

## **INTEGRATING GENERATIVE AI (GROK.AI) INTO THE DEVELOPMENT OF PERSONALIZED ENGLISH TEACHING MEDIA IN KINDERGARTEN**

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**Abstract:** This study investigates the process of Integrating Generative Artificial Intelligence, specifically Grok.ai, into the development of personalized English teaching media in kindergarten. Adopting a descriptive qualitative approach, this study was conducted at TK Kartika XV-3, Kartasura, Sukoharjo, Central Java, with 41 students participating in an English lesson on the theme of Occupations and Workplaces. Data were collected through direct observation, semi-structured interviews with the classroom teacher, and documentation of the AI-generated media and classroom activities. Data analysis followed Miles, Huberman, and Saldaña's (2014) interactive model. Findings reveal that Grok.ai was integrated through a deliberate two-stage process: (1) the creation of personalized flashcards in which each student's photograph was transformed via AI-generated image editing to depict the child wearing a professional costume, and (2) the development of differentiated worksheets tailored to the distinct proficiency levels of two student groups. Both stages required carefully crafted prompts and iterative refinement cycles to produce outputs that were visually appropriate and pedagogically usable. These findings confirm that effective integration of generative AI in early childhood English teaching media demands deliberate prompt literacy and systematic pre-observation of student needs, and that Grok.ai is an effective tool for creating personalized, developmentally appropriate English teaching materials in Indonesian kindergartens.

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**Keywords:** English Teaching; Generative AI; Grok.ai; Kindergarten; Personalized Media

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### **INTRODUCTION**

Teaching English in kindergarten demands a fundamentally different approach from other educational levels. Young learners in the preoperational stage of cognitive development, typically between the ages of two and seven, learn most effectively through concrete, visual, and personally relevant experiences (Santrock, 2014). Children understand and retain meaning more effectively when they have seen images associated with that meaning, making visual media not merely helpful but essential for early childhood language instruction (Ernestova, 1988, as cited in Fauziati, 2017). Furthermore, children talk about the here and now, meaning that learning content must be anchored in their immediate, familiar daily experiences (Clark & Clark, 1977, as cited in Fauziati, 2017). Ideally, therefore, English teaching media in kindergarten should be both visually rich and personally relevant to each individual child.

Wright (1990) established that pictures are among the most powerful tools for language learning, as they stimulate imagination and provide concrete visual anchors for vocabulary meaning. This principle is particularly critical in early childhood contexts, where children's cognitive development depends on personal, visual, and experiential learning (Ardiana, 2021). Pictures develop motivation, build positive attitudes toward the target language, and reinforce

language skills by providing a visual anchor for vocabulary meaning (Fauziati, 2017). The empirical significance of visual media in vocabulary learning has been demonstrated by Gunawan (2022), whose study found that the use of pictures significantly improved students' English vocabulary achievement, with post-test mean scores (79) substantially higher than pre-test mean scores (32).

Vygotsky's sociocultural theory further complements this understanding: the teacher acts as a scaffolder who mediates between young learners and the learning media, using the Zone of Proximal Development (ZPD) as a framework for supporting vocabulary production in a personally meaningful context (Santrock, 2014). Sadykova and Kayumova (2025) demonstrated in a mixed-method study involving 4-6-year-old EFL learners that AI-powered image generators hold significant educational potential for developing language skills in young learners, with the teacher's mediating role remaining indispensable throughout the learning process.

In practice, however, English teachers in kindergarten settings frequently face significant constraints of time, resources, and graphic design expertise. These constraints result in the use of generic, impersonal media that fails to engage children's motivation at an optimal level, as identified in the researcher's pre-observation at TK Kartika XV-3, Kartasura, Sukoharjo. Istiqomah and Giovani (2025) documented a similar challenge in their community service study at TK ABA Wasur II in Merauke, finding that most kindergarten teachers had not yet maximized the use of AI technology in their teaching, primarily due to limited knowledge and skills in using AI tools. This gap between the pedagogical ideal of personally relevant visual media and the practical reality of resource-limited classroom instruction represents a significant and widespread problem in Indonesian early childhood English education.

The rapid development of Generative Artificial Intelligence (Generative AI) has opened entirely new possibilities for addressing this gap. Technologies such as Grok.ai are capable of producing new images and visual materials efficiently based on user-provided textual instructions known as prompts. Weng and Fu (2025) note that generative AI significantly increases learner motivation and confidence while enabling teachers to individualize instruction. Zhang, Halili, and Zainuddin (2026) confirmed in a systematic review that generative AI tools offer significant benefits for young learners in early childhood settings, including personalized learning pathways and increased engagement. Fauzi et al. (2025) found a statistically significant positive correlation between the use of Grok.ai as a teaching medium and students' digital literacy ( $r = .364$ ,  $p = .048$ ), suggesting that Grok.ai holds genuine educational potential beyond its social media origins. Su, Ng, and Chu (2023) further identified that AI literacy in early childhood education presents both significant challenges and opportunities, emphasizing the need for deliberate professional development among educators who wish to integrate AI tools effectively. Abimanto (2023) noted

that AI technology has the potential to transform language teaching by making it more accessible and efficient for learners from diverse backgrounds. A teacher can now produce personalized visual flashcards customized to each student's individual context within minutes, without requiring expertise in complex design software.

Effective use of generative AI in media development, however, requires a specific technical competency: prompt literacy. Sevcan and Çepni (2025) define prompt literacy as the ability to craft effective, specific, and contextually appropriate instructions for AI systems, and demonstrate that structured prompt writing training significantly improved EFL teachers' capacity to produce pedagogically relevant AI-generated content. Anwar (2024) similarly found that training in AI technology recognition significantly improved teachers' competencies in digital transformation, underscoring the importance of deliberate professional development for educators integrating AI into their practice.

Although there is an extensive literature of research on generative AI in education, studies specifically exploring the process of integrating AI into the development of personalized English teaching media for kindergarten students remain very limited, especially in the Indonesian early childhood education context. This study addresses this gap by examining how Grok.ai was integrated into the development of personalized English teaching media at TK Kartika XV-3, focusing on the media creation process through prompt engineering, the iterative refinement of AI outputs, and the pedagogical decisions that guided media development. The research question guiding this study is: How is Generative AI (Grok.ai) integrated into the development of personalized English teaching media for kindergarten students?

## **METHOD**

This study employs a qualitative approach with a descriptive design. A descriptive qualitative design was selected because the primary aim is to explore and gain an in-depth understanding of the process of integrating generative AI in developing English teaching media as it naturally occurs in a real kindergarten classroom, without experimental treatment or manipulation.

This study was conducted at TK Kartika XV-3, located in Pucangan Village, Kartasura District, Sukoharjo Regency, Central Java. Data collection was carried out on 24 February 2026, coinciding with the school's planned English lesson on the topic of Occupations and Workplaces. The participants comprised 41 students: 23 students from Group A and 18 students from Group B. Group A students were at a basic English proficiency level focusing on vocabulary introduction, while Group B students demonstrated higher readiness for more cognitively demanding literacy tasks. The classroom teacher accompanied and facilitated the implementation of the AI-generated media during the lesson and was subsequently interviewed.

Three complementary data collection techniques were employed. First, direct observation was conducted throughout the English learning session, systematically documented through a structured observation checklist, supplementary field notes, photographs, and video recordings. Second, a semi-structured interview was conducted with the classroom teacher following the lesson, covering her observations of the media development outcomes, the suitability of the AI-generated materials from a pedagogical perspective, and her reflections on the media creation process. Third, documentation was systematically collected, including the AI-generated personalized flashcards and worksheets produced through Grok.ai, the classroom interaction transcript, and the researcher's field notes, serving as physical evidence of the media development process (Abdussamad, 2021).

Data validity was ensured through triangulation of sources (classroom teacher interview, researcher's direct observation, and field notes) and techniques (observation, interview, and documentation), supplemented by member checking. Data analysis followed Miles, Huberman, and Saldaña's (2014) interactive model, comprising three iterative components: data reduction, data display, and conclusion drawing and verification. Relevant data were thematically tagged around the AI media generation process, and conclusions were reached after continual verification against the entire body of information gathered

## **FINDING AND DISCUSSION**

The integration of Grok.ai into English teaching media development at TK Kartika XV-3 was carried out through a deliberate two-stage process: the development of personalized flashcards featuring individual students' faces, and the development of differentiated worksheets customized to the different ability levels of Group A and Group B. Both types of media were designed specifically for the lesson on Occupations and Workplaces. Media production was completed prior to the classroom session to allow for quality review and printing.

### **A. Personalized Flashcard Development**

The findings of this study emphasize the use of personalized flashcards as a key form of AI-generated media in kindergarten English learning. Each flashcard displayed a student's own face edited into a different profession role, producing visual materials that were simultaneously curriculum-aligned and personally meaningful to each child. Rather than serving only as a tool for generating materials, Grok.ai was used to adapt learning content in a way that reflected students' identities, a process that required deliberate prompt engineering and systematic pre-observation of student interests.

The production of this flashcards also revealed key competency requirement, prompt literacy. Producing each flashcard required two to three prompt iterations before achieving visually satisfactory and age-appropriate result. This confirms that effective use of generative AI in

teaching media development demands deliberate and specific instruction-crafting skills from teachers, not simply access to the technology (Sevcan & Cepni, 2025).

The core prompt used for flashcard development was:

*“Make this kid wear a doctor’s uniform with a stethoscope around her neck, don’t change her facial features, just her clothes”*

Variations of this prompt were applied across five target professions such as doctor, pilot, chef, soldier, and teacher. These professions were not selected at coincidence. During the pre-observation phase, the researcher observed and noted the professions that students frequently mentioned when asked about their future aspirations. The students showed familiarity with these roles and expressed personal interest in them, making these professions contextually relevant and meaningful as vocabulary themes for the lesson. By grounding the flashcard content in students’ own expressed aspirations, the media was designed to bridge the gap between classroom vocabulary and children’s real-world experiences.

The personalized flashcards showed a noticeable impact on student engagement during the learning process. Based on classroom observations, students demonstrated strong enthusiasm when the flashcards were introduced. They paid more attention, responded actively, and showed excitement when they recognized their own images in the learning media. This response is consistent with the principle that children in preoperational stage understand and retain meaning more effectively when learning content is anchored in their own concrete personal experiences (Santrock, 2014). When learning about professions, students were not only identifying vocabulary but also relating it to themselves through the visual representation, making the learning process more concrete and meaningful. As a result, students were able to participate more confidently in classroom activities.

More specifically to this increased participation, more detailed student responses were observed during the use of personalized flashcards. Several students showed spontaneous reactions such as smiling, laughing, and pointing the flashcards when they recognized their own faces. Some students also called their friends’ names while looking at the images, indicating that they were actively connecting the visual content with their classroom environment.

An interesting response was also observed when some students expressed their desire to have their photos shared with their parents after seeing themselves in the flashcards, this reaction shows that the learning experience was not only engaging in the classroom but also meaningful on a personal level. Students appeared proud and excited to be part of the learning media, suggesting a sense of ownership and emotional connection to the activity.

Compared to previous learning sessions using general visual media, the use of personalized flashcards showed a noticeable difference in student responses. In earlier lessons, some students

tended to be less responsive and required more prompting from teacher to participate. However, during the use of personalized flashcards, students became more attentive and responded more actively without repeated encouragement. This suggests that personalized media can reduce passive behavior and create a more engaging learning experience.

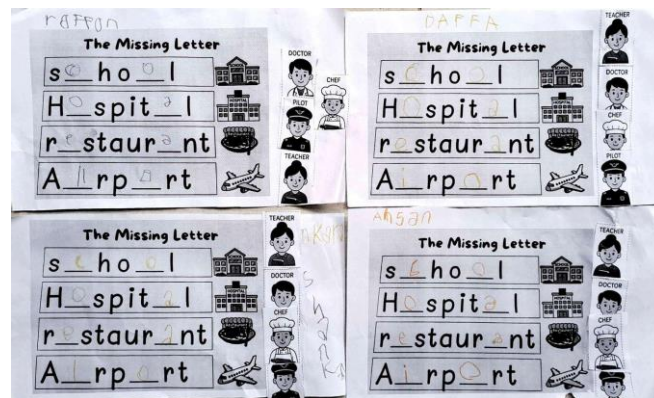
### B. Differentiated Worksheet Development

In addition to the use of personalized flashcards, differentiated worksheets were also implemented to support students' learning. Two sets of worksheets differentiated by difficulty level were developed to serve the distinct developmental needs of Group A and Group B. The decision to differentiate the worksheets was informed by pre-observation data identifying meaningful differences in the English language proficiency and literacy readiness of the two groups. Group A students benefited from a more visual, basic vocabulary introduction approach, while Group B students were ready for a more cognitively demanding task involving letter recognition and word completion. The detailed prompt used for the Group B missing letter worksheet was:

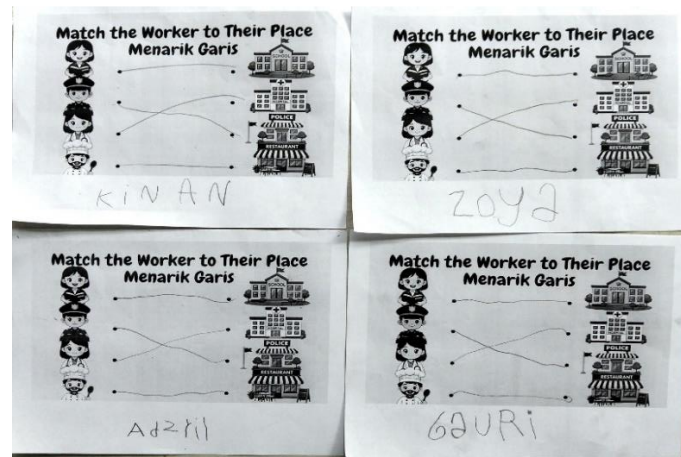
*“Cute children’s English worksheet ‘The Missing Letter’, title in fun font, four puzzles with missing letters and icons: first ‘s \_ h o \_ l’ with school building icon, second ‘H \_ s p i t \_ l’ with hospital icon, third ‘r \_ s t a u r \_ \_ t’ with restaurant food plate icon, fourth ‘A \_ \_ p \_ \_ t’ with airport icon, blank lines for letters, cartoon style for kids age 4-6, educational activity sheet layout, white background with dotted lines, playful, high detail, printable worksheet style, vector illustration, no text distortion, clean and clear.”*

For group A, a simpler prompt was used to generate a vocabulary matching worksheet:

*“Cute children’s english worksheet ‘Match the Worker to Their Place’, title in fun font, four matching puzzles with profession icons on the left and workplace icons on the right: teacher with school, doctor with hospital, chef with restaurant, police with police station, cartoon style for kids age 4-6, white background printable worksheet style, clean and clear”*



**Figure 1.** Completed Group B 'The Missing Letter' worksheets showing student work



**Figure 2.** Completed Group A 'Match the Worker to Their Place' worksheets showing student work

The ability to provide differentiated tasks tailored to each group's proficiency level shows how AI-supported media can assist teachers in managing diverse learning needs more effectively, while the pedagogical decisions about what to differentiate and at what level remained entirely in the hands of teacher.

Differences in student response were also observed between group A and group B during the learning activities. Group A students, who worked on simpler tasks showed confidence in recognizing and matching vocabulary with visual support. Meanwhile group B students demonstrated strong engagement when completing more challenging tasks, identifying and filling in missing letters. Despite variation in task difficulty, both groups demonstrated active engagement throughout the lesson, indicating that the differentiated worksheets facilitated participation across diverse levels of ability.

Beyond student responses, the interaction between the teacher and students also showed notable changes during the implementation of the differentiated worksheets. The structured and visual nature of the tasks enabled the teacher to provide clearer and more focused guidance, which supported students in understanding the instructions more effectively. Consequently, classroom communication developed into a more interactive process, contributing to a smoother and more organized learning experience.

Taken together, the findings indicate that the use of personalized flashcards and differentiated worksheets not only enhanced students engagement but also supported a more meaningful and inclusive learning process. Students participated more actively when the learning materials were connected to their personal experiences and aligned with their ability levels. The combination of these approaches fostered a classroom environment that was interactive and responsive to

individual differences among learners. These findings suggest that the integration of AI-generated media, when effectively guided by teacher, can support more effective and student-centered English learning in early childhood education.

## CONCLUSION

This study suggests that integrating generative AI in the creation of English teaching materials for kindergarten enhances the learning experience by facilitating a more engaging and adaptive approach, especially through individualized flashcards and differentiated worksheets. The implementation of personalized flashcards, using students' own photos, enhanced student engagement and participation in learning activities. Students expressed increased attention and engagement when they could identify with the learning materials. The implementation of differentiated worksheets for Groups A and B facilitated the adjustment of learning activities according to students' capacities. This method facilitated universal student participation in the course at a suitable level of difficulty, thus sustaining engagement and preventing both confusion and boredom.

The integration of these two methodologies created a learning environment that was more responsive to students' needs. The results show that AI-based media personalized for students' academic characteristics can efficiently facilitate English language learning in early childhood education. The utilization of personalized and differentiated resources offers practical support to educators in facilitating varied learning needs in classrooms and creating meaningful learning experiences for young learners.

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