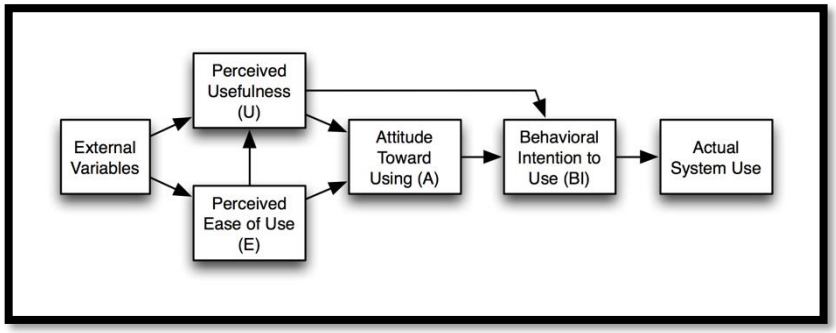

Figure 1 Technology Acceptance Model (Davis, 1989).

The Technology Acceptance Model or TAM introduced by Davis (1989) explains that the acceptance and use of technology are determined by two main beliefs, namely perceived usefulness and perceived ease of use as shown in Figure 1. According to Xue et al. (2025), perceived usefulness refers to the extent to which a person believes that using a technology will enhance their job performance, while perceived ease of use refers to the extent to which the technology is believed to require little effort. Both of these beliefs influence an individual's attitude towards technology, and subsequently behavioural intention and actual use. In the context of teachers, TAM helps explain why some teachers accept AI in teaching while others do not.

Technological Pedagogical Content Knowledge (TPACK)

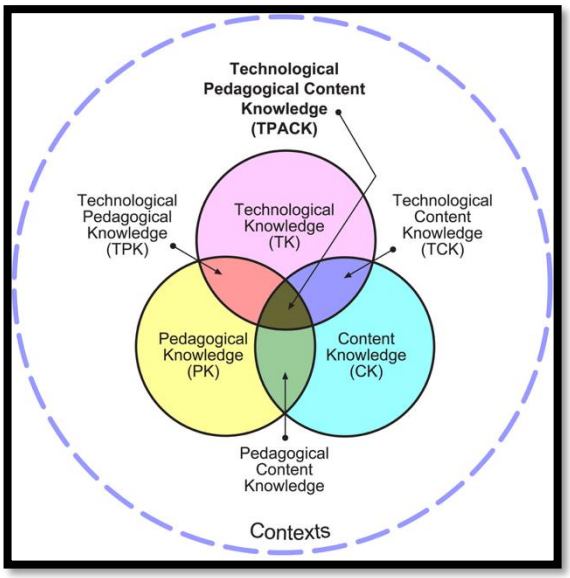

Figure 2 Technological Pedagogical Content Knowledge (Mishra & Koehler, 2006)

The TPACK model developed by Mishra and Koehler (2006) states that effective integration of technology in teaching requires teachers to master content knowledge (CK), pedagogical knowledge (PK) and technological knowledge (TK), and to understand the interaction among these three types of knowledge as shown in Figure 2. In the context of artificial intelligence (AI), technical skills in operating AI tools alone are not sufficient. Loganathan and Khairul Azhar (2025) emphasised that possessing technological knowledge alone is not adequate for effective integration. This is because teachers also need to adapt AI tools to specific learning content (technological content knowledge) and appropriate teaching strategies (technological pedagogical knowledge). These two frameworks complement each other because TAM explains the factors that influence teachers' acceptance of AI, while TPACK explains the knowledge required to use AI meaningfully in teaching.

Teachers' Knowledge of Artificial Intelligence (AI)

Knowledge as the Foundation of Professional AI Use

Knowledge about artificial intelligence or AI needs to be made the main foundation for the accurate and responsible use of AI in the classroom. Long and Magerko (2020) proposed an AI literacy framework comprising 17 competencies in five themes, namely what is AI, what can AI do, how does AI work, how should AI be used and how do people perceive AI. This framework shows that knowledge about AI is not limited to skills in operating tools, but also encompasses an understanding of how AI works and its appropriate use. This foundational knowledge is very important because, without clear knowledge, users will use AI tools carelessly and violate the principles and ethics that must be upheld throughout their use.

Level of AI Knowledge and Use in the Malaysian Context

Local research findings show that the levels of AI knowledge, readiness and use among teachers differ according to the context and the constructs measured. Syakirah Che Dahalan and Mohd Syaubari Othman (2025) involved 120 Malay Language teachers in primary schools of the School Transformation Programme 2025 (TS25) in Muallim district, Perak, and found that teachers' AI-related knowledge was at a moderate level (M = 3.0357, SD = 0.68808), while

the level of AI use was low. In contrast, Nur Udhwa Ashikin Mohd Rani et al. (2025), involving 107 Malay Language teachers in 20 national schools of TS25 cohort 7 in Gombak district, Selangor, reported that teachers' readiness to implement AI in teaching and learning was at a high level, with an overall mean of 4.47, with the knowledge and skills factor recording the highest mean (4.68) in influencing that readiness. Khor and Surat (2026), meanwhile, reported a very high level of ChatGPT use (98.4%) among teachers in Selangor. Differences in the constructs of knowledge, readiness and use, as well as in populations and instruments, mean that these findings cannot be compared directly, but they show that the picture of teachers and AI is not uniform and requires extensive and careful further measurement and empirical research.

Training and Demographic Factors

Training related to artificial intelligence is among the factors that influence improvements in teachers' knowledge of and attitudes towards AI. This is because the study by Lademann et al. (2025), which evaluated an online training programme for in-service teachers in Germany with 436 respondents for the attitude assessment and 291 respondents for AI literacy, showed significant changes in teachers' knowledge of and attitudes towards AI. The programme combined webinars, self-directed learning modules and practical projects. AI literacy scores increased significantly, while all attitude items towards the use and integration of AI showed positive changes, and teachers reported higher confidence in integrating AI after the programme. In addition, demographic factors are linked to access to and comfort with technology. Woodruff et al. (2023) surveyed more than 4,500 PK-12 educators across 50 states in the United States and reported that there are differences in access to technology and levels of comfort with technology across regions, genders and age groups. In the review of this issue paper, evidence on how age, gender, teaching experience, school location, teaching field and academic qualifications relate to AI knowledge and use among primary school teachers in Malaysia remains limited, and should be tested empirically.

Teachers' Implementation of AI

Opportunities for AI Implementation in Teachers' Work

The implementation of AI in the classroom is one of the most easily observed aspects because it involves actions that can be seen and assessed directly. Celik et al. (2022) showed that AI can support teachers in three phases of teaching, namely planning, implementation and assessment. In the context of teachers in Selangor, Khor and Surat (2026) described ChatGPT use as covering the purposes of lesson planning, preparation of materials, assessment and teaching reflection. Loganathan and Khairul Azhar (2025), meanwhile, described that in the teaching of English speaking skills, AI can provide instant and automatic feedback, support differentiated instruction and increase student engagement, thereby enabling teachers to focus more on the design of learning activities. Therefore, it is clear that AI provides extensive opportunities in its implementation through teachers' work in schools.

Level of Implementation and Barriers

The level of AI implementation reported by several past studies shows differing findings between studies. Syakirah Che Dahalan and Mohd Syaubari Othman (2025) reported low AI use among primary school Malay Language teachers in TS25 in Muallim, while the report by Cheah et al. (2025), as stated in Lademann et al. (2025), shows that fewer than half of the teachers studied used AI tools in daily practice. At the same time, teachers in Gombak

reported high readiness (Nur Udhwa Ashikin Mohd Rani et al., 2025). Therefore, the differences in findings between studies show that implementation is still not comprehensive, especially involving locality aspects such as urban and rural areas.

Meanwhile, several barriers were identified in past studies. Woodruff et al. (2023) reported that the acceptance of AI in K-12 education in the United States is influenced by hesitancy stemming from technological barriers. The study also assessed infrastructure needs such as reliable internet access, hardware and software. Nithyavani Manikam et al. (2025) concluded that AI integration requires an integrated and ethical professional development approach, emphasising teacher competence and institutional support. In the context of teaching English speaking skills, Loganathan and Khairul Azhar (2025) identified similar barriers, namely limited teacher training, usability issues, the absence of a pedagogical framework, teacher resistance, weak infrastructure, and ethical and privacy concerns.

Ethics of AI Use by Teachers

Ethical Dimensions

The UNESCO (2021) Recommendation on the Ethics of Artificial Intelligence, adopted by 193 member states in November 2021, is built on four core values and ten principles. Among the principles relevant to teachers' professional practice are privacy and data protection, transparency and explainability, human oversight, fairness and non-discrimination, and responsibility and accountability. These principles provide an international reference for evaluating teachers' use of AI, particularly in safeguarding student data, ensuring that decisions made with the assistance of AI can be explained, and preserving teachers' professional judgement. All of these principles are very important for the teaching profession because teachers are directly involved with students and are exposed to confidential information that could potentially be misused through artificial intelligence. Therefore, the practice of the principles outlined needs to be emphasised as ethics during the use of AI in schools.

Professional Ethics and Practice Challenges

Khor and Surat (2026) linked ChatGPT use with teachers' professional ethical practice and emphasised the need for reflective AI integration and specific professional training to safeguard the integrity of the teaching profession. Their finding that the relationship between the two variables is only at a low to moderate level shows that frequent use cannot be regarded as evidence of strong ethical practice. In the context of higher education, Khairul Hamimah Mohammad Jodi et al. (2025) interviewed five respondents who were lecturers at higher education institutions (IPT) and found that the main ethical challenges involved data privacy, the transparency of decisions produced by AI, and the risk of dependence on technology that may reduce the element of human relationships. The respondents also stressed the absence of clear guidelines on the ethical use of AI, which raises concerns about fairness and professional responsibility. The findings of this small-scale qualitative study cannot be generalised to primary school teachers, but they show ethical issues that should be examined in the school context.

Selwyn (2022), meanwhile, stated several matters that deserve attention in the discussion of AI in education. These include the limitations of AI in adapting to human social and emotional contexts associated with the use of AI in the T&L process, and the fact that the use of AI in

education is a supplementary method in the T&L process and not a replacement for the task of a teacher in educating human capital. This argument supports the view that teachers' professional and ethical judgement cannot be replaced by AI. Loganathan and Khairul Azhar (2025) also emphasised that AI should be seen as a support tool and not a replacement for teachers.

Issues and Challenges

The statements above show that the conveniences and opportunities offered by artificial intelligence (AI) to users, especially teachers, are accompanied by several interrelated issues and challenges. These issues and challenges are discussed according to the dimensions of knowledge, implementation and ethics, followed by the constraints of research evidence.

Uneven AI Knowledge and Literacy

The main issue and challenge that arises is that teachers' knowledge of AI is not uniform according to the constructs and localities of the studies. Syakirah Che Dahalan and Mohd Syaubari Othman (2025) reported a moderate level of knowledge (M = 3.0357) among primary school Malay Language teachers in TS25 in Muallim, Perak, while Nur Udhwa Ashikin Mohd Rani et al. (2025) reported that the knowledge and skills factor recorded the highest mean (4.68) in influencing the readiness of Malay Language teachers in Gombak to implement AI. Although both studies measured different constructs and their findings cannot be compared directly. However, both show that knowledge is a very important aspect to be measured and examined. In addition, Nur Alia Arshad and Khairul Azhar (2026) found that the lack of training and AI literacy was the most frequently reported challenge, namely in 12 articles. Long and Magerko (2020), through the AI literacy framework, showed that knowledge about AI encompasses an understanding of what AI is, what AI can do, how AI works, how AI should be used and how people perceive AI. Measuring teachers' knowledge that only touches on skills in operating tools risks not meeting the requirements of those dimensions. Loganathan and Khairul Azhar (2025), meanwhile, described that limited training and use of AI tools can cause the tools to be underutilised or misused, and stressed the need for training that encompasses technical and pedagogical skills. Evidence from Lademann et al. (2025), meanwhile, shows that structured training can improve AI literacy and teachers' attitudes, but this evidence was obtained from teachers in Germany and needs to be tested in the Malaysian context. All of these findings clearly show that AI knowledge and literacy are very important to discuss and require more extensive further research.

The Gap Between Readiness, Use and Implementation

High readiness (Nur Udhwa Ashikin Mohd Rani et al., 2025), low AI use (Syakirah Che Dahalan & Mohd Syaubari Othman, 2025), very high ChatGPT use (Khor & Surat, 2026) and the report that fewer than half of teachers use AI in daily practice (Cheah et al., 2025, in Lademann et al., 2025) were reported in different populations, constructs and instruments. However, all of these findings have clearly shown that problems of gaps and non-uniformity of data according to locality and constructs still occur. In discussing this matter, the TAM and TPACK models

From the TAM perspective, teachers' acceptance is influenced by perceived usefulness and perceived ease of use (Davis, 1989), while from the TPACK perspective, meaningful use requires alignment among technology, pedagogy and content (Mishra & Koehler, 2006). Teachers who are ready and consider AI useful still need pedagogical knowledge to integrate

it into teaching. Khor and Surat (2026) also cautioned that the relationship between ChatGPT use and professional ethical practice is only at a small to moderate level and does not imply cause and effect, so frequency of use alone cannot be taken as an indicator of professionalism. The relationship between knowledge and teachers' implementation of AI should be tested empirically.

Pressure, Workload and the Absence of a Pedagogical Framework

Loganathan and Khairul Azhar (2025) described that the pressure to adapt to rapidly developing technology can add to teachers' workload and professional stress, and that overburdened teachers may reject tools perceived as time-consuming to learn. They also stated that without a clear pedagogical framework, teachers find it difficult to integrate AI into lesson plans and AI risks being used in a non-meaningful way. For example, AI is used only for simple exercises without contributing to the development of deeper and sustained skills. Although these findings originate from the teaching of English speaking skills, they reflect challenges relevant to teachers of other subjects, and need to be validated in the context of primary school teachers in Selangor.

Uneven Institutional Support and Infrastructure

The implementation of AI actually depends heavily on the state of institutional support such as schools, the District Education Offices (PPD), the State Education Departments (JPN) and the Ministry of Education Malaysia (KPM). This is because AI requires suitable tools such as laptops, computers and wifi for users to access it. This is supported by Woodruff et al. (2023), who emphasised the need for infrastructure such as reliable internet access, hardware and software, and reported differences in access to and comfort with technology across regions, genders and age groups. Nithyavani Manikam et al. (2025), meanwhile, emphasised the role of institutional support and continuous professional development in AI integration. Loganathan and Khairul Azhar (2025) added that AI tools requiring a stable internet connection and up-to-date devices may function poorly in under-resourced schools. These statements clearly prove that robust and up-to-date infrastructure is greatly needed and is important to be prioritised in the improvement of educational institutions in Malaysia. In addition, institutional support through the introduction of integrated training on a regular and continuous basis also needs to be instilled in all teachers in schools regardless of gender, age and teaching subject. This is to ensure that meaningful AI usage skills can be implemented by all teachers in schools.

Ethical Guidelines, Privacy and Dependence

Ethics is an important challenge in discussing the use of AI by teachers. Akgun and Greenhow (2022) stressed that the negative ethical and social-system effects of AI are rarely fully considered in the education context, including issues of privacy, surveillance, autonomy, and algorithmic bias and discrimination. This is also supported by Khairul Hamimah Mohammad Jodi et al. (2025) who interviewed five lecturers and found that the main ethical challenges were data privacy, the transparency of decisions produced by AI, and the risk of dependence on technology that may reduce human relationships. The respondents emphasised the absence of clear guidelines, which raises concerns about fairness and professional responsibility. They also stressed that AI-generated output must be checked by humans, and some stated that lecturers should be ethical models for students. Therefore, these ethical challenges cannot be taken lightly because teachers are on the front line of decisions on using

AI tools during teaching and learning, yet they are not equipped with the knowledge to identify those risks.

Principles of Privacy and Data Protection in Schools

In the school context, the principle of privacy and data protection can be interpreted as teachers' responsibility to be careful with student data entered into AI tools (UNESCO, 2021). This is important because many AI tools collect personal data such as voice recordings and interaction patterns, which raises concerns about data security and misuse, and that bias in algorithms can lead to unfair treatment of certain groups of students. Selwyn (2022), meanwhile, cautioned about the limitations of AI in modelling human social and emotional contexts as well as the social harms that can be associated with its use. Khor and Surat (2026) stressed the need for reflective AI integration to preserve the integrity of the teaching profession.

Limited Empirical Evidence

Khor and Surat (2026) stated that empirical evidence on AI use among local teachers remains very limited and that a research gap still exists linking AI use specifically with teachers' professional ethical practice. In this issue paper, local studies on primary school teachers are largely concentrated on Malay Language teachers in TS25 schools in the districts of Selangor state, correlational studies on ChatGPT and professional ethics, and studies on ethical challenges set in higher education. Studies that measure the knowledge, implementation and ethics of AI use simultaneously among primary school teachers in Selangor have not yet been conducted, and this shows a need that must be taken up by researchers to ensure that all of these gaps can be filled with facts on the ground.

Discussion and Recommendations

Discussion

This issue paper shows that AI offers extensive and tangible opportunities to teachers around the world, including in Malaysia, but due attention needs to be given to several issues such as the use of generative AI tools, which is reported to be very high among teachers in Selangor (Khor & Surat, 2026). However, the differing reports on knowledge, readiness and use (Syakirah Che Dahalan & Mohd Syaubari Othman, 2025; Nur Udhwa Ashikin Mohd Rani et al., 2025) show that those opportunities are not necessarily translated into uniform and meaningful implementation. Therefore, the level of use needs to be distinguished from the quality of implementation, and the relationship between knowledge and implementation is the matter most worthy of testing.

The TAM and TPACK frameworks help to interpret this situation. TAM explains why teachers accept or do not accept AI, namely based on perceived usefulness and ease of use (Davis, 1989). TPACK, meanwhile, explains that acceptance alone is not sufficient because teachers need to align technology with pedagogy and content (Mishra & Koehler, 2006). The finding of Lademann et al. (2025) that structured training improves AI literacy and teachers' attitudes shows that both of these aspects, namely attitudinal readiness and knowledge, can be improved through planned interventions.

The ethical dimension adds complexity to this discussion. Khor and Surat (2026) found a positive but small to moderate relationship between ChatGPT use and professional ethical

practice, and that relationship does not imply cause and effect. This means that teachers who frequently use AI do not necessarily practise better ethics, and teachers who use AI less are not necessarily less ethical. Meanwhile, Khairul Hamimah Mohammad Jodi et al. (2025) showed that the absence of clear guidelines is felt to be a source of concern about fairness and professional responsibility, even in the higher education context. The view that teacher professionalism in the AI era needs to encompass digital and ethical dimensions is in line with the emphasis by Khor and Surat (2026) on the integrity of the teaching profession.

Finally, the role of teachers should not be sidelined. Selwyn (2022) cautioned about the limitations of AI in adapting to human social and emotional contexts, while Loganathan and Khairul Azhar (2025) emphasised that AI is a support tool and not a replacement for teachers. In the study by Khairul Hamimah Mohammad Jodi et al. (2025), the respondents also agreed that student supervision still requires human interaction. Teachers' professional and ethical judgement remains the core, and AI should be used to support that judgement.

Recommendations

Based on the discussion above, several recommendations are put forward.

First, the implementation of structured, integrated and continuous professional training. Training should encompass technical skills as well as how to align AI with up-to-date content and pedagogy. This is evidenced by the study by Lademann et al. (2025), which shows the effectiveness of a programme that combines webinars, self-directed modules and practical projects, while Nithyavani Manikam et al. (2025) emphasised an integrated and ethical professional development approach. This need is also supported by Khairul Hamimah Mohammad Jodi et al. (2025), who recommended regular and continuous digital literacy and ethics training.

In addition, the formulation of clear and flexible ethical guidelines on AI use needs to be introduced urgently. Khairul Hamimah Mohammad Jodi et al. (2025), through their study, recommended guidelines that are responsive to technological developments and contain the principles of integrity, fairness and responsibility. Meanwhile, the ethical principles for the use of artificial intelligence proposed by UNESCO, such as privacy and data protection, transparency, human oversight and fairness, can be used as a reference, with appropriate adaptation for the primary school ecosystem (UNESCO, 2021). This is important to ensure that ethics and integrity become the main reference in the use of AI tools by educators. Furthermore, the cultivation of ethical literacy among teachers and students also needs to be strengthened. Khairul Hamimah Mohammad Jodi et al. (2025) recommended a technology ethics literacy module and the instilling of AI ethical values in the curriculum, and stressed the role of educators as ethical models. This recommendation originates from the higher education context but can be used as a guide and adapted as well as tested for primary education. Therefore, the need for clear ethical guidelines should be prioritised by stakeholders and KPM needs to be the driver of this formulation.

In addition, the need for institutional support, infrastructure and stakeholder collaboration. Schools, through the Ministry of Education Malaysia, need to provide adequate and up-to-date support and basic facilities so that teachers can carry out the teaching and learning process as well as additional tasks such as recording, reporting and analysis related to learning using AI tools on an ongoing basis. Loganathan and Jamaludin (2025) recommended the use

of cloud-based platforms and low-bandwidth solutions to reduce the technology gap, as well as collaboration among developers, educators and policymakers. Khairul Hamimah Mohammad Jodi et al. (2025), meanwhile, recommended collaboration between institutions and policy agencies for primary schools in Malaysia. Institutional and stakeholder support for infrastructure and facilities for schools and educators will further strengthen education through artificial intelligence that is being highlighted today.

Next, strengthening the role of teachers. The widespread use of AI tools in the field of education, whether at the higher education, secondary or, even more so, primary education level, should be guided by human control, namely the teachers who use them. The direct use of AI tools without human control will give rise to various issues and problems, especially involving students' data and privacy, which must not be taken lightly by users. Furthermore, teachers are also obliged to carry out detailed checks on AI-generated output as emphasised by the respondents in the study by Khairul Hamimah Mohammad Jodi et al. (2025). This is because AI-generated output may give rise to issues of bias, technical errors and even fabricated facts. Therefore, every AI-generated output must be checked thoroughly and continuously, and full trust must not be placed in the AI-generated output produced.

Finally, further empirical research. Further research, whether quantitative or qualitative, that focuses on the broad use of AI from the aspects discussed is greatly needed to provide local evidence and to answer the issues and challenges faced. Khairul Hamimah Mohammad Jodi et al. (2025) also recommended further research that takes the Malaysian context into account, including a combination of universal and local values. Therefore, it is highly appropriate to conduct more further empirical studies on the use of AI in Malaysia to ensure that all current and future actions and needs can be realised accurately and in a focused manner.

Conclusion

Artificial Intelligence (AI) indeed offers extensive and tangible opportunities to teachers in the planning, implementation and assessment of the teaching process. However, the reported levels of knowledge, implementation and ethics do not show any sign, frequency of use does not necessarily reflect strong ethical practice, and AI implementation depends on training and institutional support. Therefore, integrated professional training, clear ethical guidelines, institutional support and the preservation of the teacher's role are the main requirements to ensure that AI is used professionally and responsibly.

This issue paper is conceptual in nature and based on a selected literature review it does not replace empirical research. Its main contribution is to summarise the issues and challenges of AI use among teachers in a single discussion guided by TAM and TPACK, thereby opening room for further empirical research in the primary school context in Selangor.

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