Collaborative Design with Conversational Artificial Intelligence: A Case Study of Pre-Service Language Teachers in Multidisciplinary Teams

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This study examines the integration of Generative Artificial Intelligence (GAI) conversational agents as collaborative team members in a blended learning teacher education course for pre-service language teachers. Focusing on the intersection of emerging technologies and blended learning, the research explores how pre-service language teachers interact with GAI to support lesson planning, foster multidisciplinary collaboration, and enhance digital literacy skills. The findings reveal that GAI can impact the training experience of pre-service teachers by serving both as a pedagogical tool and a collaborative partner. Implications are discussed for teacher educators, researchers, teachers, and administrators in integrating AI technologies into teacher training programs to prepare educators for technology-rich learning environments.

Key Words: generative artificial intelligence, multidisciplinary design, digital literacy, prompt literacy

INTRODUCTION

The effective integration of emerging technologies into pre-service teacher training programs has become critical in preparing educators for modern, technology-enhanced classrooms. In the context of language teaching, leveraging such technologies, particularly within blended learning environments, can address challenges like engaging diverse learners, incorporating culturally responsive teaching practices, and facilitating personalized learning experiences (Bizami, Tasir, & Kew, 2023; Perry, Findon, & Cordingley, 2021; Anthony, Kamaludin, Romli, Raffei, , Phon, Abdullah, & Ming, 2022). Blended learning, which combines face-to-face instruction with online learning activities, requires teachers to be proficient in both traditional and digital pedagogies. Despite the potential benefits, many teacher education programs seek opportunities to prepare pre-service teachers to integrate advanced technological tools, especially those involving Artificial Intelligence (AI), into their teaching practices.

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The primary aim of this study is to explore how the Generative AI conversational agent can act as a collaborative co-designer with pre-service language teachers in a blended learning course working on middle school English Language Arts (ELA) and foreign language lessons. Specifically, the study seeks to understand how pre-service teachers engage with GAI in multidisciplinary teams, how this experience shapes their skills in using GAI technologies, and how lesson plans developed in this context align with the Triple E Framework with aspects to engage, enhance, and extend students' learning (Kolb, 2017). By examining these aspects, the research contributes to the broader discourse on language teacher education and offers practical strategies for integrating AI into pre-service teacher programs.

This study's purpose is to explore whether generative chatbots can move beyond mere productivity aid to become co-creators who sharpen novice teachers' digital fluency, ethical judgment, and inventive lesson design—evidence essential for teacher preparation in AI-integrated classrooms.

LITERATURE REVIEW

This section reviews the theoretical and research literature on issues in language teacher education within blended learning environments, educators' AI competencies and literacy, digital literacy in teacher education, and the application of the Triple E Framework in technology integration, all through the lens of sociocultural theory.

ISSUES IN LANGUAGE TEACHER TRAINING IN BLENDED LEARNING ENVIRONMENTS. Blended learning environments, which integrate face-to-face and online instruction, present unique challenges and opportunities for language teacher education. From a sociocultural perspective, effective teacher training relies on social interactions and the cultural context in which learning occurs (Vygotsky, 1978). Pre-service teachers often struggle to combine traditional and digital pedagogies due to limited training and experience (Comas-Quinn, 2011). The integration of technology requires not only technical skills but also a pedagogical shift, which can be difficult for those accustomed to conventional methods (Graham, 2006; Bizami, Tasir, & Kew, 2023). Institutional barriers such as limited access to technology, inadequate support, and lack of professional development further impede the successful implementation of blended learning (Porter, Graham, Bodily, & Sandberg, 2016). On the other hand, blended learning offers advantages by providing flexibility in time and space, enabling access to diverse resources, and facilitating collaboration beyond traditional classroom constraints (Al-Samarraie & Saeed, 2018). It supports the development of digital literacy and fosters innovative teaching practices by exposing pre-service teachers to various technological tools and platforms (Taheri, & Pennington, 2024). Moreover, blended learning promotes learner autonomy and personalized learning experiences, essential for effective language instruction (Elhamuye, 2024). Providing blended learning project and learning opportunities for pre-service teachers would enhance their ability and competency before their professional teaching career.

DIGITAL LITERACY AND ARTIFICIAL INTELLIGENCE LITERACY IN TEACHER EDUCATION. Digital literacy is a fundamental component of modern teacher education, encompassing the ability to effectively use digital technologies in teaching and learning (Taheri, & Pennington, 2024). Sociocultural theory emphasizes the role of social interaction and cultural tools in developing these competencies. However, digital literacy development often lacks depth and practical application, with pre-service teachers

receiving basic training in standard educational technologies but missing opportunities to engage with emerging tools like generative AI (Masoumi, & Noroozi, 2023). AI literacy extends digital literacy by requiring educators to understand AI technologies, their educational applications, and ethical considerations (Ng, Leung, Su, Ng, & Chu, 2023). Chen, Pan, and Jiang (2024) propose an AI literacy framework for educators, highlighting dimensions such as technical knowledge, integration into pedagogical practices, prompt literacy, and ethical awareness. They emphasize prompt literacy—the ability to craft effective prompts to elicit meaningful AI responses—as crucial for maximizing AI tools like Generative AI conversational agents. Additionally, critical thinking and reflective practices are essential for assessing the reliability and appropriateness of AI-generated content, addressing potential biases and inaccuracies (Chen et al., 2024). Despite the importance of AI competencies, there is a lack of consensus on defining AI literacy for educators, and few teacher education programs have incorporated comprehensive AI training. This gap underscores the need for targeted initiatives to enhance educators' AI competencies, enabling effective and ethical use of AI tools (Chen et al., 2024). In the mean time, many current studies focus on pre-service or in-service teachers' perceptions (Bae, Jaesung, Park, Choi, & Moon, 2024) or views (Hojeij, Kuhail, & ElSayary, 2024) on generative AI's use and competency in teaching. However, there is a need for empirical investigations to explore how such experiences can contribute to pre-service teacher preparation.

TRIPLE E FRAMEWORK IN TECHNOLOGY INTEGRATION. The Triple E Framework (Engage, Enhance, Extend) by Kolb (2011) provides a valuable lens for evaluating technology integration in educational settings through a sociocultural lens. It posits that technology should engage students by actively involving them in the learning process, enhance their understanding by supporting higher-order thinking skills, and extend learning by connecting it to real-world applications (Kolb, 2017). Applying the Triple E Framework in teacher education ensures that technology integration is purposeful and aligned with pedagogical goals, fostering meaningful interactions and collaborative learning experiences. This framework encourages educators to use technology not merely for its own sake but to genuinely improve learning outcomes, supporting the sociocultural emphasis on social interaction and cultural relevance in education.

METHODS

RESEARCH QUESTIONS

This study examines the integration of Generative Artificial Intelligence (GAI) conversational agents in pre-service language teacher education within blended learning environments through the lenses of sociocultural theory, AI literacy, digital literacy, and the Triple E Framework. The research is guided by three questions:

1. How does interaction with Generative AI influence pre-service language teachers' development of digital literacy and AI competencies?
2. What is the impact of Generative AI interaction on pre-service language teachers' collaborative practices within multidisciplinary teams?
3. How does engaging with Generative AI conversational agents affect pre-service language teachers' reflective practices and pedagogical decision-making?

CONTEXT

In this study, the pre-service language teachers participated in a blended learning team project over six weeks of the semester. The project required them to co-design a multidisciplinary middle school unit that integrated multiple subject areas, including English Language Arts, Social Studies, Science, and Foreign Languages. The blended learning approach involved both in-person and online meetings (Perry, Findon, & Cordingley, 2021), allowing the pre-service teachers to work flexibly and explore diverse communication and collaboration methods. During in-person sessions, the teams engaged in intensive brainstorming, peer feedback discussions, and hands-on planning activities. Online interactions were supported through digital platforms, where the participants shared resources, refined lesson plans, and interacted with a Generative AI tool, ChatGPT 3.0, to engage the conversation agent as a team member.

TEAM COLLABORATION AND BRAINSTORMING THE THEME: Following team formation, students were allocated a designated time slot in class to brainstorm and select a thematic focus for their unit. This phase was critical for laying the groundwork for both content integration and pedagogy. Teams explored various interdisciplinary themes that resonated with the middle school curriculum. They considered contemporary issues and curricular intersections that could meaningfully connect the subject areas. In face-to-face sessions, teams engaged in intensive brainstorming activities, including mind-mapping and sketching out initial lesson plan ideas. These sessions were dynamic, with instructors providing real-time feedback and scaffolding to enhance critical dialogue. Structured peer feedback sessions allowed groups to present their initial ideas and receive constructive critiques from both classmates and facilitators. This process not only refined the thematic proposals but also promoted cross-pollination of ideas among different teams.

INTEGRATION OF BLENDED LEARNING MODALITIES: The project was underpinned by a blended learning approach that combined in-person interactions with online collaborative activities: During traditional classroom meetings, teams engaged deeply in hands-on activities. This included: intensive brainstorming facilitated through group discussions that encouraged the rapid exchange of ideas. Regular intervals for team check-ins enabled continuous refinement of their teaching unit design. Digital platforms played a crucial role in maintaining project momentum and ensuring continuous collaboration outside of the classroom. The integration of a Generative AI tool, ChatGPT 3.0, added a novel dimension to the process. Over three dedicated sessions, teams interacted with the AI in a manner analogous to collaborating with a team member. The AI discussion sessions were structured to: prompt new ideas and alternative perspectives during brainstorming; assisting in identifying potential gaps in the unit design and suggest evidence-based modifications; and serving as a mediator to encourage reflective questioning and deeper analysis of content interrelations across disciplines.

In sum, this project not only served as a practical exercise in interdisciplinary curriculum development but also offered valuable insights into the impact of blended learning environments and AI-facilitated collaboration in teacher education. The detailed process—from the initial survey and team formation, through thematic brainstorming, to iterative, multi-modal engagement—underscores the potential of innovative teaching strategies to support professional growth in pre-service educators.

PARTICIPANTS AND CAESES

For this case study, five pre-service language teachers majoring in ELA or foreign language education participated in this study. IRB approval was obtained, and all participants provided consent to join the study. Table 1 provides demographic information and their teaching concentration and topic of their team unit. Each language pre-service teacher was considered a case (Yin, 2009).

Table 1. *Participants Demographic Information*

Name (pseudonym)	Gender	Year in School	Topic of the Unit	Teaching Concentration
Emily	F	Junior	Mexico	Spanish
Gilly	F	Senior	Ancient Greece	English Language Art
Monica	F	Sophomore	India	English Language Art
Sally	F	Junior	Statue of Liberty	English Language Art
Susan	F	Sophomore	Mexico	English Language Art

DATA SOURCES AND DATA ANALYSIS

During the project, the following data were collected: *1) Lesson Plans.* Participants developed lesson plans that were evaluated using the Triple E Framework to assess the effectiveness of technology integration. 2). *Participant Reflections*. Participants maintained reflective journals documenting their experiences using ChatGPT. 3). *Chat Histories.* Interactions between the pre-service teachers and ChatGPT were recorded.

The data analysis began with analyzing lesson plans using the Triple E Framework rubric to evaluate engagement, enhancement, and extension. Each lesson plan was scored on a scale of 1 to 2 for each component with six areas for each level, with higher scores (total of 18 points) indicating greater alignment with the framework's criteria. Participant reflections were analyzed thematically using Braun and Clarke's (2006) six-phase framework to identify key themes. The chat histories were analyzed to triangulate with each participant's reflection and lesson plan artifacts.

RESULTS

This section presents the findings from the analysis, with lesson plan evaluation score presented in table 2, and thematical results presented below for each research question.

Table 2. *Lesson Plan Scores for Each Language*

Name (pseudonym)	Topic of the Unit	Lesson Subject	Triple E Rubric Score
Emily	Mexico	Spanish	15/18
Gilly	Ancient Greece	English Language Art	15/18

Monica	India	English Language Art	17/18
Sally	Statue of Liberty	English Language Art	14/18
Susan	Mexico	English Language Art	12/18

RESEARCH QUESTION 1: ENHANCED DIGITAL LITERACY AND AI COMPENCIES, AND CIRITICAL ANALYSIS VIA GAI

Interaction with Generative AI enhances pre-service language teachers' digital literacy and AI competencies by providing practical experience in using AI tools for idea generation and resource gathering. Participants frequently utilized AI as a "brainstormer" when encountering challenges in lesson planning. Emily, for instance, stated, "*AI mostly played the role of 'brainstormer' when it came to our project. When we were struggling with ideas on how to incorporate all of the disciplines, we looked to AI for some inspiration and creativity*." Similarly, Gilly highlighted the AI's role in sparking innovative ideas: "*AI was beneficial in our interdisciplinary collaboration as it sparked ideas regarding virtual field trips… Having AI to aid in sparking ideas and providing some suggestions was quite beneficial and helpful*." These interactions demonstrated the effective use of ChatGPT for generating comprehensive project ideas. For example, when tasked with developing an interdisciplinary project based on Mexico, ChatGPT provided ten detailed suggestions, including creating a multimedia travel guide, a documentary film, and a virtual museum exhibit. Emily integrated these AI-generated ideas into her Spanish lesson by incorporating realistic travel scenarios, showcasing a successful collaboration between human creativity and AI assistance.

Interacting with Generative AI fostered critical evaluation skills as pre-service teachers assessed the appropriateness and accuracy of AI-generated content. Participants exhibited a cautious and discerning approach toward AI utilization. Monica expressed concerns about the reliability of AI-generated lesson plans: "*AI was not frequently used as its software was known for making mistakes and could create lesson plans that needed to be academically age-appropriate.*" Similarly, Sally shared her reservations: "*Personally, I don't like using AI because of the issues it has but I understand the fundamental values in student education*." This critical stance ensured that the integration of AI was carefully aligned with learning objectives and educational standards. For example, in Sally's unit on the Statue of Liberty, students were given the option to choose between digital or traditional methods, thereby accommodating different learning preferences and ensuring the relevance and appropriateness of the technology used. This selective integration highlighted the participants' ability to critically evaluate and selectively implement AI tools to enhance their teaching practices.

Pre-service teachers developed a balanced approach to technology integration, using AI as a supplementary tool while valuing traditional resources and human interaction. The participants viewed AI as an additional resource rather than a replacement for peer collaboration. Emily noted, "*I didn't rely too heavily on AI as I didn't see a need for it. At the same time, I found a lot better feedback from my peers than I did ChatGPT.*" Monica further explained, "*If I were stuck or needed assistance, I would ask AI a question before asking my group for help to see if AI could provide additional support*." This balanced approach was evident in the lesson plans, where technology-supported activities were integrated with traditional methods.

RESEARCH QUESTION 2: BRIDGING THE COLLABORATION VIA GAI

Generative AI acted as a facilitator for idea generation, enhancing collaborative practices by helping teams overcome creative blocks and stimulating productive discussions.

AI interactions facilitated group brainstorming and lesson planning. Emily described AI's role in overcoming creative blocks: "*When all of us were stumped, AI was definitely helpful to get the ball rolling which I appreciate.*" Gilly further emphasized AI's impact on collaboration: "*AI was beneficial in our interdisciplinary collaboration as it sparked ideas regarding virtual field trips… Having AI to aid in sparking ideas and providing some suggestions was quite beneficial and helpful.*" Similarly, Monica reflected: "*The role of AI as a tool for inspiration of different methods we could use in our lesson gave my group clarification for other activities we could provide our students that are fun and engaging as they learn about India.*" This was evident in Monica's lesson plan and chat history with ChatGPT. Monica asked AI to create a culturally responsive unit for learning about India. ChatGPT provided a comprehensive plan that included exploring Indian literature, conducting virtual tours, and engaging in reflective writing. This structured response offered a foundation for the group to customize their lessons further.

While AI contributes to collaboration by providing ideas, pre-service teachers still value human interaction and peer feedback more highly. As shows in Figure 1, although AI played a helpful role in idea generation, pre-service teachers favored human interactions for refining and validating ideas. Emily reflected: "*I found a lot better feedback from my peers than I did ChatGPT. I feel as though having a real-time, face-to-face conversation with my peers was a lot more helpful than chatting with AI.*" Similarly, Sally emphasized the importance of group dialogue: "*Actually, the role of AI in the interdisciplinary collaboration was to create questions among the group lesson and how to incorporate AI in the lesson idea.*" These reflections indicate that AI served as a supplementary tool for raising questions or prompting discussions, but meaningful collaborative work happened among group members.
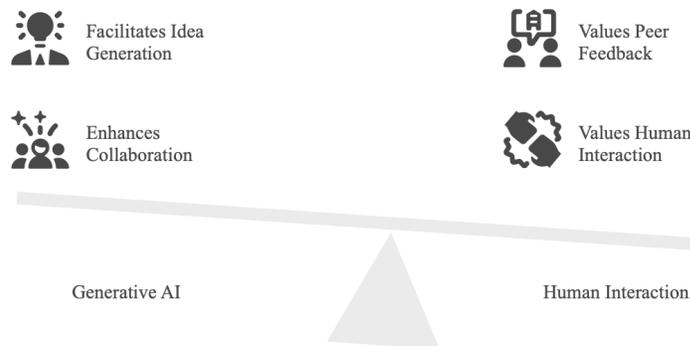

Figure 1. Pre-Service Teachers' Balance between Generative AI and Human Interaction

RESEARCH QUESTION 3: PROMPTED INNOVATION AND REFLECTIVE RPACTICES

Engaging with Generative AI prompts pre-service teachers to adopt innovative pedagogical approaches and incorporate technology-enhanced instructional strategies. AI interactions led teachers to explore creative and immersive teaching methods. Gilly noted: "*The utilization of AI not only streamlined the brainstorming process but also encouraged creative thinking, enabling us to explore innovative approaches to engage students in immersive learning experiences.*" Similarly, Monica shared: "*My interaction with AI influenced my interdisciplinary collaboration with my group, influencing my decision to choose the topic I would teach about India and the virtual trip I would take my students on.*" For example, in the India Through Poetry lesson, the team incorporated a 360-degree virtual tour of Chennai, which aligned with ChatGPT's suggestions. This integration helped create a culturally immersive experience for students.

Interaction with AI encourages reflective practice by prompting teachers to consider the effectiveness and appropriateness of integrating technology into their teaching. Preservice teachers show evidence to critically evaluate AI's role in their practice. Emily observed: "*I feel as though there are many misconceptions within the university about the uses of AI and ChatGPT… ChatGPT was mostly used for inspiration rather than content.*" Similarly, Student 3 expressed concerns: "*AI was not frequently used as its software was known for making mistakes and could create lesson plans that needed to be academically age-appropriate.*" Lesson plans reflected this reflective approach, where technology was integrated selectively to align with instructional goals. For example, while technology was used for engagement and support, pre-service teachers were cautious about leveraging it to promote higher-order thinking.

Pre-service teachers become more aware of ethical considerations related to AI, influencing their pedagogical decisions to ensure responsible use of technology. Interacting with AI prompted teachers to consider ethical implications like accuracy and age-appropriateness. Monica expressed caution: "*AI was not frequently used as its software was known for making mistakes… I had difficulty in AI finishing the thought.*" Sally highlighted potential broader implications: "*Personally, I don't like using AI because of the issues it has but I understand the fundamental values in student education.*" Pre-service teachers demonstrated this awareness by carefully integrating AI in ways that aligned with ethical standards and educational values.

AI engagement enhances teachers' focus on student-centered learning by encouraging the incorporation of activities that promote creativity and real-world connections. Susan described AI's role in focusing on real-world connections: "*AI-powered analytics also assisted us in identifying ecological data patterns and trends, which were critical for our project's study component, revealing Mexico's biodiversity and environmental ramifications.*" For example, in the interdisciplinary lesson on Mexico, the "Free Verse Fiesta" allowed students to explore multiple subjects creatively, emphasizing student ownership and engagement.

SUMMARY OF RESULTS

Overall, the results of the study present the following three (3) key points and shown in Figure 2, which illustrates the progression from pre-service teachers' foundational digital literacy and AI competencies, through collaborative human interactions, to the development of innovative pedagogical designs.

1. Integrating GAI chat bot into design process facilitated pre-service teachers' enhanced digital literacy, AI competencies and critical analysis.
    a. Regular use of ChatGPT as a "brain-stormer" or idea generator gave the pre-service language teachers practical experience with AI tools, boosting their confidence in finding resources and lesson ideas. Participants did not

accept AI output at face value; they cross-checked age-appropriateness, accuracy, and curricular fit before using it, which sharpened their evaluative skills.
   b. AI was treated as a helpful supplement—not a substitute—for peer feedback or traditional materials. Teachers toggled between AI suggestions and human collaboration to refine their plans.
2. Generative AI facilitates the collaboration among pre-service teachers team members as well as human-machine interactions.
   a. When teams hit creative blocks, ChatGPT quickly surfaced fresh angles (e.g., virtual field trips, culturally responsive activities), jump-starting discussion and shaping lesson structures.
   b. While AI supplied raw ideas and questions, meaningful refinement—and final validation—came from real-time peer conversation.
   c. Participants valued AI for "starting the ball rolling," but relied on teammates for depth and quality assurance.
3. Generative AI served as stimulus for novel pedagogy, heightened reflection and ethics, and in the process created stronger student-centered focus.
   a. Exposure to AI-generated suggestions encouraged richer, tech-enhanced lessons (e.g., 360° virtual tours, multimedia projects) that made content immersive and interdisciplinary.
   b. Pre-service teachers became more deliberate about when and why to integrate AI, weighing issues of factual accuracy, developmental suitability, and equitable learning.
   c. Furthermore, AI-assisted planning steered teachers toward activities that foster creativity, real-world connections, and learner autonomy—such as data-driven environmental studies and poetic explorations of culture.
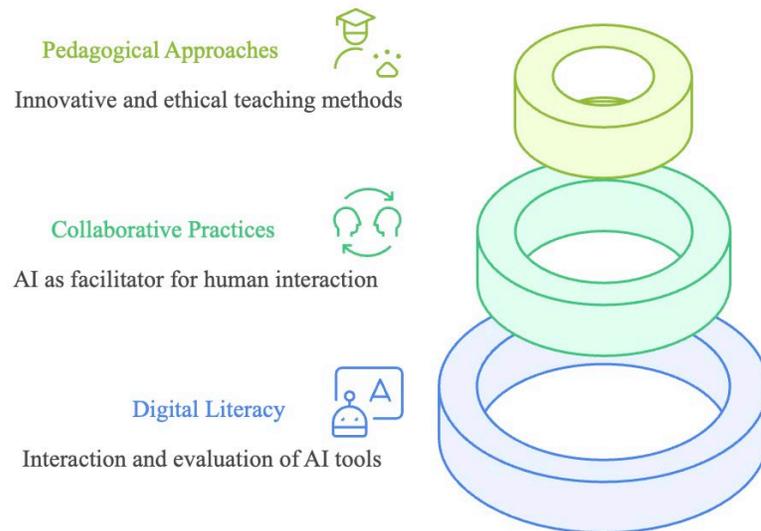
Figure 2. Pre-service's Enhanced Skills through Collaboration with Generative AI Collaboration

In summary and shown in Figure 2, generative AI served best as an ideation partner and reflective mirror—broadening pre-service teachers' digital skill set, facilitating collaboration, and nudging them toward innovative, ethically grounded, student-focused instruction—yet its greatest value emerged when balanced with human judgment and peer discourse.

DISCUSSION

The findings of this study align closely with existing literature on emerging technologies in teacher education and provide valuable insights into how Generative AI influences the practices of pre-service language teachers in blended learning environments.

BLENDED LEARNING ENVIRONMENTS: CHALLENGES AND OPPORTUNITIES

The study took place within a blended learning environment, which, as highlighted in the literature, presents both challenges and opportunities in language teacher education. Blended learning requires teachers to be adept at integrating traditional and digital pedagogies, yet many pre-service teachers may lack sufficient training and experience in this area (Bizami, Tasir, & Kew, 2023; Comas-Quinn, 2011). In this study, pre-service teachers initially faced challenges in effectively utilizing technology within design tasks and collaborative work. However, the integration of Generative AI served as a mediational tool that not only facilitated idea generation but also helped teachers navigate the complexities of blended learning environments.

The use of AI in this context addressed some of the issues inherent in blended learning by providing flexible access to resources and supporting the development of digital competencies (Porter, et, al. 2016). The AI tool acted as a bridge between traditional pedagogical approaches and the demands of technology-enhanced instruction, helping pre-service teachers to design lessons that effectively combined face-to-face and online elements. This finding suggests that while blended learning can be a source of challenges due to the required shift in pedagogical practices, it can also serve as a solution when supported by appropriate technological tools and training.

ENHANCEMENT OF AI COMPETENCIES AND DIGITAL LITERACY

One of the most significant impacts observed in this study was the enhancement of digital literacy and AI competencies among pre-service teachers. According to Chen, Pan, and Jiang (2024), effective AI competency for educators involves a multi-dimensional skill set that includes technical knowledge of AI concepts, prompt literacy, critical evaluation of AI outputs, and ethical awareness. The pre-service teachers in this study demonstrated growth in all these areas. The concept of prompt literacy was particularly evident as teachers improved their ability to craft effective prompts that elicited meaningful and relevant responses from the AI tool. For instance, when seeking ideas for interdisciplinary projects or virtual tours, teachers framed their inquiries to align with their instructional goals, reflecting the importance of prompt literacy as emphasized by Chen et al. (2024). This skill allowed them to harness the AI tool more effectively, enhancing their lesson planning and collaborative efforts. Moreover, teachers engaged in critical evaluation of AI-generated content, assessing its accuracy, appropriateness,

and relevance. This reflective practice aligns with the AI literacy competencies outlined by Chen et al. (2024) and underscores the importance of developing educators' abilities to interact with AI tools critically and ethically.

ETHICAL CONSIDERATIONS AND REFLECTIVE PRACTICES

The study also highlighted the importance of ethical considerations in AI integration. Pre-service teachers expressed concerns about the accuracy and age-appropriateness of AI-generated content, demonstrating an awareness of the potential pitfalls associated with AI use in education. This ethical awareness is a key component of the AI competency framework proposed by Chen et al. (2024) and is essential for responsible technology integration. Interactions with AI prompted pre-service teachers to engage in reflective practices, considering not only how to use AI tools but also when and why to use them. This reflective approach contributed to more thoughtful pedagogical decision-making, ensuring that technology integration was purposeful and aligned with educational values and standards.

COLLABORATIVE PRACTICES AND THE ROLE OF AI

The study found that while AI served as a valuable tool for idea generation and overcoming creative blocks, pre-service teachers valued human interaction and peer feedback more highly. This finding supports the notion that while AI can enhance collaborative practices by stimulating discussions and providing initial ideas, meaningful collaboration relies on human connections and dialogue (Vygotsky, 1978). By integrating AI into their collaborative work, pre-service teachers were able to combine the strengths of technology with the benefits of human interaction. This balanced approach reflects an effective strategy for navigating the challenges of blended learning environments, where both digital tools and interpersonal relationships play crucial roles.

CONCLUSION:
LIMITATIONS, IMPLICATIONS AND FUTURE RESEARCH

The findings of this study demonstrate the multifaceted impact of integrating Generative AI into pre-service language teacher education programs. Interactions with AI supported the development of digital literacy, fostered collaborative practices, and encouraged reflective pedagogical decision-making among pre-service teachers. By engaging with AI conversation agent, pre-service teachers enhanced their digital design skills, developed critical evaluation capabilities, and gained proficiency in prompt literacy, allowing them to use AI more effectively in planning and instructional contexts. However, this study's findings are limited by the small sample size and the specific focus on language teachers' perspective. With only five participants, the generalizability of the results is constrained, and the data may not capture the full range of experiences within the pre-service teachers' community.

There are several implications for teachers, teacher educators, researchers and school administrators. For teachers, the study suggests that AI can be a valuable resource for idea generation, however, it is crucial for teachers to approach AI with a critical lens, evaluating the accuracy and relevance of AI-generated content and being mindful of ethical considerations. Teachers should use AI to supplement human collaboration, enhancing but not replacing the essential elements of face-to-face interaction and peer feedback. For teacher educators, this study highlights the importance of incorporating comprehensive

digital and AI literacy training into teacher education programs. AI competency extends beyond technical skills to include prompt literacy, critical evaluation, and ethical awareness (Chen et al., 2024). Teacher educators are encouraged to design training modules that provide hands-on experience with AI tools, emphasize collaborative learning, and encourage reflective practice. For researchers, there is a need for ongoing research into the long-term impact of AI integration on teaching practices, student outcomes, and educators' professional development. Future studies could explore the evolution of AI capabilities and their applications in diverse educational settings, assessing the effectiveness of different AI-based instructional strategies in various cultural and institutional contexts. Additionally, research should investigate the ethical implications of AI in education, exploring issues such as data privacy, biases, and the potential impact on student learning. For school administrators, administrators play a crucial role in supporting the effective integration of AI into teaching and learning. They can support instructional practices by providing resources, professional development opportunities, and clear guidelines on AI use, fostering a culture of innovation and responsible technology integration within their institutions. Establishing policies on data privacy, ethical AI usage, and the evaluation of AI-generated content will ensure that AI integration aligns with educational standards and values.

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