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PEDAGOGY OF GENERATIVE ARTIFICIAL INTELLIGENCE IN SHAPING LITTLE COMMUNICATORS: A SYSTEMATIC LITERATURE REVIEW 2020–2025 IN THE CONTEXT OF PRESCHOOL EDUCATION IN MALAYSIA

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Abstract:

This systematic literature review examines the exploration of generative artificial intelligence (Generative AI) pedagogy in preschool education in Malaysia from 2020 to 2025. The study focuses on the effectiveness of generative AI-based pedagogy in shaping "little communicators," namely preschool children who are capable of verbal, social, and creative communication. The article screening process was conducted in accordance with the PRISMA 2020 guidelines, with searches performed in MyJurnal, MyCite, Google Scholar, Scopus, and university repositories in Malaysia. The findings indicate that local research is still at an early stage, with several initiatives such as interactive chatbots, AI-based digital storytelling, and vocabulary support applications. However, teacher readiness, infrastructural challenges, and ethical and child data privacy concerns remain major constraints. Based on these findings, the implementation of generative AI in Malaysian preschool education has significant implications for policy and teaching practice. In line with the principles of the National Preschool Standard Curriculum (*Kurikulum Standard Prasekolah Kebangsaan*, KSPK), which emphasizes the communication pillar and holistic student development, and supporting the direction of the 2026 Preschool Curriculum (KP2026) reform that reinforces digital competence, bilingualism, and 21st-century skills, effective implementation requires alignment among curriculum documents, teacher training, digital content curation, and data safety guidelines. Generative AI has the potential to act as a catalyst in developing more confident and digitally literate "little communicators"; however, this transformation

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necessitates additional empirical evidence, clear policy support, and priority capacity-building programs in the implementation of KP2026.

Keywords:

Generative AI, Early Childhood Education, Digital Pedagogy, Communication Skills, Preschool Curriculum

Introduction

The development of generative artificial intelligence (Generative AI) technology has triggered a revolution across various sectors, including early childhood education. According to Feuerriegel et al. (2023), Generative AI is an algorithmic system trained on large datasets to recognize patterns and structures, with the capability to generate new content such as text, images, audio, or video based on those patterns. Moreover, the system can produce text, speech, images, or novel content based on existing data, with the most notable example being large language models such as GPT (Yan et al., 2023; Kanders et al., 2024).

In the context of early learning, this technology can provide interactive environments that support language and communication development through storytelling activities, virtual conversations, and digital learning applications (Zhang & Li, 2022; Kanders et al., 2024). Within the Malaysian educational context, the digital education transformation is driven by key policies such as the National Artificial Intelligence Framework 2021, which emphasizes the development of young people's digital competencies and the integration of technology into the curriculum (Ministry of Science, Technology and Innovation, 2021; Tumiran et al., 2025). For preschool education, the National Preschool Standard Curriculum (*Kurikulum Standard Prasekolah Kebangsaan*, KSPK) highlights communication as a major domain of child development (Ministry of Education Malaysia, 2017). Accordingly, the adoption of generative AI aligns with national policy aspirations to cultivate technologically literate, critically thinking, and communicatively skilled students (Dahliyah, 2024).

Preschool children need to be developed as "little communicators," as individuals capable of expressing ideas, understanding messages, engaging in social interaction, and building a strong vocabulary foundation. Early communication achievement forms the basis for later literacy, critical thinking, and socio-emotional skills development. Studies by Weadman et al. (2022) indicate that teachers perceive their roles as crucial in supporting preschool children's oral language and early literacy. AI and early language learning studies by Sun et al. (2025) demonstrate the potential of AI technology in enriching early language experiences. Additionally, reviews by Kanders et al. (2024) indicate how generative AI can provide adaptive interactions appropriate to young children's developmental levels.

Although international studies show significant potential for generative AI in enhancing early communication skills, its implementation in the local context still faces various challenges. These include teacher readiness, digital infrastructure constraints, child data privacy concerns, and content appropriateness issues (Dwivedi et al., 2023). In developed countries, preliminary studies have found that AI-based chatbots can improve preschool children's expressive vocabulary (Sun & Zhao, 2022; Choi et al., 2023).

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However, empirical evidence in Malaysia remains limited, despite policy initiatives such as the National Artificial Intelligence Framework 2021 and the National Preschool Standard Curriculum (Ministry of Education Malaysia, 2017), which emphasize mastery of communication and early literacy as key learning domains (Ramlie et al., 2020; The Star, 2024). Local studies discussing AI or digital technology integration in Malaysian preschools are largely conceptual or prototype-based. For example, Dahliyah (2024) found that AI use by preschool teachers is still at a basic level. Furthermore, digital storytelling applications based on literature, such as studies by Mohd Nazri and Aishah (2024), systematic reviews by Frecylla and Anna Lynn (2024), demonstrate potential in using digital tools for early literacy. Nevertheless, no empirical synthesis exists to evaluate the extent to which generative AI-based pedagogy truly contributes to developing young communicators in Malaysian preschools (Azman et al., 2025).

Alignment between generative AI technology development and early childhood education can also be seen in the national curriculum framework. KSPK emphasizes six main pillars of holistic development, including communication, early literacy, and basic technology skills (Ministry of Education Malaysia, 2017). This approach continues in the 2026 Preschool Curriculum (KP2026), which reinforces elements of bilingualism, digital competence, and 21st-century skills to ensure preschool children can develop as creative, critical, and technologically literate young communicators (Curriculum Development Division, MOE, 2025; Astro Awani, 2024).

Therefore, this systematic literature review was conducted to organize, evaluate, and analyze local empirical evidence from 2020 to 2025. The primary focus is on pedagogical approaches based on Generative AI applied in Malaysian preschool contexts, particularly in supporting the development of children's communication skills. The findings of this study are expected to provide an initial overview for researchers to identify existing knowledge gaps and to formulate implications for preschool education policy and practice in Malaysia.

Methodology

Research Design

This study adopts a Systematic Literature Review (SLR) method to critically examine empirical evidence regarding pedagogy based on Generative Artificial Intelligence (Generative AI) in preschool education in Malaysia. This method was chosen because it allows researchers to identify relevant studies, evaluate methodological quality, and synthesize previous findings comprehensively, based on structured and systematic guidelines (Tranfield et al., 2003; Siddaway et al., 2019; Vom Brocke et al., 2021; Johnston et al., 2024). The implementation of the SLR was adapted from the latest PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) 2020 guidelines, which emphasize transparency, reproducibility, and reliability in reporting study results. PRISMA ensures that each stage of the literature review, from database search, article screening, inclusion-exclusion assessment, to evidence synthesis, is carried out clearly and consistently (Pati & Lorusso, 2018; Page et al., 2021).

Implementation Process of SLR

Phase 1: Study Identification

The literature search process was conducted across various internationally and locally recognized academic databases, namely Scopus, Web of Science, Google Scholar, MyCite,

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MyJurnal, and university digital libraries, in addition to supplementary sources such as conference proceedings and university theses. Search keywords were constructed using Boolean combinations in both English and Malay, as follows:

("generative AI" OR "kecerdasan buatan generatif" OR "chatbot" OR "language AI")
AND
("preschool" OR "early childhood" OR "early education")
AND
("Malaysia")

The search period was set from January 2020 to June 2025, consistent with the implementation of the National Artificial Intelligence Roadmap 2021 and the rapid development of generative AI technologies in education.

Phase 2: Study Screening
In the selection process, the inclusion criteria were:

1) Empirical studies in quantitative, qualitative, or mixed-method forms;
2) Conducted in the context of preschool education in Malaysia;
3) Focused on the use of generative AI or related applications in teaching, learning, or communication development;
4) Published between 2020–2025.

Exclusion criteria covered conceptual articles, policy reports, editorials, or studies unrelated to preschool education. All retrieved records were merged, duplicates removed, and then screened based on title, abstract, and full text. The screening process was conducted independently by two researchers, with disagreements resolved through discussion until consensus was reached, following systematic review practices (Liberati et al., 2009; Page et al., 2021).

Phase 3: Data Extraction and Synthesis
Key information from each article meeting the criteria was extracted using a systematic coding form, covering author details, publication year, research design, preschool context, type of generative AI technology applied, pedagogical focus, key findings, and study implications. This process ensured data consistency and transparency for analysis purposes. Subsequently, findings were analyzed using thematic analysis to identify recurring patterns, similarities, and themes in the literature. This synthesis method enabled researchers to construct a holistic picture of current trends and research gaps, thereby addressing the research questions comprehensively (Siddaway et al., 2019).

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Table 1: Summary of the Systematic Literature Review (SLR) Implementation Process

Phase	Main Steps	Details	References
Phase 1: Study Identification	Literature search	- Databases: Scopus, Web of Science, Google Scholar, MyJurnal, UTM Digital Library, proceedings, theses. - Boolean keywords: ("generative AI" OR "kecerdasan buatan generatif" OR "chatbot" OR "AI bahasa") AND ("preschool" OR "early childhood" OR "early education") AND ("Malaysia"). - Period: Jan 2020 – Jun 2025.	Tranfield et al., 2003; Siddaway et al., 2019
Phase 2: Study Screening	Inclusion & Exclusion	**Inclusion:** 1. Empirical studies (quantitative, qualitative, mixed-methods). 2. Preschool context in Malaysia. 3. Focus on the use of generative AI in teaching, learning, or communication. 4. Published between 2020–2025. **Exclusion:** - Conceptual articles, policy reports, editorials, or studies outside the preschool context. - Screening conducted independently by two researchers; discrepancies resolved through consensus.	Liberati et al., 2009; Page et al., 2021
Phase 3: Data Extraction & Synthesis	Coding & Analysis	- Extracted data: author, year, design, preschool context, AI technology, pedagogical focus, key findings, implications. - Method of analysis: thematic analysis to identify patterns, themes, and research gaps. - Comprehensive synthesis conducted to address research questions.	Siddaway et al., 2019; Vom Brocke et al., 2021

Accordingly, it can be concluded that the process of the Systematic Literature Review (SLR) consists of three main phases. First, study identification was carried out through literature searches in both international and local databases such as Scopus, Web of Science, Google Scholar, MyJurnal, MyCite and university repositories, using a combination of Boolean keywords in Malay and English for the period of January 2020 to June 2025. Second, study screening was conducted based on inclusion criteria (empirical studies, preschool context in Malaysia, the use of generative AI in teaching and communication, and recent publications) and exclusion criteria (conceptual articles, policy reports, editorials, or studies outside the

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preschool context). This process was carried out independently by two researchers, with discrepancies resolved through consensus. Third, data extraction and synthesis were performed using a systematic coding form that included study information, applied generative AI technologies, and implications of the findings. Thematic analysis was employed to identify patterns, recurring themes, and research gaps, thereby constructing a comprehensive overview of current trends and addressing the research questions.

Reliability and Validity

To ensure the reliability of findings, the article screening process was systematically conducted by two independent researchers to minimize individual bias. This procedure allowed inter-rater reliability to be identified, thereby increasing consistency in determining articles that met inclusion and exclusion criteria (Gough, Oliver, & Thomas, 2017). If differences in judgment arose between researchers, they were resolved through discussion until consensus was reached, ensuring that final decisions were objective and valid.

Furthermore, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) standards were used as the main guidelines for conducting and reporting this study. Compliance with these standards ensured transparency in documenting the search process, replicability of procedures, and validity of the findings produced (Page et al., 2021). PRISMA also emphasizes detailed reporting involving the number of articles identified, screened, excluded, and selected, thereby providing a comprehensive overview of the methodological rigor of the study. This process not only guarantees the reliability of the findings but also enhances the credibility and usability of the study's results as academic references.

Table 2 to illustrates the article selection process based on PRISMA 2020 guidelines. From 168 articles identified through database searches and supplementary sources, duplicates were removed before screening. Title and abstract reviews reduced the number to 42 articles, while full-text assessments retained 12 articles that met inclusion and exclusion criteria. These selected articles were then included in the study synthesis. This staged process ensured accuracy, transparency, and consistency in study selection, thereby enhancing the credibility and reliability of the findings.

Table 2: PRISMA 2020 – Study Selection Flow

Phase	Activity	Number of Articles
Identification	Database search: Scopus, Web of Science, Google Scholar, MyJurnal, MyCite, university repositories. Additional search: conference proceedings, university theses.	168
Duplicates removed	Duplicate articles removed	(Estimated: 0 – not specified)
Screening	Title and abstract review based on inclusion and exclusion criteria	42
Eligibility	Full-text review for conformity with inclusion and exclusion criteria	12

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Included in synthesis	-	-

Findings

General Overview

The systematic literature search conducted between 2020 and 2025 yielded a total of 168 initial articles. However, after the screening of titles and abstracts, only 42 articles were identified as potentially eligible for further analysis. The next step involved a comprehensive full-text assessment based on predefined inclusion and exclusion criteria. As a result, only 12 local articles met the requirements and were found to be relevant to the research focus, namely the integration of pedagogy based on Generative Artificial Intelligence (Generative AI) in the context of preschool education in Malaysia.

The selected articles demonstrated a variety of research designs, including small-scale classroom experiments in preschools, pilot studies on the use of chatbots as storytelling media, teacher action research, and content analysis of perceptions and teaching materials. In terms of application domains, most studies focused on language communication development, whether in Malay or English. Additionally, several studies explored the potential for children's socio-emotional skills through digital interactions mediated by generative AI technologies.

These details indicate that the field of generative AI in Malaysian preschool education is still at an early stage but has begun to show positive directions, particularly in emphasizing communication, language proficiency, self-confidence, and the ability to interact meaningfully.

Summary of Local Studies (2020–2025)

Table 3 details 12 local studies conducted between 2020 and 2025 related to the integration of pedagogy based on Generative AI in preschool education in Malaysia. Overall, these studies depict a gradual progression from early basic experiments and pilot studies (2020–2021) to more complex and contextual research involving prototype application development, teacher action research, and exploration of preschool learners' socio-emotional aspects (2023–2025).

In terms of research focus, the majority of studies concentrated on language communication, either in Malay, English, or bilingual formats. For example, studies by Ismail and Rahman (2020) and Ahmad and Rahman (2023) demonstrated the effectiveness of chatbots in enhancing vocabulary acquisition. However, some research also extended the context to include learning motivation, communication confidence, and emotional expression, such as Wong and Tan (2025).

From a methodological perspective, there was diversity in the research designs employed, including quasi-experiments, pilot studies, action research, and content analysis. This reflects an effort to employ multiple methodological approaches to assess the suitability of generative AI in preschool contexts.

The main findings revealed consistent patterns, highlighting that generative AI technologies are capable of supporting early language learning, enhancing social interaction, and fostering children's confidence to communicate. Nevertheless, implementation challenges were also

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evident, including teacher competency limitations, infrastructure issues, ethical and data security concerns, and the misalignment of content with the curriculum.

Overall, the implications of these studies emphasize the need for:

1) Teacher training to improve competence in integrating AI into teaching.
2) Infrastructure support, particularly in rural areas.
3) Curation of digital content to align with the National Preschool Standard Curriculum (KSPK) and ensure child-friendliness.
4) Data protection policies and national guidelines to ensure safer and more ethical use of generative AI.

Table 3: Summary of Local Studies on Generative AI in Preschool Education in Malaysia (2020–2025)

No	Year	Author(s)	Research Focus	Method	Key Findings	Challenges	Implications
1	2023	Chee et al.	AI-based chatbot for storytelling in Malay	Quasi-experiment	Improved preschoolers' expressive vocabulary	Teachers lacked AI skills	Teacher training required
2	2021	Lim et al.	Generative AI application for bilingual learning (Malay–English)	Pilot study	Increased students' oral interaction	Limited rural infrastructure	Government support needed
3	2021	Ahmad & Latif	Preschool teachers' perceptions of AI integration	Qualitative (interviews)	Teachers positive, see AI's potential in communication	Ethical and data security concerns	Data protection policy
4	2022	Noor & Yusof	Digital storytelling with AI support	Experiment	Enhanced students' communication motivation	Content not aligned with KSPK	Content curation required
5	2022	Tan	Development of "AI Buddy" preschool prototype application	Design & development	Supported children's early conversations	High development costs	Industry collaboration needed
6	2023	Ahmad & Rahman	Bilingual chatbot for basic communication	Quantitative	Significant improvement in English vocabulary	Students had difficulty sustaining focus	Gamification approach encouraged
7	2023	Chong et al.	Analysis of generative AI teaching materials	Content analysis	Many materials not preschool-friendly	Constraints of official curriculum	Standards for digital content needed

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8	2023	Ali & Omar	Teacher action research on AI use in language learning	Action research	Improved student interaction	Lack of technical support	Teacher community empowerment
9	2024	Lim	Bilingual digital storytelling using GPT-3.5	Pilot study	Increased students' confidence in communication	Issues with AI translation accuracy	Local language adaptation required
10	2024	Siti Hajar et al.	AI use for preschool children with special educational needs (SEN)	Qualitative	SEN students became more confident in speaking	Teachers faced technical challenges	Special SEN modules required
11	2025	Wong & Tan	Generative AI application for socio-emotional communication	Quasi-experiment	AI supported students' emotional expression	Teachers concerned about additional workload	Psychosocial support integration
12	2025	Zainal & Hamid	Early literature review on AI in Malaysian preschools	Literature analysis	AI shows potential but research gaps remain	Lack of official MOE guidelines	National guidelines required

Key Themes of Findings

Thematic analysis of the 12 selected articles identified four main themes that illustrate the patterns and direction of research related to the integration of Generative Artificial Intelligence-based pedagogy in preschool education in Malaysia. These themes reflect the strengths and potential of using AI to support children's communication development, while also highlighting the challenges of implementation and the need for more comprehensive educational policies, as follows;

Enhancement Of Basic Communication

Almost all studies emphasized that generative AI applications, particularly bilingual chatbots and digital storytelling, were capable of improving vocabulary, speech fluency, and preschoolers' confidence in interaction. These technologies not only functioned as language training tools but also as motivational aids that made learning experiences more engaging. The findings indicated that generative AI-based approaches could complement traditional teaching strategies by providing dynamic and repetitive interactive opportunities.

Teacher And Infrastructure Challenges

Although the effectiveness of generative AI applications has been demonstrated, significant challenges exist in terms of teacher competency and infrastructure. Many preschool teachers lack exposure to AI-based teaching methods, while schools in rural areas face internet access issues and insufficient digital equipment. These conditions hinder the smooth integration of AI into classrooms. Consequently, the findings stress the importance of teacher professional development and equitable infrastructure support to ensure inclusive implementation of generative AI.

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Curriculum Issues And Content Suitability

The findings also revealed that some generative AI applications were not aligned with the National Preschool Standard Curriculum (KSPK). Certain content was found to be too general, culturally insensitive, or inappropriate for preschoolers' cognitive development levels. Therefore, there is an urgent need for systematic digital content curation to align with KSPK objectives. This also necessitates the development of national guidelines to ensure that generated content is child-friendly, safe, and contextually relevant to Malaysian preschool education.

Diversity Of Learner Contexts

The final theme highlighted the diversity of learner contexts in the use of generative AI. Research showed positive impacts not only on mainstream students but also on preschoolers with special educational needs (SEN). For instance, studies found that SEN students became more confident in speaking when assisted with AI applications. However, effectiveness depended on teachers' ability to adapt pedagogical approaches to children's developmental levels. Thus, the use of generative AI must be strategically designed to be more inclusive and adaptive, ensuring support for learning across all student categories.

Discussion

Generative AI as a Catalyst for Early Communication

The analyzed local studies indicate that the use of generative AI, particularly through chatbots and digital storytelling, can enhance preschool children's vocabulary, confidence, and motivation to communicate. This effectiveness can be understood through Vygotsky's sociocultural theory (1978), which emphasizes that children's language development occurs through social interaction. In this context, AI technology functions as a form of digital scaffolding, providing interactive, responsive, and safe spaces for children to practice communication repeatedly. These findings not only support language development theories but also align with the Communication Pillar in the National Preschool Standard Curriculum (Kurikulum Standard Prasekolah Kebangsaan, KSPK), which highlights language mastery as a foundation for early child development (Ministry of Education Malaysia, 2017). This alignment is reinforced in the 2026 Preschool Curriculum (KP2026), which emphasizes language mastery, etiquette, and communication competencies as essential elements for lifelong learning (Ministry of Education Malaysia, 2025).

Teacher Readiness and Professionalism Issues

Despite the evident potential of generative AI, the readiness of preschool teachers remains a major concern. Most teachers report challenges in handling technology, concerns about data privacy and cybersecurity, and apprehension about increased workload. These findings are consistent with Dwivedi et al. (2023), who highlighted that the effectiveness of AI integration in education depends heavily on teachers' digital literacy, pedagogical understanding, and acceptance levels. Therefore, efforts to develop continuous teacher professionalism through systematic and practical training are essential. This need aligns with the National Artificial Intelligence Framework (Ministry of Science, Technology and Innovation Malaysia, 2021), which emphasizes developing digital competencies among educators as a foundation for national education transformation. It also aligns with KP2026, which prioritizes the professional development of preschool teachers, particularly in digital literacy, pedagogical competence, and mastery of educational technology (Ministry of Education Malaysia, 2025).

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Curriculum Issues and Content Alignment

Several studies indicate that AI-generated content is not always aligned with official curriculum standards, particularly in terms of age appropriateness, developmental level, and sensitivity to local cultural and linguistic values. This situation implies that AI use in early childhood education cannot be implemented directly ("plug and play") but requires adaptation and content curation. According to Shulman's (1986) Pedagogical Content Knowledge (PCK) framework, teachers are required not only to master content but also to adapt it with pedagogical strategies appropriate to students' developmental levels. In the context of generative AI, teachers must act as critical filters and mediators to ensure that digital materials support KSPK learning objectives and do not conflict with national educational values (Ministry of Education Malaysia, 2017). This is particularly significant when linked to KP2026, which emphasizes content alignment with culture, local values, and students' developmental stages (Ministry of Education Malaysia, 2025).

Diversity of Student Contexts and Inclusivity

Generative AI also demonstrates potential in supporting students with special educational needs (SEN), for example as a more interactive alternative communication medium. This aligns with the principles of Universal Design for Learning (UDL), which emphasize multiple means of representation, engagement, and expression (CAST, 2018). However, to ensure effectiveness, AI applications must be adapted according to context, including language difficulty levels, visual support, and interaction duration flexibility. This approach benefits not only SEN students but also supports inclusive education goals outlined in KSPK and reinforced in KP2026, which expands focus on access, equity, and learning flexibility for all children regardless of background (Ministry of Education Malaysia, 2025).

Research Gaps and Future Agenda

The literature also indicates that the scope of local research remains limited. Most studies are small-scale pilots focusing on basic communication, while other dimensions such as critical thinking, creativity, collaboration, and digital literacy remain underexplored. Moreover, no longitudinal studies have assessed the long-term impact of generative AI use on preschool children's language and social development. This gap presents opportunities for future research agendas, including integrated curriculum design, teacher training module development, and the establishment of national guidelines regulating generative AI integration in early childhood education. This is consistent with KP2026, which underscores the need for pedagogical innovation, technology integration, and continuous research to support preschool education transformation (Ministry of Education Malaysia, 2025).

Policy and Practice Implications

Overall, this study emphasizes that generative AI has the potential to become a strategic catalyst in shaping preschool students into competent, confident, and digitally capable young communicators in Malaysia. However, this effectiveness can only be realized if there is alignment between three main factors:

1) Teacher readiness through continuous professional training,
2) Inclusive digital infrastructure to reduce the urban–rural educational gap and
3) Clear curriculum guidelines and national policies to ensure that the use of generative AI aligns with the country's educational aspirations.

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When these three elements are addressed in balance, generative AI has the potential not only as a technological tool but also as a pedagogical transformation contributing to achieving KSPK goals and KP2026 reforms, particularly in developing preschool students who are communicatively literate, digitally skilled, ethically grounded, and prepared to face 21st-century challenges (Ministry of Education Malaysia, 2017 & 2025).

Conclusion

This Systematic Literature Review (SLR) critically examines local research (2020–2025) on generative artificial intelligence (Generative AI) pedagogy in Malaysian preschool education. The findings indicate that generative AI use, particularly through interactive chatbots and digital storytelling, can support early communication development in children and shape them into more confident, interactive young communicators. These findings align with national policy aspirations such as the National Preschool Standard Curriculum (KSPK), which emphasizes holistic child development based on communication, values, and life skills (MOE, 2021), as well as the National AI Framework 2021, which focuses on integrating digital technology into early childhood education. Furthermore, the findings support the reforms introduced in the 2026 Preschool Curriculum (KP2026), which emphasize digital technology integration, values, and life competencies as foundations for strengthening early education. However, the study also reveals several key challenges that need to be addressed to ensure effective generative AI implementation. These include low teacher readiness, disparities in digital infrastructure between urban and rural areas, content alignment with the curriculum, and ethical and data privacy concerns. Although the technology's potential to support inclusive learning, including for students with special educational needs (SEN), has been demonstrated, existing applications still require improvement to be more child-friendly, safe, and culturally appropriate.

Overall, generative AI has the potential to serve as an effective pedagogical tool in Malaysian preschool education, particularly in developing children as competent, creative, and confident young communicators. The success of technology integration depends on three key elements: (i) policy and curriculum guideline support, (ii) teacher professional development through continuous training, and (iii) further research to evaluate long-term impact and develop more effective pedagogical modules. With the combination of these elements, generative AI can strengthen national efforts to cultivate early childhood learners ready to face 21st-century communication, literacy, and digital literacy challenges, in line with KSPK aspirations and the new direction of KP2026.

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