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INTEGRATING GENERATIVE AI IN PRIMARY ENGLISH MATERIAL DESIGN: INSIGHTS FROM INDONESIAN TEACHERS' PERCEPTIONS

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Abstract/Izvleček

This study explored primary school teachers' perceptions of Generative AI (GenAI) in English material design. Data from 20 certified Indonesian teachers were collected through interviews and document analysis. Findings indicate GenAI is valued for enhancing efficiency and personalization, especially in creating worksheets, reading texts, grammar tasks, and vocabulary lists. However, concerns emerged regarding pedagogical integration, ethical use, and lack of training. Teachers' perceptions were shaped by their professional development experiences. The study underscores the urgent need for continuous, practice-based teacher training to develop AI literacy and ensure that GenAI supports, rather than replaces, instructional decision-making.

Integracija generativne umetne inteligence v oblikovanje učnih gradiv za angleščino v osnovni šoli: ugotovitve iz raziskav stališč indonezijskih učiteljev

V študiji smo raziskovali zaznave učiteljev osnovnih šol o uporabi generativne umetne inteligence (GUI; angl. Generative Artificial Intelligence – GenAI) pri oblikovanju učnih gradiv za pouk angleščine. Podatke dvajsetih učiteljev iz Indonezije smo zbrali z intervjuji in analizo dokumentov. Ugotovitve kažejo, da učitelji GUI cenijo zaradi povečanja učinkovitosti in personalizacije, zlasti pri ustvarjanju delovnih listov, bralnih besedil, slovničnih vaj in seznamov besedišča. Kljub temu so se pojavile skrbi glede pedagoške rabe, etične rabe in pomanjkanja tovrstnega usposabljanja. V študiji poudarjamo nujnost stalnega, na praksi temelječega usposabljanja učiteljev za razvoj tovrstne pismenosti in podporo pri pedagoških odločitvah.

Keywords:
Artificial Intelligence, English Material Design, Generative AI, Primary Education, Teacher Perception.

Ključne besede:
umetna inteligenca, oblikovanje učnih gradiv za angleščino, generativna umetna inteligenca, osnovnošolsko izobraževanje, zaznava učiteljev.

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Introduction

Developing English learning materials for primary school education is crucial in supporting children's holistic growth. Early exposure to English significantly contributes to children's cognitive development and social skills, including communicative perspective-taking (Lucas, 2023). This foundational stage in language acquisition is closely linked to broader literacy gains and future academic success. Moreover, early English learning can nurture motivation and engagement, essential for sustained language learning progress (Tong et al., 2021). Teachers are key agents in this process, serving as designers who create and adapt materials to suit their students' developmental needs (Li et al., 2023). By tailoring content to their learners, teachers address diverse learning needs and enhance their pedagogical competence through the design process. Additionally, involving students in material development can boost their sense of ownership and increase their active participation in learning (Silvola et al., 2021).

The characteristics of instructional materials are central to facilitating effective language learning. To maintain learner interest and increase motivation, resources should be interactive and incorporate multimedia components, such as animated videos (Tugtekin and Dursun, 2022). For vocabulary development, meaningful repetition, dialogic reading, and integration of multimedia elements are effective (Chow et al., 2023). The most impactful resources offer a holistic approach by integrating language with content from other subjects, thereby enriching the educational experience. However, producing such tailored materials presents challenges. Recent advances in Artificial Intelligence (AI), particularly Generative AI (GenAI), offer new possibilities for overcoming these challenges.

GenAI tools, including ChatGPT, Bard, and Copilot, represent a significant innovation in AI. These tools use advanced machine learning to generate human-like text and visuals, making them adaptable for various educational applications (Rudolph et al., 2023). Within the context of English language learning, GenAI enables the development of personalized and context-sensitive materials. It can generate content that aligns with individual student needs, increasing engagement and supporting improved learning outcomes (Hu and Shao, 2025). GenAI also facilitates adaptive learning paths by adjusting content difficulty and pacing. Furthermore, it produces materials that reflect diverse cultural contexts and supports interaction through intelligent tutoring and real-time feedback systems (Eguchi et al., 2021).

AI is increasingly being integrated into educational practices due to its potential to enhance teaching and learning processes. It supports teachers in lesson planning, developing simulations, and designing adaptive assessments, which can improve instructional quality (Yeh, 2025). AI also assists in modifying curricula based on student performance, thereby maintaining relevance and effectiveness. In addition, AI helps with administrative duties such as grading, reducing the burden on teachers (Ahmad et al., 2022). Despite these benefits, several challenges remain. Algorithmic bias, where AI replicates social and cultural inequalities in its training data, must be addressed (Massala, 2023). Data privacy and security concerns also require attention, with strong safeguards necessary to protect student information (Al-Abdullatif & Gameil, 2020). Ethical considerations are equally important to ensure AI supports rather than undermines equity in education or the professional roles of teachers.

The academic literature on AI in education has grown significantly, focusing primarily on secondary and tertiary education contexts. Much of this research highlights general applications of AI, particularly GenAI, in teaching and learning (Moorhouse et al., 2024). A central focus has been on adaptive systems that personalize learning to increase engagement and outcomes (Hastomo et al., 2025). Studies often examine machine learning, data mining, and learning analytics to enhance educational practices, showing that AI-based tools can provide personalized feedback that improves student achievement (Chang et al., 2023). Intelligent tutoring systems and automated assessments have also been found to increase student participation and reduce teacher workload (Liu and Xiao, 2025).

In language learning, research has explored areas such as grammar and vocabulary, utilizing tools like chatbots and natural language processing to create more adaptive learning experiences (Marzuki et al., 2023). Despite the increasing body of literature, there are two notable gaps. First, there is a predominant focus on higher and secondary education. Second, limited attention has been given to the use of AI, particularly GenAI, in the development of instructional materials (Darwin et al., 2024; Mohamed, 2024; Safitri and Fithriani, 2024; Taşçı and Tunaz, 2024). Specifically, no existing studies have examined how primary school teachers perceive and apply GenAI in designing English learning materials. Understanding these perspectives is essential, as teachers' views influence the successful integration of new technologies into educational practice. To address this gap in the Indonesian context, the current study aims to investigate the following research questions:

1. How do primary school teachers perceive the integration of GenAI in designing English language learning materials?

2. What English learning materials are commonly developed by primary school teachers using GenAI?

Teachers' perceptions and technology adoption

Understanding teacher perceptions is essential for the successful adoption of educational technology. These perceptions significantly influence teachers' willingness to embrace and implement new tools. The Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) provide valuable frameworks for analysing this relationship (Lin et al., 2025). According to these models, perceptions of a technology's usefulness and ease of use are key predictors of teachers' behavioural intentions. Specifically, TAM identifies perceived usefulness and ease of use as the core determinants of technology acceptance, shaping attitudes and intentions (Ibrahim and Shiring, 2022). UTAUT builds upon this by incorporating additional constructs such as performance expectancy, effort expectancy, social influence, and facilitating conditions, collectively influencing actual usage behaviour (Al-Adwan et al., 2025).

In addition to these theoretical perspectives, teacher self-efficacy is a crucial factor. Teachers who believe in using technology effectively are more likely to develop positive attitudes and integrate it into their practice. This confidence can be enhanced through targeted training and institutional support. However, even when technology is available, several obstacles may hinder integration. These include inadequate infrastructure, limited training opportunities, and pedagogical misalignment (Cahyono et al., 2016; Gozali and Cahyono, 2022). Overcoming these challenges requires adequate resources and strong administrative and technical support. A supportive school environment can reinforce teacher confidence and foster the positive attitudes that are essential for successful implementation. While these models offer a general understanding of technology adoption, they gain renewed significance in dynamic contexts marked by rapid innovation. This is especially relevant for the emergence of GenAI. Despite its growing relevance, current research has not explored how these established frameworks apply to primary school teachers' perceptions of using GenAI to design English language learning materials. This gap highlights the need for further investigation in this specific context.

Methods

Research Design

This study employed an interpretivist-constructivist paradigm to explore the nuanced interaction between teachers and GenAI in educational settings (Lincoln and Guba, 1985). This paradigm views reality as a subjective construct shaped by individual experiences, making it suitable for examining teachers' perceptions, challenges, and concerns. In this context, perception is understood as a personal interpretation shaped by professional and contextual factors. Rather than seeking universal conclusions, the study aimed to understand participants' varied and lived experiences, following the qualitative tradition of prioritizing depth over generalizability (Creswell and Poth, 2018). To apply this paradigm, the study adopted a phenomenological case study design. This combined approach allowed for detailed exploration of individual experiences while situating them within a defined institutional and geographical context (Yin, 2018). The phenomenological aspect focused on understanding teachers' first-hand interactions with GenAI, capturing the meaning they assign to these experiences. The case study component framed the investigation within the specific realities of a group of elementary English teachers. These elements provided a comprehensive analytical perspective, revealing the essence of the participants' experiences and the contextual conditions that shaped them.

Context of the Study and Participants

This research was conducted in elementary schools across Lampung Province, Indonesia, which was purposefully selected for its diverse educational settings. The area includes both urban centres such as Bandar Lampung and more suburban and rural districts, encompassing public and private institutions with varying levels of technological infrastructure, curricular flexibility, and student demographics. This diversity enhances the transferability of findings, which is essential in qualitative research (Lincoln and Guba, 1985). Participants were chosen through purposive maximum variation sampling to capture a wide range of perspectives rather than achieve statistical generalization (Patton, 2015). The sample consisted of 20 certified elementary English teachers from different school types, all with some experience using GenAI for material development. The selection also accounted for differences in teaching experience and self-reported familiarity with GenAI.

Instruments

To obtain rich and layered data, this study employed semi-structured interviews as the primary method and document analysis as a secondary tool for triangulation (Bowen, 2009). The interview guide combined core open-ended questions with the flexibility to pursue follow-up inquiries, allowing the researcher to explore emerging issues while maintaining consistency across participants. This flexible format was particularly suited to investigating evolving teacher perspectives on GenAI (Kvale and Brinkmann, 2009). The interviews explored teachers' initial and developing views of GenAI, the types of instructional materials they created, and the processes they followed. Participants provided two to three examples of GenAI-generated English teaching materials to complement the interview data, including original prompts, raw outputs, and final versions. This supplementary data addressed the potential "say-do gap" by offering concrete artifacts to confirm or elaborate on interview responses. Agreement between interview content and document evidence reinforced the credibility of the findings, while discrepancies prompted further analytical inquiry. This triangulation process enhanced the study's trustworthiness, a key standard in qualitative research (Denzin, 2017). The collected materials were examined for suitability for the intended grade level, the degree of teacher modification from the original GenAI output, and the creativity reflected in their classroom application.

Data Collection

The data collection process was structured and ethical, beginning with formal approval from the university's research ethics board. Following this, permission was obtained from school principals who served as institutional gatekeepers. Participants meeting the purposive sampling criteria were identified and invited to participate. Before data collection, each participant participated in an individual informed consent session, which explained the study's purpose, procedures, confidentiality protocols, and voluntary involvement. Participants then signed a consent form to confirm their agreement. Data collection sessions were held in quiet, private settings and lasted 45 to 60 minutes. With consent, interviews were audio-recorded, and at the end of each session, participants submitted two to three examples of GenAI-generated teaching materials. All audio recordings were transcribed verbatim to ensure the accuracy and completeness of the dataset, which was essential for rigorous qualitative analysis.

Data Analysis

The data were analysed using reflexive thematic analysis, which was selected for its structured yet adaptable approach suitable for exploratory research (Braun and Clarke, 2006). The process was supported by NVivo, a qualitative data analysis software, to enhance analytical rigor and manage data efficiently. Using such tools represents a methodological advance that helps maintain consistency and reduces the potential for error often found in manual coding, particularly with large datasets (Saldana, 2021). The analysis followed Braun and Clarke's six-phase process. It began with familiarization, during which the researcher thoroughly read transcripts and reviewed documents to develop a deep understanding of the data. This was followed by open coding, where descriptive labels were systematically applied to meaningful segments. Related codes were then organized into preliminary themes based on recurring patterns. These themes were critically evaluated and refined to ensure internal consistency and clear distinctions between categories, aligning with principles of sound thematic development (Patton, 2015). Each theme was defined and named to capture its core meaning. In the final phase, the themes were integrated into a coherent analytical narrative, supported by illustrative data excerpts, to address the research questions comprehensively.

Results

Primary school teachers' perception of the integration of GenAI in designing English language learning materials

Table 1 presents key themes derived from participant data regarding the benefits and drawbacks of GenAI integration in educational contexts.

The findings reveal a complex and often dualistic set of perceptions among primary school English teachers regarding integrating GenAI in material design. There is a strong and widely held positive view of GenAI's potential to enhance job performance, as one teacher noted, "*It helps me create personalized materials for my students much faster*" (Participant 1). This aligns with the PU construct within the TAM. Teachers consistently recognized GenAI's capacity to increase efficiency, save significant preparation time, and facilitate the creation of personalized content for diverse learner groups. This positive perception is often driven by an acknowledgment that GenAI can automate repetitive and time-consuming tasks, freeing teachers to focus on more direct instructional activities.

Table 1
Analysis of Teacher Perceptions of GenAI

Perception Dimension	Key Themes from Participant Data
Perceived Benefits (Usefulness)	Efficiency and Time Saving: Rapid lesson plans, texts, and activity generation.
	Personalization of Learning: Creating differentiated materials for varied proficiency levels.
	Enhanced Creativity: Generating novel ideas for lessons and story prompts.
	Access to Information: Quick access to a wide range of content and explanations.
Perceived Drawbacks (Barriers to Ease of Use)	Pedagogical Uncertainty: Lack of clarity on how to integrate GenAI effectively into lesson flow.
	Lack of Confidence and Skills: Feeling unprepared to use the tools without formal training.
	Fear of Over-reliance: Concern that both teachers and students will become dependent on the tools.
	Accuracy and Data Privacy: Concerns about content reliability and the safety of users' data.

However, this enthusiasm is substantially moderated by a significant degree of apprehension and a lack of confidence in these tools' practical and pedagogical application. This reflects a low PEoU, a construct that extends beyond simple user interface navigation in the context of GenAI. For these teachers, PEoU encompasses a broader set of competences, including the ability to integrate the technology into pedagogical practice in a sound manner, trust AI output, and navigate its ethical complexities. As one participant expressed, "*I'm not sure if I'm using it correctly for teaching, even if it seems easy to get an answer*" (Participant 9). Many participants were confused about the full range of possible applications, which research suggests can lead to a reduced intention to integrate such tools into their practice.

A key finding is that perception is not static. Teachers who participated in structured and collaborative professional development, such as lesson study formats, reported a notable improvement in their attitudes and perceptions. One teacher remarked, "*After the lesson study session, I felt much more confident and saw more possibilities for my classroom*" (Participant 7). This experiential use appeared to enhance their sense of the tool's usefulness and their confidence, which motivated a stronger intention for future integration.

Overall, the prevailing sentiment is cautious optimism. Teachers embrace the potential of GenAI to support academic achievement and student engagement, but simultaneously express a clear desire for the technology to function as a supportive assistant, firmly under the control of their professional judgment, rather than as a replacement for their pedagogical expertise. This was succinctly captured by a senior teacher who stated, "*The tool is a great assistant, but I must always be the one in control of the final material*" (Participant 14).

Types of English learning materials commonly developed by primary school teachers using GenAI

Table 2 presents the types of English learning materials frequently developed by primary school teachers using GenAI.

Table 2
Findings of Types of English learning materials commonly developed by primary school teachers using GenAI

Material Category	Specific Material Type
Foundational Content & Texts	Reading passages (short stories, factual texts)
	Worksheets (fill-in-the-blank, matching)
	Vocabulary lists with definitions
	Lesson plan outlines
Skill-Specific Practice	Grammar exercises
	Role-play dialogues and scripts
	Story starters and writing prompts
	Pronunciation practice sentences
Assessment & Evaluation	Multiple-choice quiz questions
	Open-ended comprehension questions

According to thematic analysis, this study identified the specific types of English language teaching materials that primary school teachers commonly develop using GenAI. The findings indicate that usage is heavily concentrated on tasks that reduce the administrative and preparatory workload associated with teaching. The primary motivation for using GenAI in material design is to increase efficiency and produce a wide variety of resources quickly, with one teacher stating, "*My main reason for using it is to get my preparation done more quickly*" (Participant 5). GenAI is predominantly viewed and utilized as an educational support tool for generating human-like content across different modalities.

The most frequent applications involve the generation of foundational, text-based content. This includes creating customized worksheets, reading passages tailored to specific topics or reading levels, and vocabulary lists with definitions. One participant shared, "*I mostly use it to generate simple reading passages and grammar exercises*

for my students" (Participant 13). Teachers also regularly use GenAI to produce skill-specific practice materials, such as grammar exercises targeting particular linguistic structures, simple dialogues for role-playing activities, and creative story starters to inspire student writing. Generating these materials quickly allows teachers better to address diverse learner needs within a single classroom.

A smaller group of teachers reported higher levels of technological confidence and described experimenting with more complex and interactive material types. One advanced user mentioned, "*I've started using it to create prompts for pictures and to generate quiz questions for Kahoot*" (Participant 10). These included generating prompts for visual aids, such as asking the AI to describe an image that could then be created or found, and developing questions for interactive quizzes and assessments. Across all use cases, the pattern is clear: teachers leverage GenAI as a fast and versatile assistant for content creation, enabling them to produce a greater volume and variety of materials than would be possible through manual methods alone.

Discussion

This study's exploration of teacher perceptions is closely aligned with established models of technology acceptance, particularly the TAM and UTAUT. Teachers reported a high level of PU, echoing common discussions of GenAI's potential to automate tasks, reduce workload, and personalize instruction (Kong et al., 2024). However, the primary obstacle to adoption emerged around PEoU. For GenAI, PEoU encompasses more than user interface simplicity; it includes teachers' technical ability, pedagogical confidence, and trust in the tool's output. Many participants noted that technical knowledge alone was inadequate without the capacity to evaluate whether the AI-generated content aligned with sound instructional practices. This expanded view of PEoU helps explain the "widespread confusion on the possible applications" observed in previous studies (Petrucco et al., 2025).

The data further revealed that teachers currently use GenAI primarily for instrumental purposes, mainly for generating worksheets, reading texts, and other preparatory materials. These uses are consistent with findings highlighting GenAI's role in saving time and supporting classroom management tasks (George and Wooden, 2023). However, this reliance on efficiency risks long-term consequences, including a potential decline in teacher creativity and the standardization of instructional content. To mitigate this, teachers must develop a new professional

competency: crafting pedagogically sound prompts. As Leung (2024) explains, this "pedagogical prompt engineering" skill allows educators to convert instructional goals and learner needs into clear instructions that guide the AI in producing appropriate content. By cultivating this skill, teachers can move from passive users to active co-designers of meaningful learning experiences (Zulianti et al., 2024).

A unifying theme in these findings is the importance of fostering teacher agency in the age of AI. Teacher agency refers to making informed, reflective, and pedagogically sound decisions about how and when to use GenAI tools (Lee and Tseng, 2025). Building this capacity requires rethinking professional development. Rather than focusing solely on basic digital skills, training should aim to develop a comprehensive form of AI literacy. This includes technical knowledge, ethical reasoning, critical evaluation of AI output, and instructional creativity (Eguchi et al., 2021). The study suggests that one-time training sessions are insufficient. Effective professional development should be ongoing, collaborative, and embedded in authentic teaching practice. Ultimately, empowering teachers to lead technological integration ensures that GenAI serves educational purposes while reinforcing the teacher's central role in guiding student learning.

Conclusion

The findings of this study revealed that primary school teachers perceived GenAI as both promising and challenging in the context of English material development. In response to the first research question, teachers valued GenAI for its ability to improve efficiency and support the creation of personalized materials. However, their perceptions were shaped by a mixture of enthusiasm and uncertainty. Many teachers reported limited confidence in integrating the technology into pedagogical practice. Barriers such as ethical concerns, lack of training, and technical limitations influenced their readiness to adopt GenAI meaningfully. These mixed views reflect the importance of considering perceived usefulness and ease of use when introducing AI tools into primary education.

The study identified the most common materials developed using GenAI regarding the second research question. These included reading texts, worksheets, vocabulary lists, grammar tasks, and simple writing prompts. Teachers with more confidence also used GenAI to create interactive quizzes and visual aids. These findings suggest that GenAI is currently used in a practical and supportive role, focused on content generation rather than instructional innovation.

The study implies that teacher training programs must prioritize hands-on experience and critical thinking about AI-generated content. As a qualitative study with a limited sample size from a single region, its findings are not generalizable. Future research should include larger populations and examine how professional development shapes long-term adoption patterns.

Data Availability Statement

The article is based on data fully presented and discussed within the article itself; therefore, no additional data archiving is required.

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