The Artificial Intelligence (AI) Revolution in Enhancing The Quality of Malay Language Teaching And Learning

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ABSTRACT

The advancement of Artificial Intelligence (AI) has reshaped the educational landscape, offering innovative solutions to enhance teaching and learning quality. Within the context of Malay language education, AI is increasingly recognized as a powerful tool to address the challenges of classroom diversity through differentiated and personalized instruction. This concept paper examines the integration of AI in Malay language teaching and learning, emphasizing its role in improving instructional quality and responding to learners' varied needs. Using a literature review approach, the study draws on journals, proceedings, books, and empirical findings to discuss three key dimensions: (i) the concept of AI in differentiated instruction, (ii) challenges faced in implementing differentiated learning in Malay language classrooms, and (iii) possible solutions through AI applications. Findings from the review indicate that AI technologies, including adaptive learning systems, intelligent tutoring platforms, and data-driven analytics, provide teachers with valuable support in lesson planning, personalized resource allocation, and monitoring student progress. These tools enable the design of learning experiences that align with individual proficiency levels, learning styles, and cognitive capacities, thereby fostering more inclusive and effective instruction. Despite these benefits, issues such as limited teacher readiness, infrastructure constraints, and ethical concerns remain pressing challenges that must be addressed to ensure successful implementation. This paper underscores the transformative potential of AI in enhancing the quality of Malay language education. It also provides a reference point for educators, policymakers, and researchers in leveraging AI to optimize differentiated learning and advance inclusive educational practices. The analysis from this study can serve as a reference for educators in addressing the challenges of differentiated learning by optimally leveraging advanced technologies such as AI in education.

Keywords - Artificial Intelligence, Malay language education, personalized learning, educational technology

INTRODUCTION

The advancement of technology in education positions educational technology as a cornerstone for the dynamic development of Malaysia's future education system. This aligns with the eighth shift in the Malaysia Education Blueprint (MEB) 2013–2025, which emphasizes the integration of information and communication technology (ICT) to enhance the quality of learning in Malaysia (Ministry of Education Malaysia [MOE], 2013). In this era of rapid digital growth, Artificial Intelligence (AI) has emerged as a vital tool in transforming language teaching and learning, particularly for the Malay language.

AI offers immense potential in improving the efficiency of instruction through applications such as natural language processing (NLP) and machine translation. Research shows that AI-driven platforms can effectively enhance learners' fluency and engagement (Jia et al., 2022), while also fostering 21st-century skills in line with the School Transformation 2025 (TS25) program under the MEB framework (Resnick & Robinson, 2017). Digital learning, as highlighted by Mohamed Nazul (2020), represents a key transformation of Malaysia's education system and elevates the country's competitiveness at the global level.

In the context of Malay language learning, AI, particularly NLP, provides new opportunities for language development by generating culturally relevant texts, supporting creative writing, and enriching instructional materials (Tian et al., 2024). The widespread use of Malay in Southeast Asia further drives demand for AI

applications that facilitate cross-cultural communication and collaboration (Noor Zuhidayah Muhd Zulkifli et al., 2019; Xiao, 2021; Zainaba Omar et al., 2020). AI-driven tools also introduce adaptive and personalized learning approaches that significantly improve the overall teaching and learning experience (Srinivasa et al., 2022).

In conclusion, the integration of AI into Malay language education signifies a major leap forward, offering dynamic, personalized, and innovative solutions that enhance learning quality, elevate student outcomes, and revolutionize teaching practices. This paper explores the transformative role of AI in reshaping the landscape of Malay language teaching and learning.

Objectives

This study aims to achieve the following objectives:

1. To discuss the potential of Artificial Intelligence (AI) technologies in enhancing the effectiveness of Malay language teaching and learning.
2. To discuss the benefits of integrating AI applications in supporting teachers' pedagogical practices for Malay language education.
3. To discuss the challenges and limitations faced by educators in adopting AI in Malay language teaching and learning.
4. To discuss strategies and recommendations for effective integration of AI into Malay language teaching and learning in Malaysian schools.

Definition of Artificial Intelligence

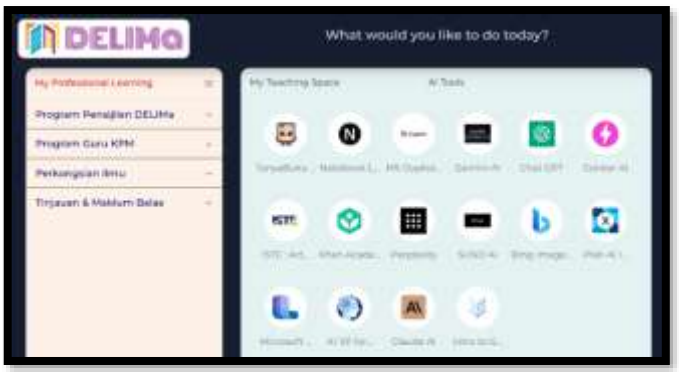
Artificial Intelligence (AI) is broadly defined as a computer-based system capable of performing tasks that mimic or extend human intelligence. It draws from multiple disciplines, including computer science, psychology, linguistics, and mathematics, to develop systems that can analyze data, make decisions, and learn from experience. Recent advancements emphasize the role of AI in enhancing human cognitive abilities through machine learning and adaptive algorithms (Kaluarachchi, Reis, & Nanayakkara, 2021).

In the field of education, AI is increasingly recognized as a transformative force that reshapes teaching and learning practices. It supports educators by automating routine tasks, enabling personalized instruction, and creating innovative approaches to knowledge sharing (Kaur, 2021). Similarly, Alam (2021) highlights that AI can optimize learning processes by improving efficiency and supporting students' diverse needs.

For Malay language education, AI provides opportunities to revolutionize instructional methods, particularly through natural language processing (NLP) applications that enhance comprehension, fluency, and communication. By integrating AI into teaching and learning, educators can foster more engaging, adaptive, and effective language learning experiences, ultimately contributing to the quality and future-oriented development of Malay language education.

Artificial Intelligence in Digital Educational Learning Initiative Malaysia (DELIMa)

Figure 1: AI Tools in DELIMa Platform



The Artificial Intelligence (AI) Revolution in Enhancing the Quality of Malay Language Teaching and Learning is a cornerstone of Malaysia's digital education transformation, centrally facilitated by the Digital Educational Learning Initiative Malaysia (DELIMa) platform. DELIMa serves as a centralized ecosystem that integrates a diverse suite of AI-based applications, fundamentally reshaping pedagogical approaches for the Malay language. This integration empowers educators to design more dynamic lessons and enables students to engage in personalized, self-directed learning, aligning with the nation's vision for a future-ready education system (Ministry of Education Malaysia [MOE], 2021).

Within the DELIMa environment, generative AI tools like ChatGPT are leveraged by teachers to efficiently generate essay ideas, compose model texts on themes such as "National Unity," and produce practice questions, thereby streamlining content creation and fostering critical thinking (Yusof & Rahman, 2023). Similarly, multimodal AI applications such as Gemini AI allow for the cohesive integration of text and visuals, enabling the creation of illustrated digital poetry and interactive stories that significantly stimulate student creativity (Tan & Zainuddin, 2024).

For content development, Microsoft Copilot enhances teacher efficiency by assisting in the rapid preparation of lesson plans, worksheets, and presentation slides, freeing educators to focus more on pedagogical delivery (Nor & Lim, 2022). Tools like Bing Image Creator and Pixlr further enrich this process by allowing for the instant generation of visuals to illustrate complex proverbs and idioms or to design instructional posters and infographics, which greatly aid in conceptual understanding and communication skills (Kamaruddin et al., 2021).

Beyond content generation, AI is instrumental in assessment and engagement. Claude AI provides a platform for offering constructive, value-oriented feedback on student essays, supporting an ethical learning environment consistent with the moral values embedded in the curriculum. Interactive platforms like Kahoot and Quizizz utilize AI to design adaptive quizzes for grammar and vocabulary, promoting high levels of student participation and enabling real-time formative assessment (Zulkifli & Lee, 2024).

Furthermore, creative tools such as Suno AI add a novel dimension to literature appreciation by transforming poems into songs, enhancing emotional and auditory engagement in the classroom (Mohd Sharif & Goh, 2022). In summary, the strategic incorporation of these AI applications within DELIMa fosters a more interactive, student-centered, and adaptive approach to Malay language education, accelerating instructional tasks while empowering students through contextualized and creative learning experiences.

Related Policy

Educational Digitalization Policy

The Artificial Intelligence (AI) Revolution in Enhancing the Quality of Malay Language Teaching and Learning is strategically anchored in Malaysia’s progressive national education policies. This trajectory, evolving from the Malaysia Education Blueprint (PPPM 2013–2025) through the ICT Transformation Plan (2019–2023), has culminated in the Educational Digitalization Policy launched in 2023. This policy provides the foundational framework for integrating AI into the educational ecosystem, with a clear vision to cultivate digitally fluent and competitive students by enhancing their knowledge, skills, and values (Ministry of Education Malaysia [MOE], 2023).

A core objective of this digitalization agenda is the development of digitally proficient learners. In the context of Malay language education, AI is instrumental in achieving this by providing platforms for self-directed learning. AI-driven chatbots and interactive applications deliver immediate, personalized feedback on grammar, spelling, and composition, enabling students to identify and address their weaknesses efficiently and master essential digital literacy skills concurrently. Furthermore, the policy emphasizes the empowerment of educators. AI tools support teachers by analyzing student performance data to pinpoint common challenges and automatically recommend targeted teaching resources and supplementary materials. This data-driven approach allows for a more focused and effective instructional process, moving beyond a one-size-fits-all model.

The successful implementation of these AI-enhanced methodologies is contingent upon the policy’s focus on

strengthening digital infrastructure and content. Robust internet connectivity and access to user-friendly software are prerequisites for leveraging AI platforms that deliver enriched Malay language content, such as interactive video modules and adaptive quizzes, to a national audience. Finally, the policy optimizes strategic partnerships,

acting as a catalyst for innovation. Collaborations between educational institutions and technology companies are crucial for developing and scaling sophisticated AI applications, like intelligent language learning systems, ensuring the tools are both pedagogically sound and widely accessible. Through this multi-faceted approach, the Educational Digitalization Policy ensures AI integration is systematic and effective, directly supporting the enhancement of Malay language teaching and learning while narrowing the digital divide (MOE, 2023).

LITERATURE REVIEW

Local Studies

The integration of artificial intelligence (AI) into Malay language education presents significant opportunities alongside distinct linguistic challenges. The unique syntactic, morphological, and semantic features of Malay, including complex affixation and reduplication patterns, pose considerable difficulties for AI systems in achieving accurate translation and natural language generation. Sensitivity to cultural context remains a critical factor for developing effective AI tools, necessitating algorithms that are not only linguistically proficient but also culturally nuanced (Syed Abdul Basit Andrabi & Abdul Wahid, 2021).

Natural language processing (NLP) technologies are central to advancing Malay language content creation. These systems demonstrate growing capability in generating contextually and culturally relevant material, thereby supporting creative writing and textual development (Mukhlis Amien, 2023). In educational settings, AI-driven platforms have been shown to enhance academic achievement. Experimental studies indicate that virtual learning environments can lead to measurable improvements in test scores and significantly increase student engagement and interest in Malay language subjects.

Teacher perceptions strongly support the integration of AI in pedagogical practices. A substantial majority of pre-service teachers recognize AI's potential to diversify teaching methodologies and increase student motivation (Salbihana Samsudin, Halif Md Saleh, & Ahmad Shukri, 2023). These findings align with research indicating that AI applications provide valuable insights into effective pedagogical strategies and help maintain student focus during instruction (Muhammad Ali & Emre, 2022). The benefits extend to instructional efficiency, with AI enabling more accurate decision-making and targeted observation of student abilities.

From a student perspective, AI-powered writing tools demonstrate significant positive impacts on learning outcomes. Research indicates improvements in writing quality, particularly in content organization and structural coherence, when students utilize generative AI applications (Marzuki et al., 2023). These tools serve as effective brainstorming aids, supporting draft development and facilitating collaborative learning experiences. Furthermore, AI implementation in assessment provides automatic grading and personalized feedback, enhancing both teaching efficiency and learning effectiveness

International studies

The proliferation of AI-powered applications has fundamentally reshaped educational paradigms, including the teaching and learning of the Malay language. These technologies enable more personalized, adaptive, and engaging educational experiences that cater to diverse learner needs. Intelligent tutoring systems, chatbots, and natural language processing (NLP) tools provide individualized learning pathways, significantly improving language acquisition outcomes (Eswaran et al., 2024; Cantos et al., 2023).

Empirical evidence underscores the efficacy of AI-driven approaches. Studies indicate that AI-assisted instruction can improve language proficiency by as much as 45%, markedly outperforming traditional methods, which yield approximately 13% improvement (Alzahrani, 2024). This enhancement is largely attributable to

tools that offer automated writing assistance, real-time feedback, and interactive speaking practice, creating immersive and responsive learning environments.

Beyond elevating proficiency, AI plays a crucial role in promoting educational equity. It helps overcome language barriers and provides support for diverse learning populations, thereby addressing longstanding inequalities in language education.

However, this integration must be undertaken responsibly. Key ethical considerations, including algorithmic bias and data privacy, necessitate careful oversight and collaborative frameworks between educators and AI developers (Singha et al., 2024). Ultimately, the thoughtful adoption of AI holds immense potential to revolutionize Malay language education, making it more effective, inclusive, and aligned with the demands of a digital world.

Research Gap

Despite the demonstrated potential of artificial intelligence (AI) in language education, significant research gaps persist regarding its specific application to Malay language teaching and learning. A primary challenge is the scarcity of large-scale, culturally contextualized datasets necessary to train AI models effectively. This limitation is exacerbated by the linguistic complexity of Malay, particularly its morphological features such as affixation and reduplication, which complicate accurate algorithmic processing.

Furthermore, while studies indicate AI can improve motivation and short-term learning outcomes, there is a notable absence of comprehensive pedagogical frameworks to guide the structured integration of AI into Malay language curricula. The readiness and training needs of in-service teachers remain critically underexplored, despite positive perceptions among pre-service educators.

Ethical considerations, including algorithmic bias, data privacy, and equitable access, though widely discussed in global literature, are insufficiently examined within the Malaysian context. Finally, existing research prioritizes immediate metrics like test scores, leaving a substantial gap in understanding the long-term impact of AI on sustained language proficiency, critical thinking, and creative expression. Addressing these interconnected gaps is essential for developing effective, equitable, and culturally responsive AI-enhanced Malay language education.

The Importance of Artificial Intelligence

Ministry of Education Malaysia (KPM)

For the Ministry of Education Malaysia (KPM), AI offers powerful tools for data-driven policy development and curriculum design. Through big data analytics, AI can identify nationwide patterns in student achievement, pinpoint systemic weaknesses in Malay language proficiency, and enable the development of targeted remedial programs. Learning analytics systems provide deep insights into student behavior and performance, facilitating informed decision-making and efficient resource allocation (Jiao et al., 2022; Zawacki-Richter et al., 2020). Furthermore, AI algorithms can assist in creating dynamic, relevant curricula and generating diagnostic assessments tailored to current student needs, thereby strengthening the overall teaching and learning process. By leveraging AI, KPM can advance evidence-based educational planning and ensure the Malay language curriculum remains responsive, effective, and equitable across all regions.

State Education Departments (JPN) and District Education Offices (PPD)

For State Education Departments (JPN) and District Education Offices (PPD), artificial intelligence serves as a powerful tool for enhancing monitoring and evaluation processes. AI systems enable real-time analysis of educational data, providing early alerts for critical issues such as declining Malay language proficiency or increased dropout rates. These predictive capabilities allow education officers to implement proactive interventions before challenges escalate, thereby improving responsiveness and management efficiency (Holmes

et al., 2021). By leveraging AI-driven analytics, JPN and PPD can more effectively identify and address grassroots issues in Malay language teaching and learning, ensuring better implementation of educational policies at the regional and local levels.

Schools

At the school level, artificial intelligence enhances administrative efficiency and data-informed decision-making. AI systems automate routine tasks such as scheduling, attendance tracking, and academic record processing, reducing administrative burdens and minimizing human error (Igbokwe, 2023). This automation allows educators to dedicate more time to pedagogical activities.

Furthermore, AI-driven analytics enable schools to analyze student performance data in Malay language learning, identifying achievement trends and students requiring additional support. Predictive analytics can flag at-risk students early, facilitating timely interventions (Mustoip & Purwadi, 2024). By optimizing resource allocation and providing actionable insights, AI helps schools create more effective and targeted teaching strategies, ultimately enhancing the quality of Malay language education.

Teachers

For Malay language educators, artificial intelligence serves as a powerful pedagogical ally that enhances instructional quality while reducing administrative burdens. AI tools directly support language acquisition by providing automated feedback on grammatical accuracy and pronunciation, enabling more targeted skill development (Saleha Omar et al., 2021). Natural Language Processing technologies facilitate the creation of culturally relevant teaching materials that incorporate nuanced linguistic elements such as idioms and proverbs, thereby preserving cultural context in language instruction.

AI further assists teachers through intelligent tutoring systems that deliver personalized learning experiences tailored to individual student needs. These systems help educators address diverse learning styles through multimodal content delivery, including videos, interactive quizzes, and games, without significantly increasing preparation time or costs. Applications like Quizizz and Kahoot leverage AI to create engaging, game-based assessments that boost student motivation while providing immediate performance analytics (Chen et al., 2023).

Crucially, AI reduces teacher workload through automated assessment and scoring systems that streamline evaluation processes and generate detailed student progress reports. This automation allows teachers to reallocate time toward developing more creative and effective instructional strategies, ultimately enhancing the overall quality of Malay language education.

Students

Artificial intelligence fundamentally transforms the Malay language learning experience by enabling personalized, accessible, and engaging educational opportunities. AI-powered adaptive learning systems tailor instruction to individual students' proficiency levels, learning paces, and preferences, providing customized exercises and immediate feedback on vocabulary, grammar, and composition (Lin et al., 2023). This personalization enhances engagement and mastery while reducing the anxiety associated with uniform instruction.

AI also dramatically expands educational access through borderless learning platforms that overcome geographical and socioeconomic barriers. Students in rural areas and those with special needs benefit from AI-driven tools that provide equitable access to quality Malay language instruction (Khawrin & Nderego, 2023). Intelligent tutoring systems and translation technologies further support comprehension and skill development, ensuring all learners can participate meaningfully in language acquisition.

Through these innovations, AI fosters autonomous learning while creating inclusive environments where every student can develop Malay language proficiency according to their individual needs and potential.

Challenges in the Implementation of AI in Malay Language Teaching and Learning

The use of Artificial Intelligence (AI) in education undoubtedly brings various advantages. However, the implementation of AI also presents challenges to different stakeholders involved in the educational ecosystem, particularly in the teaching and learning (T&L) of the Malay language. This section discusses several key challenges in implementing AI within this context.

Schools

Financial constraints and infrastructural limitations

Schools encounter substantial barriers in integrating AI into Malay language teaching, primarily stemming from financial constraints and infrastructural limitations. The implementation of AI technologies requires significant investment in specialized hardware, software, and maintenance, posing challenges for institutions with limited budgets (Thian Khian Niam & Zaimuariffudin, 2024). Many schools lack sufficient computing devices and reliable internet connectivity to support widespread AI adoption, creating inequitable access to these transformative tools.

Furthermore, existing infrastructure often proves inadequate for sustaining AI-enabled education. Reports indicate that over half of Malaysian schools lack sufficient computer facilities to effectively implement technology-enhanced learning, including AI applications for language instruction.

This digital divide between well-resourced and under-equipped institutions threatens to exacerbate educational inequalities, particularly in rural and underserved communities. Addressing these fundamental challenges of funding and infrastructure remains critical for realizing the full potential of AI in Malay language education.

Malay language teachers

Teacher Readiness and AI Literacy

A critical challenge in implementing AI for Malay language education is the varying levels of technological proficiency and AI literacy among teachers. Many educators lack the necessary technical skills and confidence to effectively integrate AI tools into their pedagogical practices (Thian Khian Niam & Zaimuariffudin, 2024). This skills gap prevents teachers from maximizing AI's potential to enhance personalized learning, streamline lesson planning, and improve assessment processes.

The challenge is particularly pronounced among experienced teachers who may have received limited formal training in digital technologies. Without comprehensive professional development programs focused specifically on AI applications in language education, even the most advanced technological infrastructure will remain underutilized. Addressing this human capital dimension through targeted training and ongoing support is essential for successful AI integration in Malay language classrooms.

Limited Role in Instilling Values and Ethics

A significant limitation in leveraging AI for Malay language education lies in its inherent inability to foster moral and ethical development. Research indicates that AI applications are largely ineffective in cultivating character and values, with overwhelming agreement among educators that these technologies cannot assist in moral development (Salbihana, Halif, & Ahmad Shukri, 2024). This constraint stems from AI's nature as a programmed tool that lacks the human capacity for emotional intelligence, ethical reasoning, and contextual moral guidance.

The National Education Philosophy of Malaysia emphasizes balanced development across physical, emotional, spiritual, intellectual, and moral dimensions, a holistic approach that AI cannot fully replicate (Ayala-Pazmiño, 2023). While AI excels in delivering personalized content and feedback, it cannot replace the nuanced teacher-student interactions essential for value-based education. Therefore, educators must maintain primary responsibility for character development, using AI as a complementary tool rather than a substitute for human

mentorship in nurturing ethical and socially responsible learners.

Students

Socioeconomic Background

Socioeconomic disparities present a significant barrier to the equitable implementation of AI in Malay language education. Students from lower-income households (B40) and middle-income groups (M40) frequently lack access to necessary technological resources, including personal computing devices and reliable internet connectivity, essential for AI-enabled learning outside school environments (Aminamul Saidah, Bity Salwany, & Zamri, 2024).

Financial constraints force many families to prioritize necessities over educational technology, creating a digital divide that limits students' ability to benefit from AI-enhanced language learning tools. This socioeconomic barrier exacerbates existing educational inequalities, as students from economically disadvantaged backgrounds cannot fully participate in AI-driven learning opportunities. Ensuring equitable access to AI technologies remains a critical challenge that must be addressed through targeted policy interventions and resource allocation to prevent the widening of achievement gaps in Malay language proficiency.

Internet Accessibility

Limited internet access presents a substantial barrier to implementing AI in Malay language education. Significant disparities exist between urban and rural connectivity, with students in remote areas often experiencing inadequate internet infrastructure that prevents reliable access to AI-powered platforms like DELIMa (Yohanes, Sondang, & Mohammad, 2024). This digital divide exacerbates educational inequalities and limits equitable participation in AI-enhanced learning.

Furthermore, the cost of internet subscriptions remains prohibitive for many families, particularly those in B40 and M40 income categories. High data expenses effectively exclude economically disadvantaged students from engaging with essential AI tools and digital resources (Khalissafri & Mohd Isa, 2023). Without addressing these fundamental issues of connectivity, affordability, and infrastructure, the potential benefits of AI in Malay language education will remain inaccessible to significant segments of the student population.

Recommendations for Improvement

The challenges or barriers that arise in efforts to enhance the quality of Malay language teaching and learning (T&L) through the implementation of artificial intelligence (AI) must be addressed. In this regard, various stakeholders must play their respective roles to ensure that such challenges are effectively managed. Therefore, this section discusses several recommendations to ensure that the implementation of AI in the process of teaching and learning the Malay language can be carried out effectively.

Ministry of Education Malaysia (KPM)

Collaboration with Multiple Stakeholders

To effectively implement AI in Malay language education, the Ministry of Education should pursue strategic collaborations with Government-Linked Companies (GLCs) and private sector partners to address infrastructure gaps. Initiatives like the CERDIK program, which provides devices and data access to underserved students, should be expanded to ensure equitable access to AI tools across socioeconomic groups (Aminamul Saidah, Bity Salwana, & Zamri, 2024).

Comprehensive Consideration of Guidelines, Ethics, and Data Privacy

The Ministry must establish comprehensive ethical guidelines and data privacy frameworks to govern AI use in educational settings. These policies should protect student and teacher data while promoting responsible AI implementation (Nisa et al., 2024; Dwi Robiul, Ivan, & Azka, 2023).

Supporting AI Research and Development in Education

Support for interdisciplinary research on AI in education (AIEd) is crucial. The Ministry should foster collaborations between technologists and educators to develop pedagogically sound AI applications tailored to Malay language learning (Intan Idura & Hishamuddin, 2024). New evaluation frameworks are needed to assess these technologies effectively (Chiu et al., 2023).

Improving Internet Access Nationwide

Finally, accelerating national broadband initiatives like JENDELA is essential to bridge the digital divide. Reliable internet access remains a prerequisite for AI adoption, particularly in rural and underserved communities (Nicholas & Khairul, 2022). These coordinated efforts will create the necessary foundation for equitable and effective AI integration in Malay language education.

State Education Departments and District Education Offices

Implement comprehensive AI training programs.

State Education Departments (JPN) and District Education Offices (PPD) should implement comprehensive training programs focused on AI applications for Malay language instruction. These initiatives must develop teachers' technical competencies and pedagogical strategies for effectively integrating AI tools into classroom practice (Ismail et al., 2022). Given the current limited scale of AI training, programs should be expanded significantly to reach all Malay language educators through continuous professional development.

Leverage School Improvement Specialist Coaches (SISC+)

Furthermore, JPN and PPD should leverage School Improvement Specialist Coaches (SISC+) to conduct targeted school visits that provide hands-on support for AI implementation. These specialists should be trained to assist teachers in utilizing AI resources available through the DELIMA platform, such as Gemini AI and MS Copilot. This on-site guidance is particularly crucial given the identified gaps in teachers' ICT competencies (Noormarizan & Ariff, 2024). Through these coordinated efforts, state and district authorities can ensure Malay language teachers receive the necessary support to effectively harness AI technologies in their instructional practices.

Schools

Encourage in-house training on AI.

Schools should implement targeted in-house training programs to build AI competency among Malay language teachers. These initiatives are essential for developing the technical skills and pedagogical understanding required to effectively integrate AI tools into instructional practices (Tan Siew Chear & Helmi, 2024). Schools can organize workshops facilitated by AI education specialists, focusing on practical applications of available tools such as those within the DELIMa platform.

Such institutional training enhances teacher preparedness and adaptability in embracing technological innovations, ultimately enriching Malay language instruction through improved AI literacy. By prioritizing continuous professional development at the school level, institutions can create sustainable support systems that empower teachers to confidently utilize AI technologies, thereby elevating the overall quality of language education.

Malay Language teachers

Taking Self-Initiative to Learn AI Tools and Applications

Malay language teachers should pursue self-directed learning to develop proficiency in AI educational tools. This includes seeking certification programs and independently exploring AI applications relevant to language

instruction. Such initiative is crucial for developing the technical competence needed to effectively integrate AI into teaching practices (Ayanwale et al., 2022).

Acting as Role Models in Instilling Values and Morality

Teachers must also emphasize their irreplaceable role in value-based education. While AI can deliver content, educators should intentionally model and teach moral values through collaborative AI-enhanced activities thatpromote respect, teamwork, and ethical reasoning (Salbihana, Halif, & Ahmad Shukri, 2024).

Practicing Knowledge Sharing through Professional Learning Communities (PLC)

Finally, active participation in Professional Learning Communities (PLCs) enables knowledge sharing and collective problem-solving regarding AI implementation. Through PLCs, teachers can disseminate successful strategies, address challenges, and foster innovation in Malay language instruction, ultimately enhancing student outcomes through collaborative professional growth (Mohd Hashiq, 2024).

CONCLUSION

In conclusion, the AI revolution in education has brought significant positive implications for the teaching and learning of the Malay language. AI implementation offers numerous benefits for enhancing the quality of Malay language instruction. Nevertheless, challenges and barriers remain, potentially hindering widespread and effective AI integration. In this regard, contributions from multiple stakeholders, such as MOE, JPN, PPD, GLCs, schools, and teachers, are essential to overcome these barriers. Therefore, stakeholders must remain proactive to ensure the successful integration of AI in Malay language education. Importantly, exposure to AI technology is vital to prepare students to be highly competitive and adaptable in today's rapidly evolving digital era.

Future Research Opportunities

Several promising research directions emerge from the current study of AI integration in Malay language education. First, there is a critical need to develop and validate AI systems specifically trained on comprehensive Malay language corpora that account for the language's unique morphological features and cultural context. Such research would address current limitations in accuracy and cultural relevance.

Second, longitudinal studies examining the sustained impact of AI tools on language proficiency, critical thinking, and creative writing skills over extended periods would provide valuable insights beyond short-term performance metrics. Additionally, research exploring ethical frameworks for educational AI in the Malaysian context, particularly regarding data privacy, algorithmic bias, and digital equity, represents an essential emerging field.

Further investigation should also focus on teacher preparation models, identifying the most effective approaches for developing educators' AI literacy and integration competencies. Finally, comparative studies analyzing cost-effective implementation models for resource-constrained environments could help bridge the digital divide while maximizing educational impact. These research avenues would significantly contribute to both theoretical knowledge and practical implementation of AI in language education.

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