



Experiencing acculturative continuous professional development: A phenomenological inquiry into madrasa teachers' integration of digital learning and indigenous knowledge of Malay culture

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Abstract

This study aims to formulate a continuous professional development [CPD] model for madrasah teachers through the integration of digital-based learning and indigenous knowledge of Malay culture in teaching professions. The need for an acculturative CPD model arises from two main demands: improving teachers' digital literacy in the era of education 4.0 and the importance of preserving cultural values such as *adab* (good manners), *budi* (good manners), *pantun* (rhymes), *syair* (poetry), *musyawarah* (deliberation), and the monotheistic outlook on life. This study uses a phenomenological approach with in-depth interviews with madrasah teachers to explore the needs, practices of digital learning, and the relevance of local wisdom in madrasah pedagogy. The research findings indicate that madrasah teachers require practical, hands-on digital training, including mastery of Learning Management Systems, digital content production, and the use of interactive learning media. Furthermore, Malay cultural values have been shown to be strongly relevant in developing teacher professionalism, particularly in the areas of etiquette, politeness, and moral reflection. The integration of digital and indigenous knowledge can be realized through culture-based digital learning modules, contextual videos, digital *pantun* applications, and community-based collaborative training. This research resulted in the design of an acculturative CPD model that combines technical training, strengthening cultural values, digital community mentoring, and reflective evaluation. The implications of this research indicate that acculturative CPD has the potential to improve pedagogical quality, strengthen madrasah cultural identity, and encourage learning innovation relevant to the local context. However, the success of this model requires policy support, digital infrastructure, and collaboration between madrasahs, traditional institutions, and the government. This study recommends large-scale piloting of the model and the development of further research using a mixed approach.

Keywords: Continuous professional development; Digital-based learning; Indigenous knowledge of Malay culture; Madrasa teachers; Teaching profession

1. Introduction

The development of science and technology in the Industrial Revolution 4.0 era has had a significant impact on various aspects of life, including education (Anwar et al., 2024; Ramandanis & Xinogalos, 2023). The Islamic education system, particularly in madrasah institutions, is required to adapt to these dynamics to remain relevant and effective in developing an intelligent, moral, and competitive generation (Caffaratti et al., 2025; Moustaghfir & Brigui, 2024). Teachers, as key actors in the learning process, play a strategic role in ensuring the quality of education is maintained (Mujallid, 2024). Therefore, CPD is an urgent need to strengthen the pedagogical, professional, social, and personal competencies of madrasah teachers.

Amidst today's digital advancements, the integration of digital-based learning is one approach that can enrich the professional development process for teachers (Aydemir Altaş & Babacan, 2025; Criollo-C et al., 2023). Educational technology provides a space for teachers to access global learning resources, collaborate virtually (Sulaiman & Ismail, 2020), innovate in learning, and develop data-driven teaching practices (Jepkemoi et al., 2024; Lin et al., 2022). However, the main challenge in the madrasah context is how to integrate these digital innovations with the Islamic identity and local wisdom that have long characterized madrasah education (Tambak et al., 2021). In the context of the Indonesian archipelago, particularly in the Malay region (Julhadi et al., 2023), Indigenous Knowledge of Malay Culture (Gandasari et al., 2024), or traditional knowledge of Malay culture, is a heritage rich in spiritual, social, and moral values (Juliana, 2020). Values such as etiquette, politeness, mutual cooperation, and a monotheistic outlook on life form a crucial foundation for shaping students' character. Preserving these values through the educational

process is increasingly crucial amidst the rapid flow of globalization and digitalization, which have the potential to erode local cultural identities. Therefore, an approach to the professional development of madrasah teachers is needed that not only adopts digital technology but also empowers local knowledge as a rich pedagogical resource.

This research seeks to explore how sustainable professional development for madrasah teachers can be designed by integrating digital-based learning while simultaneously preserving and revitalizing local Malay cultural wisdom (Scott et al., 2023; Singh & Mukeredzi, 2024). This integrative approach is expected to produce a teacher development model that is not only adaptive to technological advances but also aligned with the cultural and spiritual values that underpin Islamic education in the Malay region. Thus, madrasahs can function as modern educational institutions while remaining firmly rooted in tradition. Studies on CPD for madrasa teachers continue to experience significant developments in line with the changing global education landscape (Singh & Mukeredzi, 2024). In general, previous research indicates that CPD is a strategic tool for improving teacher quality through training, practical reflection, collaboration, and independent learning (Mokhets'engoane et al., 2024). However, the dynamics of the digital era and the need to preserve local culture demand a more adaptive, contextual, and responsive CPD model (Friedman, 2023; Nkundabakura et al., 2024).

Research in the madrasah context shows that CPD often focuses on strengthening pedagogical competencies and increasing religious knowledge (Faizuddin et al., 2022). Several studies indicate that: CPD programs in madrasahs are still top-down, lack flexibility, and are not always relevant to field needs (Friedman, 2023). Madrasah teachers need a more collaborative, reflective, and practice-based development model (Rasyidi et al., 2025). The spiritual dimension and Islamic values remain the foundation of CPD, but their integration with the challenges of the digital era is not yet optimal (Firdaus et al., 2025; Tambak et al., 2022). Thus, recent research indicates the need to design CPD that aligns with the ecological characteristics of madrasahs as religious and culturally based educational institutions.

With the acceleration of globalization and artificial intelligence, digital literacy has become a mandatory competency for teachers. Recent studies highlight the role of technology as a facilitator of online learning, micro-learning, virtual learning communities, and data-driven reflective practice (Lai et al., 2023; Méndez et al., 2022). Teachers' perceptions of technology are heavily influenced by infrastructure readiness, digital competency, and institutional support. Although technology opens up opportunities for pedagogical innovation, many madrasah teachers face a digital divide and limited best practices in implementing digital learning (Hamzah et al., 2024). However, these studies have not yet integrated digital aspects with the local cultural perspectives inherent in madrasahs, especially those located in regions with strong cultural identities such as the Malay region.

Studies on indigenous knowledge of Malay culture confirm that Malay culture possesses a unique value system, cosmology, ethics, aesthetics, and educational practices (Juliana, 2020; Tambak & Sukenti, 2020a). Previous research has shown that the values of *adab* (civility), politeness, deliberation (*musyawarah*), mutual cooperation (*gotong royong*), and the monotheistic worldview are at the core of Malay educational identity (Julhadi et al., 2023; Nofriyandi et al., 2023). Indigenous knowledge can enrich pedagogy by presenting a local context close to students' lives (Nofriyandi et al., 2023; Tambak & Sukenti, 2020a). However, the integration of Malay cultural values into the curriculum and learning practices is often partial and unsystematic (Putra et al., 2024; Suradi, 2022). Meanwhile, studies combining Malay cultural values with teacher professional development are still very limited, particularly in madrasahs (Islamic schools), which serve as hubs of Islamic education and local culture (Afandi et al., 2023; Tambak et al., 2026; Tambak & Sukenti, 2020b).

From the synthesis of these research developments, several gaps remain to be identified that remain largely unexplored there is no existing CPD model for madrasah teachers that simultaneously integrates digital-based learning with indigenous knowledge Malay cultural (Ajani, 2023; Dariyanto et al., 2020; Tannehill et al., 2021). Research still tends to separate digital

innovation from cultural preservation, even though the two can complement each other. A contextual CPD approach is needed that accommodates Islamic spirituality, Malay cultural identity, and the demands of digital-era competencies (Acuña et al., 2024; Isa et al., 2020; Singh & Mukeredzi, 2024). There is a lack of empirical studies that explore madrasah teachers' experiences in adopting technology while simultaneously upholding local values in their teaching practices.

This research contributes to fill the research gap by offering a holistic CPD approach, formulate an acculturative teacher development model. Combining digital competency with the strengthening of Malay spiritual, social, and cultural values, enrich the madrasah CPD literature with an integrative, transformative, and locally-based perspective (local wisdom-based professional development) (Mokhets'engoane et al., 2024). Scott et al. (2023) provide an applicable framework for teacher development that is both culturally grounded and pedagogically modern. Thus, this research has both academic and practical urgency to strengthen the position of madrasahs as modern, relevant Islamic educational institutions that remain firmly rooted in Malay cultural heritage.

This research focuses on designing and analyzing a model for continuing professional development for madrasah teachers that integrates digital competency with the utilization of local Malay cultural wisdom. More specifically, the focus of this research includes: (1) Analyzing the professional development needs of madrasah teachers in facing the demands of digital-based learning while maintaining Malay cultural values. (2) Identifying relevant and effective forms, patterns, and practices of digital learning for implementation in madrasah teacher professional development. (3) Exploring and mapping Indigenous Knowledge of Malay Culture that has direct relevance to pedagogical practices and teacher professionalism. (4) Integrating digital-based learning with Malay cultural values within the framework of continuing professional development for madrasah teachers. (5) Formulating an acculturative CPD model or conceptual design, namely combining digital competency and local Malay cultural wisdom in a harmonious and applicable manner. (6) Analyzing the challenges, opportunities, and implications of implementing this CPD model for improving teacher quality and learning in madrasahs.

2. Method

2.1. Research Design

The type of study used in research is a qualitative study with phenomenological approach (Lundh, 2020). A phenomenology approach was chosen because the focus of this research is to explore a deeper understanding of complex phenomena, such as digital-based learning and indigenous knowledge of Malay culture can influence their CPD (Groenewald, 2004; Patton, 2002). This research aims to understand teachers' perceptions, experiences and attitudes related to the CPD they carry out as well as the factors that influence their CPD in teaching. Through this approach, it is hoped that researchers can reveal deeper and more nuanced themes related to CPD.

2.2. Participant

The participant of this research were aliyah madrasah (senior high school) teachers in Pekanbaru. Data was obtained through in-depth interviews (Braun & Clarke, 2019) with 22 madrasah teachers in Madrasah Aliyah (senior high school) at Pekanbaru, Indonesia, to gather information about as digital-based learning and indigenous knowledge of Malay culture can influence their CPD. The research respondents consisted of 22 teachers, consisting of; 12 woman and 10 man; their ages were between 31-57 years; their teaching experience was between 9-25 years; and all informants had professional teacher certification.

2.3. Data Collection Technique

In research on the CPD of madrasah teachers which involves digital-based learning and indigenous knowledge of Malay culture in learning, the data collection techniques used were in-depth interviews (Braun & Clarke, 2019). In-depth interviews were conducted with teachers to gain a deeper understanding of the factors that influence CPD. This interview is designed to explore the

perceptions, experiences and challenges faced by teachers in creating CPD and how their involves digital-based learning and indiginous knowledge of Malay culture play a role in this process. These interviews are semi-structured, allowing for flexibility in exploring relevant topics during the conversation.

This interview provides direct insight into the factors that influence as digital-based learning and indiginous knowledge of Malay culture can influence their CPD in teaching, as well as how madrasa teachers assess the CPD applied. Apart from interviews, secondary data was also used which included school documents, as digital-based learning and indiginous knowledge of Malay culture can influence their CPD, and notes about the development of creativity in learning taken from classroom observations. This data will be used to support analysis and provide a more comprehensive picture of the dynamics in the classroom. The main data sources in research on the CPD of madrasa teachers which involve digital-based learning and indiginous knowledge of Malay culture in learning come from teachers. Madrasa teachers are the main data source because they are the direct subjects who carry out the learning process and are responsible for the CPD in teaching profesion. Interviews with madrasa teachers will explore information about their perceptions of CPD in teaching, the challenges they face in increasing CPD, as well as factors that influence their digital-based learning and indiginous knowledge of Malay culture in teaching.

The data collection instruments in this study were primarily developed through a phenomenological qualitative framework that aimed to explore madrasah teachers' lived experiences regarding CPD, digital-based learning, and the integration of Indigenous Knowledge of Malay Culture within teaching practices. The researchers designed the instruments based on three main stages: (1) an extensive review of previous literature on CPD, digital pedagogy, culturally responsive teaching, and Malay indigenous values; (2) alignment with the research objectives and phenomenological approach; and (3) expert validation and contextual adaptation to the madrasah environment in the Malay cultural region of Pekanbaru, Indonesia.

The primary data collection tool was a semi-structured in-depth interview guide. The semi-structured format was intentionally selected because it allowed flexibility for participants to narrate their experiences, perceptions, and reflections in depth while still maintaining consistency across interviews. The interview protocol was constructed around several thematic dimensions derived from the research focus, namely: (a) teachers' digital professional development needs; (b) forms and practices of digital learning; (c) indigenous Malay cultural knowledge relevant to pedagogy; (d) integration between technology and Malay cultural values; (e) the conceptualization of an acculturative CPD model; and (f) challenges and opportunities in implementation. The development of interview items also followed phenomenological interviewing principles, particularly emphasizing open-ended and experience-oriented questions. Rather than asking participants to simply provide opinions, the questions encouraged them to describe concrete experiences, classroom practices, professional challenges, cultural reflections, and personal interpretations related to digital learning and Malay cultural integration. To improve trustworthiness, the interview guide was reviewed by experts in Islamic education, qualitative research, and Malay cultural studies before field implementation. Pilot interviews were also conducted with several teachers to refine wording clarity, contextual relevance, and question flow. Examples of interview questions/items used in this study include: (1) "What kinds of digital competencies do you currently need most in your teaching practice?" (2) "Can you describe challenges you experience when implementing digital learning in madrasah classrooms?" (3) "What forms of digital learning or professional training have you participated in?" (4) "What elements of Malay culture do you consider important to integrate into teaching?" (5) "How can digital technology be used to preserve and strengthen Malay cultural values?" (6) "What characteristics should an ideal CPD model for madrasah teachers include?" (7) "What barriers hinder the implementation of digital-cultural CPD in madrasahs?" In addition to interviews, the researchers also utilized secondary data sources such as school documents, training records, classroom observation notes, and evidence of digital learning implementation to strengthen triangulation and contextual interpretation of findings.

2.4. Data Analysis

The process and stages of data analysis in research on the CPD of madrasa teachers which involves digital-based learning and indigenous knowledge of Malay culture begins with the data transcription stage (Braun & Clarke, 2019; Lundh, 2020). After data is collected through in-depth interviews, the *first step* is to transcribe all interviews and record the results to ensure that the information obtained can be analyzed systematically. This transcription is then checked to ensure the accuracy and completeness of the data that has been collected. *Second step*, the written data is organized and separated based on categories that are relevant to the research focus, such as CPD, involves digital-based learning and indigenous knowledge of Malay culture.

The *third stage* is thematic analysis (Braun & Clarke, 2019; Lundh, 2020), where the researcher identifies patterns or themes that emerge from the data. This process involved a thorough reading of interview transcripts notes, then categorizing the information based on topics relevant to the research questions. The main themes discovered, such as factors that support or hinder CPD, the impact of involves digital-based learning and indigenous knowledge of Malay culture on CPD, and how classroom dynamics contribute to the application of CPD, were further explored. After that, the researcher interpreted the findings by linking them to relevant theories and comparing them with previous research. This analysis was carried out iteratively, with revisions and testing of findings based on available data, to ensure that the analysis results were valid and comprehensive.

3. Results

The findings of this study reveal several interconnected subthemes related to the development of an acculturative CPD model for madrasah teachers in the digital era. *First*, the study identifies the urgent need for teacher professional development in mastering digital learning technologies while simultaneously preserving Malay cultural values and Islamic identity. *Second*, the research highlights relevant forms and practices of digital learning, including microlearning, blended learning, asynchronous modules, online mentoring, and collaborative teacher communities that support sustainable professional growth. *Third*, the study maps indigenous Malay cultural knowledge relevant to pedagogy and teacher professionalism, particularly values of *adab*, politeness, *musyawarah*, *pantun*, *syair*, and *budi* as contextual educational resources. *Fourth*, the findings emphasize the integration of digital learning with Malay cultural values through culturally based digital modules, storytelling videos, interactive media, and culturally contextualized learning content. *Fifth*, the study formulates the concept of an acculturative CPD model that combines modern pedagogy, Islamic values, digital competencies, and local cultural wisdom within a sustainable professional learning framework. *Finally*, the research identifies several challenges and opportunities in implementing the CPD model, including infrastructure limitations, variations in teachers' digital literacy, resistance to change, community cultural support, and the growing potential for collaboration among madrasahs, universities, and Malay cultural institutions.

3.1. The Need for Professional Development of Madrasah Teachers in Facing Digital Learning and Preserving Malay Cultural Values

Interviews with madrasah teachers, principals, and supervisors indicate that teachers' primary needs currently focus on mastering digital technologies relevant to the learning process. Teachers revealed that they require: technical training on the use of Learning Management Systems [LMS], interactive learning media, and digital literacy applications (P1-F); ongoing mentoring regarding the development of Islamic digital content appropriate to the local Malay context (P4-F); flexible, practical training models that can be directly implemented in the classroom (P9-F). Several madrasa teachers also emphasized that digital integration should not diminish the madrasah's identity and Malay culture (P3-F, P5-F, P6-F). They expressed the need for specific guidance on how values of *adab* (*adab*), politeness, and traditional wisdom can remain the spirit of digital learning (P6-F, P7-F).

Madrasa teachers explained that the need for professional development for madrasa teachers in

the digital era is increasingly pressing due to changes in student learning patterns, as students now “absorb information more quickly from digital media than from textbooks.” One teacher emphasized, “We as teachers are sometimes left behind. Children today are very familiar with gadgets, while many teachers lack adequate digital skills. Training is no longer an option, but a necessity” (P1-F).

However, one madrasa teacher cautioned that digitalization should not erode local cultural roots, particularly the strong Malay culture in the region: “Technology should not make children forget pantun, polite customs, or refined Malay language. In teaching religion, Malay culture is an important moral complement” (P3-F).

Another madrasa teacher emphasized the importance of Malay values in the context of Islamic education, especially because many of these values align with moral teachings. The teacher stated, “Malay culture is actually very Islamic – respect for elders, gentle language, and civilized customs. If packaged in digital videos, I think students will be more interested” (P9-F).

However, another madrasa teacher lamented the lack of technical guidance: “I want to make a Malay-themed Islamic preaching video, but I don't know how to edit videos. We really need training like that” (P21-M). Madrasa teachers believed that training must be practical and immediately implementable. As a young madrasa teacher, one participant felt more comfortable with technology but admitted that she was still learning to understand the depth of Malay cultural values: “I can create Canva designs, educational TikTok videos, and digital modules, but I sometimes find it difficult to incorporate appropriate Malay cultural elements” (P5-F). Another participant added, “I believe a contextualized training curriculum is important” (P19-M). Similarly, one teacher explained, “We need concrete examples: for example, how to create infographics about Malay etiquette or learning content that highlights local cultural wisdom” (P16-M). Another participant stated, “I believe digitalization can be an effective tool for cultural preservation” (P17-M).

3.2. Relevant Digital Learning Forms, Patterns, and Practices for Teacher Professional Development

Interviews revealed that teachers have tried various forms of digital learning, but their effectiveness varied. Practices considered most relevant and easy to adopt include the use of instructional videos containing explanations of the material and examples from everyday Malay life (P10-F); online synchronous classes through applications such as Zoom or Google Meet, especially for discussions and Q&As (P12-F); CPD training based on micro-learning and short digital modules that can be accessed anytime (P17-M); and the use of social platforms such as WhatsApp and Telegram for teacher learning communities (P21-M).

Most teachers stated that they needed a more structured digital training system rather than simply one-way training. Collaborative and hands-on training models were considered more effective. Madrasa teachers explained that the most relevant forms of digital learning for teacher professional development are those that are easily accessible and do not burden teachers technically. One teacher stated, “Teachers are very busy. So the most suitable form of digital learning is one that can be accessed anytime—asynchronously—such as video modules or microlearning. We can learn bit by bit without having to leave the classroom” (P4-F).

Another madrasa teacher added that self-paced learning is considered the most effective: “I like to learn at my own pace. If it's a live webinar, I often don't have time to participate because of my busy teaching schedule. But if it's a video, I can review and even take notes” (P13-M).

The most helpful practice is using a simple platform with minimal interface clutter. Madrasa teachers believed that blended learning, a combination of online training and in-person mentoring, is an effective digital learning model for professional development. One teacher explained, “If it's entirely online, we usually lose focus. But if we have digital sessions supplemented with one or two face-to-face meetings, it's much more effective. There's space for discussion and follow-up” (P12-F).

Madrasa teachers also mentioned that a relevant format is guided online modules with practical

assignments. One participant stated, "Modules should provide concrete assignments. For example, creating digital lesson plans, creating interactive quizzes, or creating learning videos. Not just theory" (P21-M).

Madrassa teachers also highlighted the importance of contextual digital learning, namely digital learning based on the madrasa context and student characteristics. One teacher explained, "Sometimes digital training is too general, not suited to the needs of madrasah teachers. What we need are real-world examples: how to create digital learning that maintains an Islamic nuance and aligns with the characteristics of madrasah students" (P16-M).

Madrassa teachers appreciated the digital format of case studies. One teacher stated:

When the training provided videos of examples of digital classes, and then we were asked to analyze them, it was very helpful. Learning from real-life cases is easier to digest. I believe reflective learning – writing digital learning journals – is also important. (P7-F)

Madrassa teachers emphasized the need for continuous digital professional learning rather than a one-time training session. One participant stated, "Digital training shouldn't just be a one-time event. We need a sustainable model: advanced modules, online communities, and regular mentoring" (P20-M). According to them, the most relevant practice is digital mentoring. One madrasa teacher stated, "Teachers are often confused when trying new things. If there's a digital mentor we can contact when we're having difficulties, that would be very helpful. I also appreciate the learning analytics approach that helps teachers monitor their competency development" (P10-F).

3.3. Mapping Indigenous Knowledge of Malay Culture relevant to Teacher Pedagogy and Professionalism

Informants, particularly traditional leaders and senior madrasa teachers, conveyed various elements of Malay culture that remain highly relevant in education, namely adab and politeness as the basis of the teacher-student relationship (Informan 8); the concept of *budi*, which combines moral, intellectual, and emotional aspects in shaping students' character (P4-F); Malay oral traditions such as *pantun*, *syair*, and *petuah*, which can be used as learning media (P22-M); the values of deliberation, mutual cooperation, and social responsibility, which align with the goals of Islamic education (P11-F); and Malay cosmology, based on monotheism, emphasizing the relationship between humans and God, nature, and each other (P5-F).

Teachers revealed that these values are often not systematically documented in the CPD curriculum, so their use relies heavily on the personal initiative of teachers or senior teachers. Madrasa teachers emphasized that knowledge of Malay culture is an essential part of the madrasa's educational identity, not merely supplementary knowledge. One madrasa teacher stated, "When we talk about teacher professionalism, it's not just about teaching ability, but also how teachers are able to instill local cultural values. Malay culture is rich in manners and politeness" (P18-M).

According to one teacher, mapping Malay cultural knowledge must include elements of language, customs, and value systems. The teacher added, "For example, greeting customs, eating customs, and dress codes can all be incorporated into the learning process. Teachers just need to know where to place these values in their teaching strategies" (P16-M).

A madrasa teacher also emphasized that teachers need to be trained to understand the philosophical meaning of Malay culture, not just its superficial aspects. The teacher observed that many elements of Malay culture bear similarities to principles in Islamic education, making them highly relevant for integration into pedagogy: "Malay culture emphasizes respect for parents, teachers, and guests. This is exactly the same as Islamic etiquette. Teachers can use examples of Malay customs when explaining morals" (P11-F).

A madrasa teacher believed that mapping cultural knowledge must be thematic and contextual: "If we teach Arabic, we can include Malay *pantun* or poetry as literacy materials. This enriches students' learning experiences" (P4-F). Another teacher viewed Malay cultural knowledge as a resource for contextual pedagogy: "If teachers understand local culture, they can make learning

more relevant to students' daily lives. This makes it easier for them to understand the material" (P14-M).

According to madrasa teachers, forms of cultural knowledge that are important to map include Malay social customs, such as shaking hands and visiting; deliberation customs; respect for knowledge and teachers; and respect for dress code. One participant explained, "All of this is relevant to character education. But many teachers don't know how to incorporate it into lesson plans or digital media. I proposed special training for cultural mapping into learning design" (P20-M).

A madrasa teacher highlighted that Malay culture can also be mapped in a digital context: "Malay culture doesn't have to be understood as something solely traditional. We can map its content into digital materials: pantun videos, traditional infographics, comics about Malay cultural etiquette" (P15-M). Another madrasa teacher stated:

Many teachers don't yet understand how to digitize Malay cultural content. The mapping must include: what the content is, how to package it, and where to place it in modern pedagogy. (P22-M)

Another participant added, "The mapping must include: Digital formats of cultural content; teacher competencies in cultural literacy; and suitability of cultural content to subject matter" (P20-M).

3.4. Integrating Digital Learning with Malay Cultural Values in Teacher Professional Development

Most teachers welcomed the idea of integrating digital and Malay culture. Interviews revealed several potential forms of integration, such as creating digital modules containing examples of Malay customs, local stories, and adab values (P5-F); using digital applications to create interactive pantun or poetry in learning (P12-F); learning videos featuring Malay narratives and cultural contexts as illustrations (P17-M); and CPD training that begins with cultural reflection before moving on to technical training (P7-F).

A madrasa teacher emphasized that integrating digital learning with Malay cultural values must begin with teachers' understanding of the essence of those values: "Many teachers are already proficient in using technology, but they don't necessarily know how to incorporate Malay cultural values into it. Yet, Malay etiquette is very rich and perfectly suited to madrasah education" (P11-F).

Another madrasa teacher emphasized that values such as politeness, respect for teachers, and gentle language can be integrated through digital media: "If we create learning videos, we can take the language style and examples from Malay culture. That actually strengthens students' character" (P5-F). However, the teacher acknowledged that there is still little teacher training that combines digital and cultural aspects. Another madrasa teacher explained that digital learning can be an effective means of preserving Malay culture while improving teachers' professional competence: "Technology is not a threat to culture. In fact, it can revive Malay values in a more modern and accessible form for students" (P1-F).

One madrasa teacher provided examples of integration practices: "Learning videos with Malay pantuns or proverbs as opening elements. The use of illustrations of baju kurung, tengkolok, or greeting customs in digital teaching materials. The presentation of the values of respect and deliberation in problem-based learning scenarios" (P12-F). This integration significantly supports teacher professionalism because it adds pedagogical and cultural dimensions that were previously lacking.

A madrasa teacher saw the integration of Malay culture into digital learning as a form of historical preservation: "Today's students are far removed from their Malay historical roots. With digital learning, we can revive historical stories, Malay religious figures, and traditions that were once highly respected" (P16-M).

Another madrasa teacher believed that teachers need special training in digital storytelling based on Malay culture: "History learning will be much more lively if teachers create videos or animations of local Malay stories. This also enhances teacher professionalism because it allows

them to be creative and innovative" (P19-M). Madrasa teachers also emphasized the importance of digital project-based learning that addresses cultural themes.

Madrasa teachers also emphasized the need for a clear integration framework to ensure that the use of technology does not conflict with the principles of adab or simplicity embraced by Malay culture. They stated that integrating technology and local culture is highly feasible. Several forms of integration, such as digital modules based on Malay culture, contextual videos, and digital pantun applications, were deemed effective (P5-F). This theme highlights the need for an acculturative CPD approach (P11-F).

3.5. Development of the Acculturative CPD Model Concept

The interviews revealed several elements expected to form an acculturative CPD model, namely need-based digital upskilling based on technology training (P9-F); integration of Malay cultural values into every training module, not just as supplementary material (P11-F); continuous mentoring through a digital learning community (P19-M); collaborative training models, such as lesson study based on adab and deliberation (P21-M); training content based on local culture, including digital learning media that utilize Malay symbols, stories, and values (Informan 13); and reflection-based evaluation, which assesses teachers' professional development in terms of competency and character (P15-M).

A madrasa teacher believed that the concept of acculturative CPD must stem from the reality that madrasa teachers work in environments with distinct religious and cultural identities: "Current CPD models are too general. Not all of them are relevant to the needs of madrasas. We need a model that combines modern professionalism with Islamic values and local culture" (P19-M).

A madrasa teacher emphasized that acculturation in CPD does not simply mean incorporating cultural elements into training, but aligning teachers' learning methods with the values and practices of the madrasa community: "Acculturation brings together two worlds – technology and tradition, innovation and etiquette. Teachers must be trained to understand both" (P11-F).

According to a madrasa teacher, the ideal acculturative CPD model includes cultural reflection, strengthening professional etiquette, and implementing technology in accordance with Islamic values. The teacher explained that CPD development must enable teachers to develop modern competencies without uprooting the madrasah's identity: "Sometimes CPD only focuses on modern pedagogy, but forgets that madrasas have their own unique characteristics. Teachers must be professional, but they must also reflect Islamic and local culture" (P12-F).

A madrasa teacher identified three important elements of acculturative CPD: elements of modern pedagogy; elements of Islamic values, such as adab, morals, and professional ethics for teachers; and elements of relevant local culture, such as Malay, Javanese, Bugis, or other cultures. According to another madrasa teacher, the CPD model must provide concrete examples of how local culture can be used as a pedagogical resource: "If CPD teaches how to incorporate pantun, proverbs, or customary deliberations into learning, that would be very beneficial" (P21-M).

Madrasa teachers also suggested the establishment of a "Malay Culture-Based Madrasah Teacher Development Center" that would provide integrated digital and local culture training materials. Informants described an ideal CPD model that encompasses technical training, cultural preservation, ongoing mentoring, and reflective evaluation. This theme points to a new, harmonious CPD design direction – digitally modern yet grounded in Malay culture (P22-M).

3.6. Challenges, Opportunities, and Implications of Implementing the CPD Model

Some madrasa teachers identified future CPD challenges, including limited digital infrastructure in some rural madrasas (P12-F); wide variation in teachers' digital literacy skills (P16-M); lack of national standards for integrating Malay culture into CPD; and resistance among some teachers to technological change. Opportunities identified include strong support from traditional leaders and the Malay community for cultural preservation through education; increased teacher awareness of the importance of digital literacy post-pandemic; availability of increasingly affordable and

accessible educational technology; and potential collaboration between madrasas, universities, and Malay traditional institutions.

According to a madrasa teacher, the biggest challenge in implementing the CPD model is the unpreparedness of some teachers to change, both in their thinking and working methods: “CPD is good, but not all teachers are ready. Some feel that training only adds to the burden without any direct benefits. Resistance is high, especially among senior teachers” (P16-M).

A madrasa teacher also mentioned technical challenges such as limited facilities and busy schedules. However, the teacher saw significant opportunities in CPD to improve the quality of madrasas: “If CPD is implemented correctly, teachers will be more confident, learning will be more creative, and madrasas can compete with public schools” (P1-F).

A madrasa teacher mentioned the following implications: teachers will become more professional, a collaborative culture will be enhanced among teachers, and madrasahs will be more adaptable to changing times. Another madrasa teacher believed that the challenges of CPD are not only internal to teachers, but also systemic: “Often, CPD is not sustainable. After the training, teachers return to their original state. There is no long-term support” (P22-M).

A madrasa teacher also lamented the lack of relevance of CPD materials to the madrasah context. In terms of opportunities, the teacher saw CPD as a space to develop the integration of Islamic values and local culture in modern teaching: “If CPD is well-designed, teachers can learn to integrate technology, culture, and Islamic values harmoniously” (P11-F). Another participant stated that this is a huge opportunity for madrasas. The implications are that learning becomes more contextual, a distinctive madrasah pedagogical identity is realized, and teachers become more adaptable to digital education (P9-F).

Implications of implementing the CPD model include improving the quality of teacher pedagogy to be more contextual, creative, and adaptive; strengthening students' Malay cultural identity even in a digital environment; encouraging madrasas to become centers of innovation that combine modernity with tradition; and creating professional teachers who excel digitally but remain rooted in Islamic cultural and spiritual values. Madrasa teachers stated that CPD revealed challenges such as limited infrastructure, varying digital capabilities, and resistance to change (P16-M). However, opportunities also exist, particularly indigenous support, accessible technology, and potential for collaboration (P14-M). This theme emphasizes that successful acculturative CPD requires a realistic and participatory implementation strategy (P18-M).

4. Discussion

The research findings indicate that madrasah teachers significantly require digital literacy development to effectively implement digital-based learning. This finding aligns with systematic reviews showing that effective teacher CPD programs emphasize collaborative learning, digital practice-based training, and ongoing institutional support (Nkundabakura et al., 2024; Rashida & Bariham, 2025). In the madrasah context, this need is further complicated by the need to master not only technical aspects but also how technology can align with the Islamic educational mission and distinctive local culture (Abakah et al., 2023; Tambak et al., 2022). The empirical findings indicate a pronounced need among madrasah teachers for practical, job-embedded digital upskilling – LMS fluency, interactive media design, and basic digital content production – which teachers framed as urgent rather than optional (Ayanwale et al., 2024; Kerimbayev et al., 2025). This pattern mirrors recent systematic syntheses showing that teacher professional development [TPD] which prioritises hands-on practice, iterative task design and embedded support leads to greater classroom uptake of digital pedagogy than one-off workshops (Amemasor et al., 2025).

In addition to technical aspects, this study reveals that the integration of Malay cultural values such as *adab* (adab), *budi* (good character), the oral tradition of *pantun* (pantun), and *deliberation* (*musyawarah*) is a crucial element in the professionalism of madrasah teachers. A phenomenological study of madrasah teachers indicates that traditional Malay cultural knowledge is an integral part of their personal and professional competencies (Tambak et al., 2025). This demonstrates that teacher professional development cannot be separated from the local cultural

context and Islamic values inherent in madrasah institutions. Digital competence in relation to cultural continuity (Ogegbo & Ramnarain, 2024): digital tools are acceptable only when they safeguard or amplify Malay values such as adab, budi, pantun, and musyawarah rather than supplant them (Amemasor et al., 2025). This dual demand – competence plus cultural fidelity – is similar to findings in culturally-sensitive education research that stress the need for technology to be adapted to local epistemologies rather than transplanted intact from mainstream contexts (Latip & Kadarohman, 2024).

It was also found that relevant digital learning practices involve more than just the use of technology; they must be contextual, applicable, and incorporate elements of local culture. This finding is consistent with studies highlighting how digital technology, when combined with local cultural content, can strengthen student motivation and relevance (Ishmuradova et al., 2025; Samuelsson, 2025). For example, the use of digital media containing elements of local culture or digital games based on local wisdom (Ostinelli & Crescentini, 2024). This indicates that the ideal CPD model for madrasah teachers involves the development of digital content integrated with local wisdom values (Gichuhi, 2025; Rashida & Bariham, 2025).

The preference for asynchronous micro-modules, blended follow-ups, case-based video exemplars and continuous mentoring reported by informants is evidence-aligned with contemporary best practice in digital CPD: flexible, micro-credentialled learning combined with cohort mentoring improves transfer to classroom practice and accommodates teachers' heavy workloads. Implementations that pair self-paced modules with short face-to-face or synchronous coaching produce higher sustained use of digital tools (Al-Obaydi et al., 2025; Shi et al., 2025). A key contribution of this study is the explicit mapping of Malay indigenous knowledge elements that teachers identified as pedagogically useful (adab, pantun, syair, deliberation customs). Mapping cultural forms in this way is a crucial first step towards formally codifying them into CPD curricula so they move from individual teacher initiative to shared resources – a strategy recommended in the indigenous-knowledge integration literature (Amalia et al., 2026; Ogegbo & Ramnarain, 2024).

Integrating digital-based learning and Malay culture within the framework of teacher professional development presents both a strategic challenge and an opportunity. Research shows that without institutional and infrastructure support, and without teacher readiness, such integration is difficult to implement effectively. A systematic review states that digital competence alone is not enough; further training, mentorship, and contextual support are needed for technology to be truly integrated into classroom practices (Al-Adwan et al., 2024; Salsabila et al., 2022). In the context of Malay-culture madrasahs, the challenge also includes ensuring that digitalization does not diminish local wisdom values, but rather strengthens them (Alenezi, 2023).

Based on the interview results, an acculturative CPD model that combines both dimensions – digital and cultural – can be formulated with elements such as digital technical training based on the real needs of madrasah teachers, digital modules that incorporate Malay culture, digital learning community mentoring, and reflective evaluation. Previous studies in the context of professional teachers confirmed that CPD that is sustainable, community-based, and relevant to the teacher's context produces better results than one-off training (Tambak & Sukenti, 2025; Tambak et al., 2025). Therefore, this CPD model has great potential to improve the quality of teaching in madrasahs that have a distinct cultural identity.

Mentoring emerged as a non-negotiable implementation element: respondents requested ongoing, accessible mentors and peer communities to trouble-shoot and to evaluate culturally-inflected lesson artifacts. This preference is consistent with evidence that mentorship and professional learning communities (PLCs) are the primary mechanisms through which CPD effects are sustained, particularly in low-resource settings where one-off inputs dissipate quickly. Embedding mentoring in a digital learning community also permits low-cost scalability using peer coaches (Kutnick et al., 2022; Shi et al., 2025). This research concern that digitalization could inadvertently erode Malay historical consciousness is valid and highlighted in comparative studies: technology can both preserve and commodify heritage depending on design choices

(Salsabila et al., 2022; Timotheou et al., 2023). To avoid superficial “cultural decoration,” CPD must teach teachers principles of cultural translation (why a pantun functions pedagogically, when musyawarah is an appropriate classroom routine) rather than only supply ready-made artifacts. This deeper cultural literacy prevents tokenistic uses of local heritage (Ogegbo & Ramnarain, 2024).

Finally, the implications of this research are far-reaching: a digital-cultural integrated CPD model not only improves teachers' technical competence but also strengthens cultural identity and Islamic values within the madrasah environment. However, implementing this model requires policy support, infrastructure investment, ongoing teacher development, and collaboration between educational institutions, traditional communities, and the government. A related study shows that the use of technology in indigenous education will be successful if the aspects of ease of use, cultural relevance, and institutional support are met (Gichuhi, 2025). Thus, this research confirms that the professional development of madrasah teachers cannot be separated from the simultaneous context of culture and technology.

5. Conclusion

This study concludes that continuing professional development for madrasah teachers requires an approach that not only emphasizes strengthening digital literacy but also integrates it with the values of Indigenous Knowledge of Malay Culture. Madrasah teachers demonstrated a strong need for practical, practice-based digital training, including mastery of LMS, digital content production, and the use of interactive learning media. At the same time, teachers emphasized the importance of upholding the values of adab (adab), budi (good character), politeness, pantun (pantun), syair (poetry), musyawarah (deliberation), and tauhid (monotheism) in learning. This study confirms that effective digital learning practices must be contextual, relevant, and reflect Malay cultural identity. Local cultural values have proven potential as pedagogical resources that enrich learning in madrasahs. The integration of technology and Malay culture can be realized through culture-based digital modules, local learning applications, narrative video content, and collaborative training rooted in indigenous values. The acculturative CPD model derived from this research encompasses a combination of digital technical training, cultural understanding, mentoring digital learning communities, and reflective evaluation. This model not only modernizes madrasah teacher competencies but also maintains the continuity of Malay cultural identity, which characterizes local Islamic education. This research was limited to madrasahs within specific Malay cultural regions, so the diversity of digital practices and the application of local wisdom are not widely represented across Indonesia. The limited number of madrasah teachers interviewed means the research results may not reflect the full perspectives of Islamic education stakeholders in the broader Malay region. This research is qualitative in nature and therefore does not provide numerical measurements of the effectiveness of the acculturative CPD model, digital literacy levels, or the degree of integration of Malay cultural values into learning. The developed model remains a conceptual design and has not been tested in large-scale implementation to assess its impact on teacher quality and student learning outcomes. Therefore, future research requires digital training based on the real needs of madrasah teachers, not just one-way technical training. Madrasahs need to develop digital content based on Malay culture, such as cultural learning videos, digital modules on adab (traditional character), or pantun (pantun) learning apps. Digital learning communities for teachers need to be strengthened, including mentorship among teachers to share best practices. Further research implications require broader-scale trials of the acculturative CPD model, including mixed methods research to quantitatively measure the model's effectiveness.

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Ethics statement: This study was conducted in accordance with established ethical standards for research involving human participants. Prior to data collection, all participants were informed about the purpose of the study, the procedures involved, their voluntary participation, and their right to withdraw at any time without penalty. Written informed consent was obtained from all participants. Participants' anonymity and confidentiality were strictly maintained. No personal identifying information was collected or disclosed, and all data were used solely for research purposes. The data were securely stored and accessed only by the research team. This research did not involve any form of deception, physical risk, or psychological harm. The study complies with the ethical principles of respect for persons, beneficence, and justice, and adheres to relevant institutional and national research ethics guidelines.

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