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Trainee Teachers' Acceptance of EduMDAI as a Progressive Pedagogy Platform towards Ethical Digital Education

Aisha Chang[1,*]

[1] Department of Holistic Education, Malaysian Institute of Teacher Education, Sarawak Campus, 98009 Miri, Sarawak, Malaysia

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ABSTRACT

The rapid advancement of digital technologies, particularly artificial intelligence (AI), has transformed global education, requiring innovative pedagogical approaches to ensure teaching and learning remain relevant, effective, and ethical. In Malaysia, the Digital Education Policy (2023) highlights the importance of fostering digitally fluent learners and bridging the digital divide. However, the integration of technology in education still faces challenges, particularly in embedding ethical values within digital learning practices. To address this gap, EduMDAI, a Progressive Pedagogy Platform that integrates Learning Management Systems (LMS), digital technologies, critical thinking, and AI, were introduced to support ethical digital education. This study aims to examine trainee teachers' acceptance of EduMDAI, focusing on three aspects: (i) their acceptance of EduMDAI usage, (ii) its role in supporting ethical digital education, and (iii) its potential in enhancing digital pedagogical skills. A pilot study using a quantitative survey design was conducted with 24 trainee teachers from the Malaysian Institute of Teacher Education, Sarawak Campus, enrolled in the GAPD1032 Digital Learning Basics course. Data were collected through a structured Likert-scale questionnaire and analysed using descriptive statistics via SPSS. Reliability analysis showed high internal consistency with Cronbach's Alpha = 0.952. Findings revealed a very high level of acceptance across all dimensions, with mean scores ranging from 4.86 to 4.92. Respondents strongly agreed that EduMDAI supports meaningful learning, enhances digital and ethical literacy, and prepares them for future digital education environments. The results indicate that EduMDAI not only provides an innovative and systematic framework for teaching and learning but also instills responsible and ethical digital practices. In conclusion, this study provides initial evidence of the positive acceptance of EduMDAI among trainee teachers, underscoring its potential as a transformative pedagogical model aligned with national and global digital education agendas. Although limited by its small sample size and single-campus context, the findings contribute valuable insights into the early adoption of ethical digital pedagogy. Future studies with larger and more diverse samples, combined with qualitative methods, are recommended to further validate and expand on these results.

1. Introduction

* *Corresponding author.*
E-mail address: aishachang@ipgm.edu.my

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The rapid development of digital technologies in the 21st century, particularly artificial intelligence (AI), has profoundly transformed the global educational landscape. This transformation extends beyond infrastructure and equipment, demanding pedagogical renewal to ensure that teaching and learning (TnL) processes remain effective and relevant in tandem with technological advancements. Pedagogy encompasses knowledge of teaching methods and principles, including techniques and approaches appropriate to instructional practice. Twenty-first-century pedagogy emphasizes the integration of three core elements: technological knowledge, pedagogical knowledge, and content knowledge [2]. This integration enables educators to design and implement teaching that aligns with contemporary needs while fostering communication, collaboration, critical thinking, and creativity among students [3].

In Malaysia, the transformation of digital education is guided by the Digital Education Policy (DPD), officially launched by the Ministry of Education Malaysia (MOE) on 28 November 2023 [4]. The policy aims to produce digitally fluent and competitive learners by enhancing knowledge, skills, and values [4]. It also benefits students, educators, educational leaders, and other stakeholders by narrowing the digital divide and ensuring effective implementation of digital education [5]. The DPD represents the ministry's commitment to driving change in digital education, with the broader goal of cultivating a digitally fluent generation while advancing the competencies of students, educators, and leaders.

At the global level, UNESCO emphasizes an inclusive, ethical, and high-impact approach to digital education. Through initiatives such as Digital Learning Week, UNESCO advocates for a digital-ethics-centered transformation of education [6]. To guarantee that learning remains a right rather than a privilege in the age of AI, UNESCO is actively working to ensure that digital learning is inclusive, ethical, and future-ready [6]. According to UNESCO's 2023 Global Education Monitoring Report, digital technology should support and enhance rather than replace human interaction in teaching [7]. The report further underscores the importance of balanced, fair, and evidence-based assessments in the use of educational technologies [7]. Thus, the use of AI in digital education should not replace human thinking but serve as a catalyst for deeper intellectual engagement.

In light of these developments, there is a need for a new ethical digital pedagogy framework such as EduMDAI. EduMDAI framework serves as a progressive pedagogical platform designed to restructure TnL implementation systematically, by integrating Learning Management Systems, Critical Thinking, Digital Technology, and AI Technology, with a strong emphasis on digital ethics. EduMDAI is an acronym for Ethical Digital Education Pedagogy integrating Learning Management System, Digital Technology, Artificial Intelligence Technology, and Critical Thinking. Figure 1 illustrates the EduMDAI Framework.

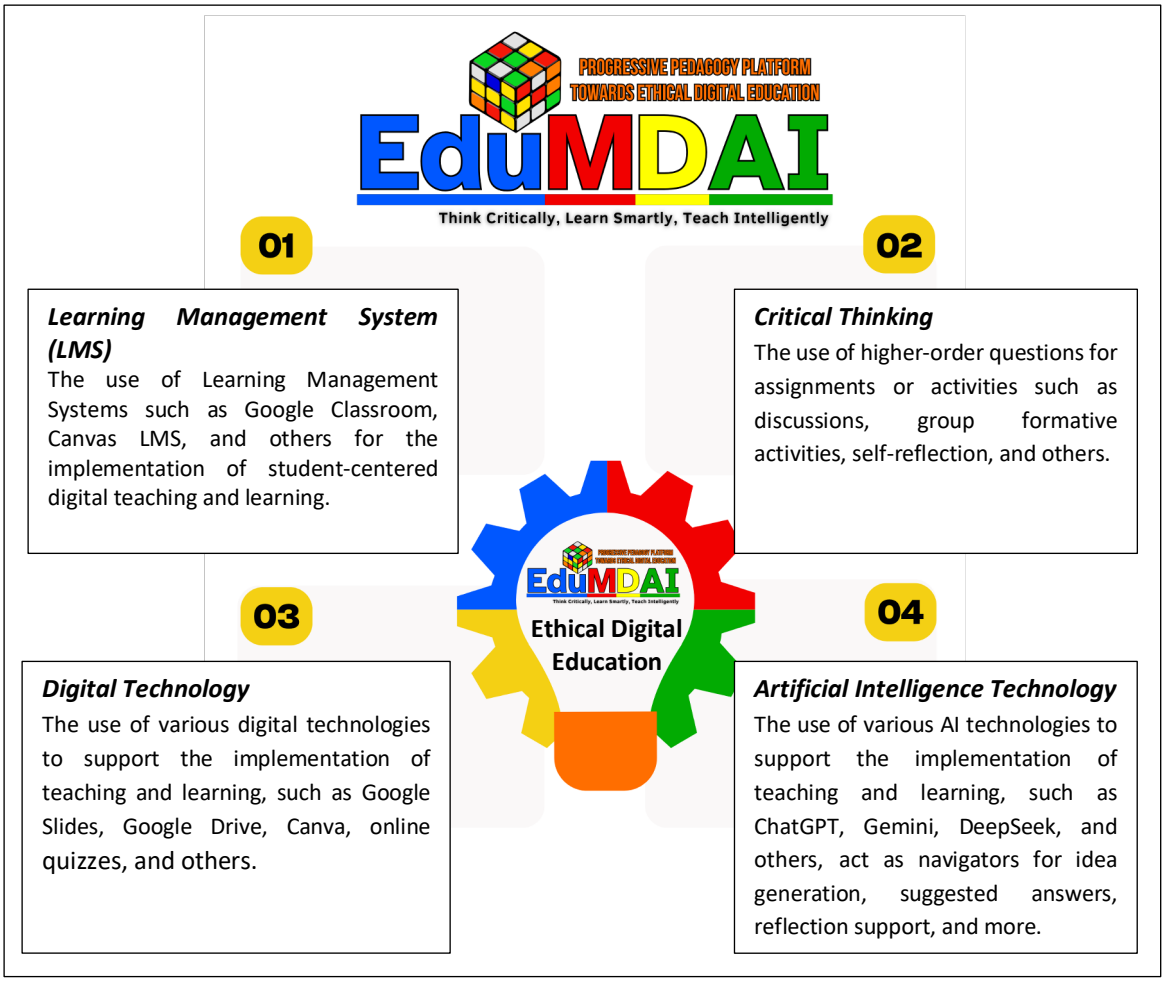

Fig. 1. EduMDAI framework

This ethical digital pedagogy combines existing technological applications with an emphasis on active student engagement, responsible technology use, and the cultivation of moral values in digital interactions. It systematically restructures the implementation of TnL by leveraging contemporary technologies, supported by clear guidelines for the ethical use of digital tools and AI. Within the EduMDAI framework in today's educational context, teachers are not only facilitators but also work together with AI technology as navigators who guide the learning process. This is because AI possesses pedagogical capabilities, providing systematic and responsive access to relevant information that is tailored to students' needs. The implementation of EduMDAI is structured into three stages:

Stage 1: Before TnL – Key components include planning learning outcomes, preparing digital resources, designing critical thinking activities, and establishing ethical guidelines.

Stage 2: During TnL – Teachers serve as facilitators, while students engage in learner-centered, collaborative, and reflective activities supported by the LMS, digital tools, and AI technology as navigators.

Stage 3: After TnL – Evaluation is carried out through the LMS, supported by rubrics for activities and assignment assessments, and reinforced by reflection for continuous improvement.

This need aligns with the "Trails of Integrity and Ethics" study at the University of Hong Kong, which demonstrated how Augmented Reality (AR) can enhance active learning while fostering integrity and ethics in digital education environments [9]. Similarly, Choi [10] describes digital

citizenship as a combination of active engagement, informed critical thinking, and social responsibility grounded in prosocial values and ethical participation. Consequently, trainee teachers' acceptance of this new pedagogy is critical, as they are the future agents of educational transformation. As the new generation of educators, they are not only responsible for delivering knowledge but also for shaping students' attitudes, values, and ethical digital practices. Their initial understanding and acceptance will determine how effectively EduMDAI function as a pedagogical framework that supports national goals for sustainable digital education. This aligns with the aspirations of the Malaysian Digital Education Policy, which emphasizes enhancing teachers' digital competencies and the provision of a value-driven, technology-based learning ecosystem [5]. Moreover, the positive acceptance of EduMDAI among trainee teachers can accelerate the restructuring of teaching methods into more progressive, interactive, and inclusive practices. This is important because trainee teachers will serve as pioneers in applying digital-ethics-based TnL strategies that balance technological use with the holistic development of students' character. EduMDAI holds significant potential as a unique new pedagogy that advancing ethical digital education grounded in artificial intelligence.

Past studies indicate that trainee teachers' confidence (self-efficacy) and their understanding of Technological Pedagogical Content Knowledge (TPACK) positively influence their intention to integrate technology in teaching [11,12]. Furthermore, there is a clear need to strengthen digital competencies that encompass ethics, safety, and responsible learning, particularly as some trainee teachers remain inadequately prepared for the current digital context [15]. Engagement in co-designing pedagogy with ICT has also been shown to enhance innovation in instructional design [16]. Therefore, the early acceptance of EduMDAI not only impacts its successful implementation but also determines the national education system's capacity to produce digitally literate generations who are responsible, critical, and ethical. From a significance perspective, this study deepen understanding of trainee teachers' acceptance of EduMDAI as a progressive pedagogical platform designed to restructure TnL through the integration of Learning Management Systems, Critical Thinking, Digital Technology, and AI Technology with an emphasis on digital ethics. The framework's legal protection (MyIPO copyright) and documented award history provide additional evidence of its originality and readiness for practical application, strengthening claims about its potential scalability and policy relevance. Accordingly, the objectives of this study are to examine trainee teachers' acceptance of EduMDAI across three dimensions (i)The level of acceptance of EduMDAI usage, (ii) The level of acceptance of EduMDAI in supporting ethical digital education, and (iii) The level of acceptance of EduMDAI's potential to enhance digital pedagogical skills.

2. Literature Review

Futuristic learning involves educational approaches and methods that harness cutting-edge technology to equip students with the skills needed to navigate future challenges and seize emerging opportunities [8]. This statement aligns with current technological advancements, particularly artificial intelligence (AI), which demand renewal in the implementation of TnL. Technology has become an essential and undeniable component of modern education [11]. By leveraging technology, students are able to explore ideas through inquiry, improve communication skills, produce educational outputs, and freely express their creativity [13,14]. Digital education encompasses learning about knowledge, skills, and values related to digital technologies, as well as TnL that integrates digital tools in a holistic, creative, and innovative manner to produce digitally fluent generations [5]. Therefore, the acceptance of new pedagogies aligned with technological

developments, particularly by educators and trainee teachers, has become a focal point in efforts to enhance the quality of technology-driven education.

2.1 Digital Education Transformation and National Policy

Global education is now in an era of digital transformation, demanding radical changes in TnL approaches. The advancement of information and communication technologies (ICT) not only provides new mediums but also reshapes interactions among teachers, students, and knowledge. In Malaysia, the Digital Education Policy (DPD) emphasizes the development of infrastructure, the improvement of teachers' digital skills, and the provision of technology-based content. This underscores the need for innovative pedagogies capable of integrating both technological and ethical dimensions in TnL [5]. EduMDAI aligns with this policy as it emphasizes not only technological mastery but also active student engagement and the cultivation of ethical values in digital spaces. From a global perspective, UNESCO stresses that educational technologies must be used fairly, responsibly, and without replacing the affective human interaction central to classroom learning [17]. The integration of digital platforms into TnL has further reinforced the importance of the teacher's role [18].

Findings from the Teacher's Digital Competency Level Study, as reported in the Digital Education Policy 2023, reveal significant gaps in teachers' digital proficiency [18]. Only 2.2% of teachers were categorized as advanced, while the majority fell into intermediate (39.9%) or basic levels when evaluated in 2021 [18,19]. This highlights the competency gap that must be addressed to ensure effective adoption of progressive pedagogy platforms such as EduMDAI. Infrastructure also remains a pressing issue, as limited access to devices and unreliable internet connectivity—particularly in rural areas—continue to restrict digital media usage in classrooms [18]. As the digital landscape evolves, TnL methods for both teachers and students must adapt accordingly [20]. EduMDAI, as a model of ethical digital pedagogy, emerges at the right time, as it is sustainable, inclusive, practical, and scalable, combining pedagogy, technology, and ethics. National digital transformation is also viewed as a catalyst for inclusive education, as illustrated by the Sekolah Anak Malaysia (SAM) initiative, the country's first fully digital school designed to expand access to education in rural areas by blending technological and traditional approaches [21].

Thus, a review of past studies reinforces the justification for EduMDAI as a new pedagogy that can be integrated into the national context. Its emphasis on ethical digital education, teacher training, curriculum reform, and AI-driven approaches underscores its potential to drive pedagogical innovation. In particular, trainee teachers must be equipped not only with technical competencies but also with sensitivity to ethical and moral values in digital contexts.

2.2 Ethical Digital Pedagogy and Digital Citizenship

The development of technological literacy in the digital education era has shifted significantly. It is no longer sufficient to merely teach technical skills; it must also involve integrity, responsibility, and critical thinking—qualities essential for becoming effective digital citizens. From a pedagogical theory perspective, Tan *et al.,* [22] propose a framework for digital pedagogy that treats technology not only as a tool but also as a driver of transformative learning grounded in ethical and critical principles. Their study also envisions teachers as agents of change who create teaching contexts that foster reflective and inclusive digital literacy. As the world evolves rapidly, teachers' roles continue to shift in response to contemporary educational challenges [22]. Hendayana *et al.,* [23] emphasize that integrating digital literacy with ethics equips technology users with the ability to understand,

manage, and apply technology wisely, responsibly, and ethically. This includes the ability to search, evaluate, and disseminate accurate information while upholding integrity, honesty, and awareness of the social impact of digital actions. By merging digital literacy with ethics, users also become more mindful of privacy protection, respect for intellectual property, the avoidance of misinformation, and the promotion of positive and constructive digital interactions [23].

Recent studies also highlight ethical dilemmas in digital education. For example, Huang *et al.,* [24] examined how university students confront issues of academic integrity in online learning contexts. Findings revealed that students' ethical reasoning strongly influences dishonest behaviours such as plagiarism and digital cheating, thereby underscoring the need for education that prioritizes moral awareness in technology use [24]. This demonstrates how EduMDAI, as a digital pedagogy platform, must not only build technological proficiency but also cultivate moral values, critical literacy, and digital responsibility among students. Global educational policies and practices, such as those advocated by UNESCO, further reinforce the importance of embedding ethical values in digital pedagogy. EduMDAI thus becomes highly relevant in preparing students to become ethical and responsible digital citizens.

2.3 Technology Acceptance among Trainee Teachers

The effective integration of technology in pre-service teacher education depends on trainee teachers' acceptance of and attitudes toward innovative applications in TnL. Two theoretical frameworks are widely applied in analysing factors influencing technology acceptance: the Unified Theory of Acceptance and Use of Technology (UTAUT) and Technological Pedagogical Content Knowledge (TPACK). A study by Lai Wah and Harwati [25], based on the UTAUT model, investigated factors influencing Malaysian ESL trainee teachers' intention to integrate technology in classrooms. Their structural equation modelling (SEM) analysis revealed that TPACK significantly impacts technology adoption, indicating that trainee teachers are more inclined to accept technology when they possess balanced mastery of technological, pedagogical, and content knowledge [25]. This indicates that technology acceptance depends not merely on availability but on the ability to integrate it effectively into pedagogy. Ye *et al.,* [26] further emphasize that TPACK development is a prerequisite for supporting 21st-century pedagogical skills among trainee teachers. Their systematic review of English trainee teacher education found that structured instructional models such as ADDIE, combined with digital tools and AI, strengthen TPACK mastery, thereby enhancing teaching competence and sustainable pedagogical practices [26]. They also assert that trainee teachers' TPACK proficiency is key to ensuring that technology is not only utilized but also meaningfully integrated into pedagogical strategies. For in-service teachers, Ismail *et al.,* [27] found that mobile technology acceptance is influenced by effort expectancy, hedonic motivation, and habit. Their study demonstrates that early acceptance of digital pedagogy among trainee teachers is vital, as it fosters long-term positive habits throughout their teaching careers [27]. Hence, the early adoption of EduMDAI during pre-service training has the potential to produce educators who are not only technologically literate but also consistent in applying digital-ethics-based TnL strategies.

2.4 Ethical Dimensions, Digital Competence, and Generative AI in Teacher Training

The emergence of generative AI, such as ChatGPT, has accelerated the need for digital literacy that extends beyond technical proficiency to include ethical considerations. UNESCO [28] emphasizes the importance of providing educators with clear guidance on data protection, transparency, and fairness in AI use. Dolezal *et al.,* [29] highlight that some trainee teachers still face challenges related

to technological self-efficacy, AI-related anxieties, and insufficient comprehensive digital literacy. Meanwhile, Refi Elfira Yuliani and Heru [30] demonstrated that implementing TPACK through a Technological Integration Self-Efficacy (TISE) approach increased trainee mathematics teachers' confidence in integrating technology into TnL. Bautista *et al.,* [31] also stress that trainee teachers' readiness to integrate AI in education depends heavily on their level of TPACK mastery. Collectively, these findings underscore the need for new pedagogies such as EduMDAI to incorporate ethics, AI literacy, and digital competence to ensure trainee teachers are well-prepared for the challenges of future digital education.

2.5 Literature Gap and Study Justification

Overall, existing literature confirms that trainee teachers' acceptance of technology is strongly influenced by pedagogical factors, technological competencies, and ethical readiness. However, there remains a shortage of empirical studies in the Malaysian context that specifically examine trainee teachers' acceptance of digital pedagogy platforms that emphasize ethics and moral values, such as EduMDAI. Therefore, this study seeks to address this gap by evaluating trainee teachers' acceptance of EduMDAI as a progressive pedagogical platform for advancing ethical digital education.

3. Methodology

3.1 Methods

This study employed a pilot study design with a quantitative survey approach. The research aimed to evaluate trainee teachers' acceptance of the EduMDAI platform, which was introduced as part of the TnL process in the GAPD1032 Digital Learning Basics course. The survey method was selected as it is well-suited for collecting exploratory data on the initial effectiveness and integration potential of EduMDAI within the context of ethical digital education.

3.2 Location, Sampling, and Study Respondents

The study was conducted at the Malaysian Institute of Teacher Education, Sarawak Campus (MITE, Sarawak Campus), involving trainee teachers enrolled in the GAPD1032 Digital Learning Basics course. This location was selected because IPGKS plays a crucial role in preparing future educators who will be serve as key implementers of Malaysia's digital education policy. The GAPD1032 course introduces trainee teachers to foundational digital literacy concepts. Purposive sampling was used to select respondents, specifically those who had completed the course and were exposed to the EduMDAI platform. A total of 24 trainee teachers participated in this study. While the sample size is relatively small, it is considered sufficient for a pilot study, which primarily seeks to test preliminary understanding, instrument reliability, and initial acceptance before a larger-scale study is conducted.

3.3 Research Instruments

The research instrument was a structured questionnaire based on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The questionnaire comprised four main sections: (i) Respondents' demographic information, (ii) Acceptance of EduMDAI usage, (iii) Acceptance of EduMDAI in supporting ethical digital education, and (iv) Acceptance of EduMDAI's potential to enhance digital pedagogical skills.

3.4 Validity and Reliability of Research Instruments

Reliability testing of the instrument revealed a Cronbach's Alpha value of 0.952, while the Cronbach's Alpha based on standardized items was 0.954. Both values exceed 0.9, indicating very high internal consistency [36,37]. A total of 19 items were analysed. According to Hair *et al.,* [38], a Cronbach's Alpha above 0.70 is acceptable, while values above 0.90 signify excellent reliability. These findings confirm that the instrument's items consistently measure the same constructs. Practically, the instrument was found to be stable and suitable for actual research without requiring major modifications. The Cronbach's Alpha index for each aspect studied is shown in Table 1.

Table 1
Reliability statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.952	0.954	19

3.5 Data Analysis

Survey data were analysed using IBM SPSS Statistics version 21. Descriptive statistical analyses were conducted, including mean, standard deviation, and percentage for each item, to represent the level of trainee teachers' acceptance. Mean scores were interpreted based on the scale proposed by Jamain *et al.,* [32], which is presented in Table 2. All mean and standard deviation values were rounded to two decimal places.

Table 2
Interpretation of mean scores

Mean Score	Score Interpretation
1.00 – 2.33	Low
2.34 – 3.66	Moderate
3.67 – 5.00	High

4. Results

4.1 Trainee Teachers' Acceptance

This section discusses and presents the findings obtained after the data were collected and analysed. The discussion of the results examines trainee teachers' acceptance of EduMDAI as a progressive pedagogy platform towards ethical digital education, involving three aspects: (i) the level of acceptance of EduMDAI usage, (ii) the level of acceptance of EduMDAI usage in supporting ethical digital education, and (iii) the level of acceptance of EduMDAI's potential in enhancing digital pedagogical skills.

4.1.1 Acceptance of EduMDAI usage

Findings on the acceptance of EduMDAI usage show an overall mean score of 4.86 with a standard deviation of 0.28, which is at a high level. Based on the analysis presented in Table 3, trainee teachers demonstrated very positive acceptance of progressive pedagogy, digital technology, and AI technology applied in the EduMDAI platform. A detailed analysis by item indicates that trainee teachers strongly agreed (mean = 4.91) that the platform features support enjoyable and meaningful

learning. They also felt very prepared (mean = 4.90) to face future forms of digital learning. Although there was slight variation in views regarding critical analysis ability (mean = 4.86), the low standard deviation (0.28) confirms that respondents' opinions were highly consistent. The findings in Table 3 show that EduMDAI successfully provided an environment that is not only innovative but also relevant and well received by the target users.

Table 3
Level of acceptance of EduMDAI usage

Item No.	Item Statement	Mean	Standard Deviation	Mean Level
1	I can learn according to my level of understanding and needs through components such as the student management system, critical thinking via formative activities, digital technology, and AI technology in the EduMDAI platform.	4.90	0.30	High
2	The features and components of the EduMDAI platform support more enjoyable and meaningful learning for me.	4.91	0.29	High
3	The EduMDAI platform helps me learn independently and build motivation to continue learning.	4.86	0.35	High
4	The functions of digital technology and AI technology in the EduMDAI platform are suitable for my needs in preparation for future learning as outlined in the 2027 School Curriculum.	4.89	0.31	High
5	I feel more prepared to face the expanded forms of future digital learning through the use of the EduMDAI platform.	4.90	0.30	High
6	The use of the EduMDAI platform supports meaningful learning, and I can apply it to problem-solving during learning activities and assignments.	4.88	0.32	High
7	During formative activities, I can critically analyse the relationship between ideas and explanations, even with the use of AI and digital technology as learning support tools through the EduMDAI platform.	4.86	0.35	High
8	I feel more confident sharing ideas in group discussions and presentations because of the availability of learning resource support tools through AI technology, which is one of the components of the EduMDAI platform.	4.86	0.35	High
9	The integration of existing applications in EduMDAI (e.g., LMS Canvas, Canva, ChatGPT) provides a better and more effective learning experience.	4.86	0.35	High
	Mean Average	4.86	0.28	**High**

4.1.2 Acceptance of EduMDAI usage in supporting ethical digital education

The analysis in Table 4 shows an overall mean score of 4.90 and a standard deviation of 0.23, also at a high level. The high mean values indicate that trainee teachers strongly agreed that EduMDAI features effectively support ethical digital TnL. The most notable finding in this section is the very strong agreement (mean = 4.92) that the platform enhances digital and ethical literacy, and encourages positive ethical practices. The lowest standard deviation across the entire study (0.23) underscores the remarkable uniformity of views among respondents. This proves that the ethical aspects integrated into the platform are not only understood but also appreciated by trainee teachers as an essential element in preparing them as responsible digital educators.

Table 4
Level of acceptance of EduMDAI usage in supporting ethical digital education

Item No.	Item Statement	Mean	Standard Deviation	Mean Level
1	The EduMDAI platform provides a safe space for digital and ethical teaching and learning.	4.88	0.32	High
2	The learning content in the EduMDAI platform encourages ethical use of technology.	4.86	0.35	High
3	The EduMDAI platform enhances my competencies in digital and ethical literacy.	4.92	0.28	High
4	The EduMDAI platform helps me understand principles and ethical practices associated with the use of digital technology.	4.91	0.29	High
5	The EduMDAI platform encourages me to consistently practice positive digital ethics.	4.92	0.28	High
	Mean Average	4.90	0.23	**High**

4.1.3 Acceptance of EduMDAI's potential to enhance digital pedagogical skills

As shown in Table 5, the analysis recorded the highest overall mean score in this study, 4.91, with the lowest standard deviation of 0.21. This indicates a high level and the most uniform readiness among trainee teachers. They were very confident (mean = 4.92) in using EduMDAI as a digital TnL tool and viewed the experience as highly valuable. They also felt very prepared to integrate digital and AI technologies into their teaching (mean = 4.91). These results clearly show that the EduMDAI platform not only gained acceptance but also built confidence and readiness among trainee teachers to face future digital education challenges. The findings indicate that the platform is an effective tool in shaping skilled and ethical teachers in the digital era.

Table 5
Level of acceptance of EduMDAI's potential to enhance digital pedagogical skills

Item No.	Item Statement	Mean	Standard Deviation	Mean Level
1	I feel confident in using the EduMDAI platform as a digital teaching and learning tool.	4.92	0.28	High
2	I am ready to integrate digital technology and AI into my teaching.	4.91	0.29	High
3	I am able to adapt to and learn to use new technologies for professional purposes.	4.89	0.31	High
4	The use of the EduMDAI platform provides valuable experience in mastering digital technology for future teaching and learning.	4.92	0.28	High
5	The EduMDAI platform is important for shaping skilled and ethical teachers in the digital world.	4.92	0.28	High
	Mean Average	4.91	0.21	**High**

4.1.4 Overall analysis of questionnaire findings by item

This section presents the overall analysis of mean scores and standard deviations (SD) for each item. The findings indicate very positive and consistent acceptance of the EduMDAI platform, with all items recording high mean levels. The study also shows that nearly all questionnaire items achieved very high mean scores, ranging between 4.86 and 4.92. These outstanding scores reflect extremely positive acceptance and perception of the EduMDAI platform among trainee teachers. Specifically, the items with the highest mean (4.92) were item 12 ("The EduMDAI platform enhances my digital and ethical literacy"), item 14 ("The EduMDAI platform encourages me to consistently practice positive digital ethics"), item 15 ("I feel confident using the EduMDAI platform as a digital teaching and learning tool"), item 18 ("The use of the EduMDAI platform provides valuable experience in mastering digital technology for future teaching and learning"), and item 19 ("The EduMDAI platform is important for shaping skilled and ethical teachers in the digital world"). Collectively, these findings prove that EduMDAI is not only regarded as an innovative pedagogy but also as a vital component in building confidence and digital ethical skills among trainee teachers. The low standard deviations for all items (0.21 – 0.35) further reinforce these findings, showing highly uniform and consistent views among respondents. No item recorded a mean below 4.86, indicating no significant negative aspects identified by respondents. Overall, this study confirms the success of EduMDAI in achieving its aim as a progressive pedagogical platform towards ethical digital education.

Table 6
Overall analysis of questionnaire findings by item

Item No.	Item Statement	Mean	Standard Deviation	Mean Level
1	I can learn according to my level of understanding and needs through components of the EduMDAI platform, such as student management system, critical thinking via formative activities, digital technology, and AI technology in the EduMDAI platform.	4.90	0.30	High
2	The features and components of the EduMDAI platform support more enjoyable and meaningful learning for me.	4.91	0.29	High
3	The EduMDAI platform helps me learn independently and build motivation to continue learning.	4.86	0.35	High
4	The functions of digital technology and AI technology in the EduMDAI platform are suitable for my needs in preparation for future learning as outlined in the 2027 School Curriculum.	4.89	0.31	High
5	I feel more prepared to face the expanded forms of future digital learning through the use of the EduMDAI platform.	4.90	0.30	High
6	The use of the EduMDAI platform supports meaningful learning and I can apply it to problem-solving during learning activities and assignments.	4.88	0.32	High
7	During formative activities, I can critically analyse the relationship between ideas and explanations, even with the use of AI and digital technology as learning support tools through the EduMDAI platform.	4.86	0.35	High
8	I feel more confident sharing ideas in group discussions and presentations because of the availability of learning resource support tools through AI technology, which is one of the components of the EduMDAI platform.	4.86	0.35	High
9	The integration of existing applications in EduMDAI (e.g., LMS Canvas, Canva, ChatGPT) provides a better and more effective learning experience.	4.86	0.35	High
10	The EduMDAI platform provides a safe space for digital and ethical teaching and learning.	4.88	0.32	High
11	The learning content in the EduMDAI platform promotes the ethical use of technology.	4.86	0.35	High
12	The EduMDAI platform enhances my competencies in digital and ethical literacy.	4.92	0.28	High
13	The EduMDAI platform helps me understand principles and ethical practices associated with the use of digital technology.	4.91	0.29	High

14	The EduMDAI platform encourages me to consistently practice positive digital ethics.	4.92	0.28	High
15	I feel confident in using the EduMDAI platform as a digital teaching and learning tool.	4.92	0.28	High
16	I am ready to integrate digital technology and AI into my teaching.	4.91	0.29	High
17	I am able to adapt to and learn to use new technologies for professional purposes.	4.89	0.31	High
18	The use of the EduMDAI platform provides valuable experience in mastering digital technology for future teaching and learning.	4.92	0.28	High
19	The EduMDAI platform is important for shaping skilled and ethical teachers in the digital world.	4.92	0.28	High

4.1.5 Overall analysis summary

According to the analysis summarized in Table 7, the collective mean score for all items is 4.89, while the standard deviation is 0.25. The mean level is high according to the set indicators. This very high mean value indicates that overall, trainee teachers have shown very positive and consistent acceptance of the EduMDAI platform. The score reflects the platform's success across various aspects, from progressive pedagogy and digital ethics to trainee teachers' readiness to apply technology. The very low standard deviation (0.25) demonstrates that there was strong uniformity of opinions among respondents. This means there were no significant differences in views, and the majority of trainee teachers agreed that EduMDAI is an effective and relevant progressive pedagogy platform for ethical digital education.

Table 7
Overall analysis summary

Statement	Overall Mean	Overall Standard Deviation	Mean Level
Trainee Teachers' Acceptance	4.89	0.25	High

5. Limitations of the Study

5.1 Scope Limitations

This study focused on trainee teachers' acceptance of the introduced innovation in the context of ethical digital education. The scope of the study emphasized only aspects of acceptance, understanding, and the potential use of the innovation among trainee teachers, without involving in-service teachers or education administrators. Therefore, the findings cannot be generalized to the entire population of educators in Malaysia.

5.2 Scope Limitations

The study was conducted only at MITE, Sarawak Campus. This location was chosen due to time, cost, and accessibility to respondents. Thus, the findings only reflect the situation at MITE, Sarawak campus and may differ if the study were extended to other campuses or different educational institutions.

5.3 Scope Limitations

The study population consisted solely of trainee teachers at the MITE, Sarawak Campus, with a total of 24 respondents. This small number of respondents does not represent the entire population of trainee teachers in Malaysia. Furthermore, the respondents' backgrounds, experiences, and fields of specialization may also influence their views on the innovation studied.

5.4 Scope Limitations

The data for this study were entirely obtained from questionnaires distributed to 24 trainee teachers at the MITE, Sarawak Campus. Therefore, the quality of the findings depends heavily on the honesty, clarity, and willingness of respondents to provide accurate feedback. There is a possibility of response bias such as social desirability bias, where respondents may answer based on what they perceive to be more socially acceptable rather than on their actual experiences. In addition, the small sample size and the involvement of only one institution limit data variation and reduce representativeness of the overall population of trainee teachers in Malaysia. Moreover, the data collected were purely descriptive quantitative and not supported by qualitative data such as interviews or observations. This means that the interpretation of findings relies solely on respondents' perceptions without providing a comprehensive picture of their actual experiences. Therefore, although the findings of this study provide an initial indication of trainee teachers' acceptance of the innovation studied, they should be interpreted with caution as they may be influenced by instrument limitations, environmental factors, and individual respondent characteristics.

6. Conclusions

Overall, this study provides early evidence that trainee teachers at the MITE, Sarawak Campus have shown positive acceptance of EduMDAI, an ethical digital pedagogy, indicating the potential for a more responsible and value-driven pedagogical transformation in teacher education. This finding aligns with the direction of Malaysia's Digital Education Policy, which emphasizes the development of digital competencies for educators and learners, as well as the importance of structured initiatives to realize such transformations[5]. Nevertheless, methodological limitations—particularly the small sample size (n = 24) and the study being limited to only one teacher education campus (MITE, Sarawak Campus)—restrict the generalizability of the findings to the wider population. Thus, the results should be interpreted as preliminary indications of acceptance, rather than conclusive evidence of the effectiveness or long-term impact of this ethical digital pedagogical innovation. Previous studies on technology acceptance among educators have also shown that factors such as perceived usefulness, ease of use, training, and infrastructure support significantly influence the intention to use pedagogical technologies, thereby highlighting the need for more holistic research [33]. From an ethical perspective, international literature underscores the need to integrate ethical competencies and AI literacy in teacher training to ensure responsible and human-centered use of technology. This reinforces the view that beyond technical acceptance, ethical aspects must be explicitly embedded in curriculum design and training interventions. Therefore, further studies with larger samples, covering multiple teacher education campuses or other educational institutions, are essential for obtaining a more comprehensive picture. Future research is also encouraged to combine qualitative methods such as interviews and observations to complement quantitative findings and provide deeper analysis in exploring actual experiences, usage contexts, and long-term impacts on

teaching practices and learning outcomes. In line with both international [35] and national digital education strategies, policymakers and curriculum developers need to collaborate to provide training frameworks, infrastructure support, and clear ethical guidelines to support the application of this ethical digital pedagogy in Malaysia's education system. In conclusion, despite its limitations, this study contributes significantly to understanding how trainee teachers perceive and respond to ethical digital pedagogical innovations. The findings highlight substantial potential and the need for policy, training, and institutional support to ensure that ethical digital education is not only accepted but also sustainably and ethically practiced.

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