

Understanding Educators' Perceived Barriers on Generative AI Use for P-12 Education: An Exploratory Study

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Abstract

This study explored P-12 educators' perceptions of generative artificial intelligence (GenAI) for teaching through a qualitative approach using thematic analysis (Braun & Clarke, 2006). Data were collected via a researcher-developed survey examining the barriers P-12 educators perceived related to GenAI use in teaching. The survey was administered to 119 educators enrolled in an online educator preparation program in a Midwestern state. The findings showed four levels of perceived barriers: educator, student, institution, and technology. Educator-related barriers included educators' lack of knowledge and readiness to use AI, the need for relevant training, their pedagogical beliefs, and professional identities. Student-related barriers included concerns about students' over-reliance on AI in learning and academic integrity, as well as students' developmental appropriateness in using AI. Organization-related barriers included a lack of buy-in from the school and district regarding AI use and limited opportunities to access AI for teaching. Technology-related barriers encompass concerns about the accuracy, reliability, and quality of AI-generated output, as well as privacy, ethics, and environmental issues. The findings suggest that educators' perceived barriers to GenAI are not primarily technical but are deeply rooted in pedagogical beliefs, professional identity, concerns about student learning, and broader realities of school contexts.

Keywords: Generative artificial intelligence (GenAI), educator preparation program, barriers

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Introduction

Since the consumer launch of generative artificial intelligence (GenAI) in late 2022, various sectors of society have adopted it. To address the rapid change in the education landscape, the United States Department of Education, Office of Educational Technology, published a report, *Artificial Intelligence and Future of Teaching and Learning*, in May 2023, to provide insights and recommendations for P-12 education in the United States. The report underscored the lack of governance structures, guidelines, relevant professional development opportunities, and education-specific guardrails, which are not keeping pace with AI adoption in the field. Even with existing concerns, as of 2025, more than 50% of P-12 educators and students use AI for teaching and learning (Andersen & Yang, 2025; Doss et al., 2025), almost 90% of educators use AI at least monthly (Ed3, 2026), and limited professional development opportunities or policies and guidelines have been provided in the field (Chiu, 2024; Doss et al., 2025; Kim et al., 2025; UNESCO, 2023).

GenAI refers to AI systems that leverage large language models (LLMs) to produce diverse media outputs—including text, images, audio, and video—by training from large datasets (Chakraborty, 2024). Platforms such as ChatGPT, Gemini, Claude, Khanmigo, and MagicSchool have made these capabilities accessible to P-12 educators, enabling them to design instruction, plan lessons, create differentiated materials, provide feedback, and manage administrative tasks more efficiently (Celik et al., 2022; Zhang & Tur, 2023). Celik and colleagues (2022) also found that AI could benefit educators in planning (e.g., making decisions on learning content, planning activity), implementation (e.g., timely monitoring, giving immediate feedback, optimizing learning activities, increasing interaction), and assessment (e.g., automated assessment and evaluation, provision of feedback) in education.

However, educators expressed mixed feelings about the use of AI for teaching and learning for various reasons. For example, potential job displacement, negative impact on students' creativity and critical thinking, and errors AI could make when interacting with it were identified as reasons for the negative perception of AI use for teaching (Alwaqdani, 2024). The recent study of AI in education (AIED) conducted by Ed3 (2026) found that educators in the United States considered the impact of AI to be smaller in their day-to-day work. Likewise, Lin (2024) found that more than half of educators expressed uncertainty about the benefits of AI and believed it would harm teaching and learning. Potential challenges included technical issues with unreliable outputs, data privacy and bias concerns, copyright concerns, limited iterative interaction, and a lack of emotion (Ed3, 2026; Zhang et al., 2026). Recent literature also framed AI use as a potential barrier to student development, which can inhibit educators' use of GenAI for teaching, including compromising academic integrity (e.g., cheating; Ed3, 2026), restricting students' critical thinking, increasing dependency on AI, causing feelings of deception, reducing human interaction, and leading to distractions (Zhang et al., 2026).

Recent systematic literature reviews in the AIED community have highlighted a dearth of empirical studies on the use of GenAI in P-12 education, with 30 studies in Alfarwan (2025) and 45 studies in Zhang et al. (2026), despite the rapid expansion of AI in society. The limited empirical research emphasizes the need for further research in P-12 settings (Aravantinos et al., 2026) and for understanding educators' perspectives—particularly on factors that inhibit P-12 educators'

GenAI use—to yield valuable insights to improve AI implementation in education (Cheah et al., 2025). Therefore, this study employed a qualitative approach using thematic analysis to explore P-12 educators' voices from the field regarding the perceived barriers to integrating GenAI into their teaching. The purpose of this exploratory qualitative study is to examine the barriers P-12 educators perceive in using GenAI for teaching. The overarching research question is: What are the P-12 educators' perceived barriers to using GenAI for teaching?

Methods

Research Participants. Participants included 119 P-12 in-service educators enrolled in online master's degree programs at an educator preparation institution in a Midwestern state of the United States. There were 85 females (71.4%), 33 males (27.7%), and one participant who preferred not to disclose (0.8%). Participants represented a range of school contexts: 66 (55.5%) taught in rural settings, 34 (28.6%) in suburban settings, and 19 (16.0%) in urban settings. Their teaching experience ranged from one to 27 years ($M = 5.82$, $SD = 4.92$); 74 participants (62.2%) reported one to five years of experience, 35 (29.4%) reported six to 10 years, and 10 (8.4%) reported 11 or more years. Participants taught across a variety of content areas, with the most frequently represented being special education ($n = 19$), elementary education ($n = 17$), business ($n = 12$), and science ($n = 12$).

Regarding the use of GenAI, 82 participants (68.9%) reported currently using tools such as ChatGPT or Gemini for teaching, while 37 (31.1%) reported not doing so. When asked about their current level of competency in using AI for teaching, 59 participants (49.6%) rated themselves at a moderate level, 46 (38.7%) at a below-moderate level, eight (6.7%) at a high level, and six (5.0%) at no competency level. Most participants ($n = 64$, 53.8%) had received a minimal amount (i.e., one to three hours) of professional development on AI in teaching and learning, 30 (25.2%) had received none, 22 (18.5%) a moderate amount (i.e., four-10 hours), and three (2.5%) an extensive amount (i.e., more than 10 hours; see Figure 1).

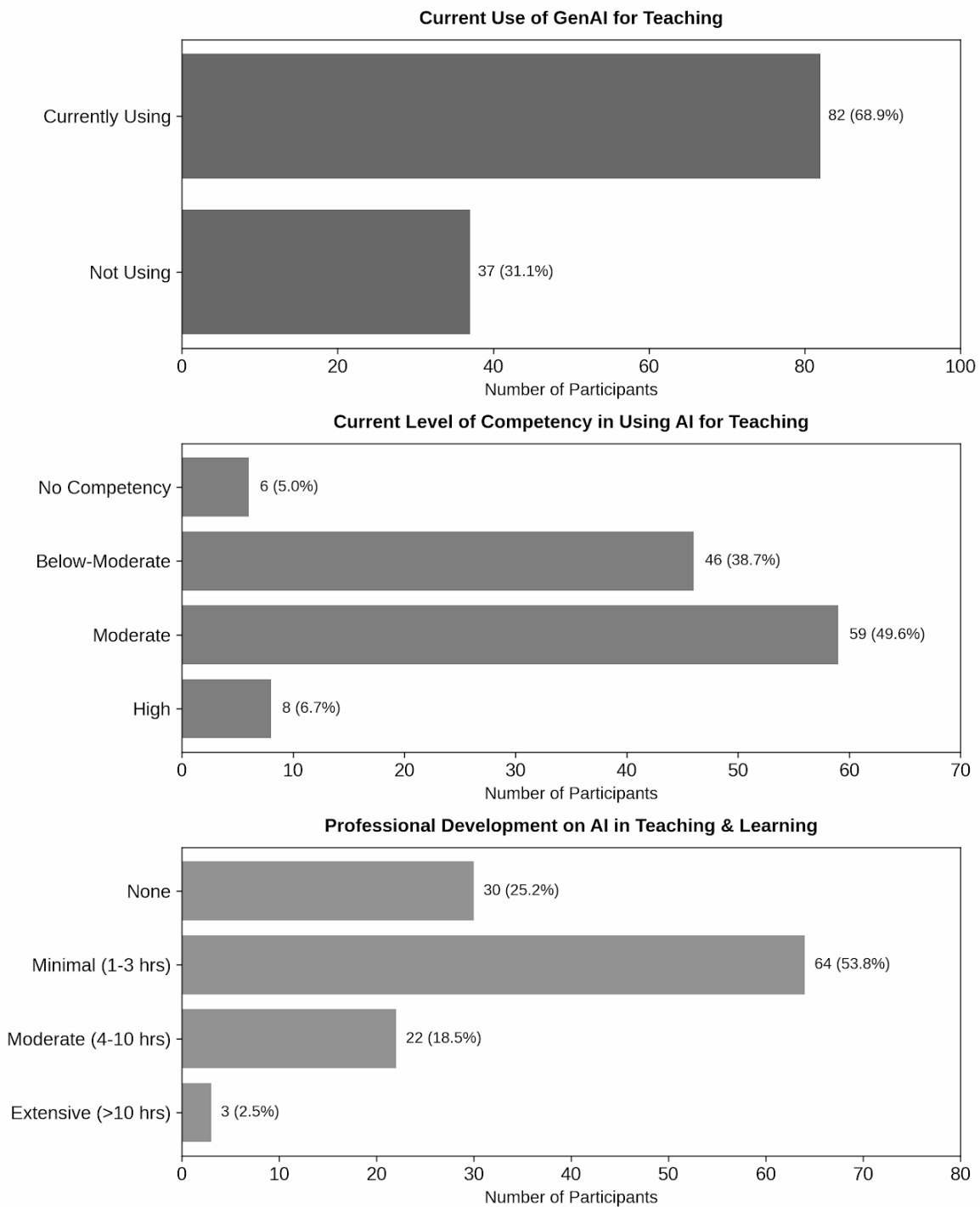
Research Procedure. The researchers received Institutional Review Board (IRB) approval before data collection. Data collection occurred between January 2025 and March 2026 across multiple graduate courses (i.e., curriculum and evaluation in education, technology in education) in an online educator preparation institution at a public university in a Midwestern state. The survey was embedded as a course assignment in the courses the researchers taught during the study period, and the researchers used convenience sampling to recruit participants. Informed consent was obtained electronically before any data collection, and participation in the research component was completely voluntary and confidential. Only the practicing in-service educators responded to the survey; no compensation or academic incentive was offered for study participation. There were no penalties for students who declined to participate. Because the activity was embedded as a component of the course assignment, all students generally completed it regardless of their participation in the study, and their choices on the consent form, as well as their completion or non-completion of the survey, did not affect their grade.

The collected data were stored in a password-protected folder accessible only to the researchers listed on the IRB. The authors, also faculty course instructors, recognized and mitigated the influence of power or position by clearly stating that the survey was voluntary and confidential in

both course instructions and the consent form. To ensure that coercion safeguards were in place, the instructors accessed and analyzed the data after the semester ended.

Figure 1

Generative AI Use for Teaching, AI Competency for Teaching, and Professional Development on AI in Teaching & Learning



The survey was created in Qualtrics—an online survey platform widely used in survey research. Participants accessed the survey using a link on the online course shell in the university's learning management system (i.e., Blackboard). To ensure data quality, only responses that were 100% completed were utilized for analysis. Incomplete or partial submissions ($n = 18$) were excluded before analysis.

Survey Instrument. Data were collected using a researcher-developed survey designed to examine P-12 educators' barriers related to GenAI in teaching. The survey included both multiple-choice and open-ended items. Multiple-choice items were used to collect data on participants' demographic information (e.g., gender, years of experience, school context, content area), self-perceived AI competency, frequency of AI use for professional purposes, and the extent of prior professional development in AI for teaching and learning.

Three open-ended questions served as the primary data sources for this study: (a) If you are not using generative AI, please explain why you are not using generative AI for your teaching (including any barriers or concerns you have with utilizing AI); (b) Please describe any barriers or concerns related to your use of AI for teaching; and (c) If you are not using generative AI to foster and deepen student thinking, please explain why generative AI is not currently being used in such ways.

Data Analysis. This study employed thematic analysis as an exploratory qualitative research method to address the research questions by understanding the phenomenon. Given that the researchers served as instructors for the courses in which the participants were enrolled, the data may lack candor or be subject to misinterpretation. Therefore, a thorough analysis of the data has been conducted to ensure its integrity and trustworthiness. Thematic analysis is a commonly used qualitative approach for identifying, analyzing, and reporting patterns of meaning within data (Braun & Clarke, 2006). Thematic analysis allows the systematic analysis of large volumes of text while remaining sensitive to participants' language and meaning making (Braun & Clarke, 2012). Given the research questions of the study, understanding educators' barriers to the use of GenAI in teaching, thematic analysis provided an inductive, data-driven interpretation that did not impose a predetermined theoretical framework on participants' responses. The thematic analysis followed the six-phase process outlined by Braun and Clarke (2006): (a) familiarizing with the data, (b) generating initial codes, (c) searching for themes, (d) reviewing themes, (e) defining and naming themes, and (f) producing the final report. This process prioritizes transparency in analysis and is appropriate for descriptive and exploratory research questions (Nowell et al., 2017).

Before analysis, all open-ended responses from the three survey questions were extracted, compiled, and reviewed for data quality. Incomplete or single-word responses with insufficient semantic content were noted, though the dataset was largely robust given the 100% completion criterion applied during collection. Each participant's response was treated as a unit of analysis.

All three open-ended questions were initially coded by the primary researcher. The primary researcher read the qualitative responses multiple times to become familiar with them, noting initial impressions and recurring themes. During the initial coding phase, responses were coded line-by-line with codes generated inductively from the data to capture the semantic content of each excerpt.

To establish the trustworthiness of the inductive analytical process, IRR was calculated between two researchers on 25% of the data (following a training phase using 10% of the data) using Cohen's kappa coefficient (κ) with 95% confidence intervals. Cohen's kappa was computed using the formula $\kappa = (Po - Pe) / (1 - Pe)$, where Po denotes observed agreement, and Pe denotes expected agreement by chance (McHugh, 2012). The calculation yielded $\kappa = .689$, indicating substantial agreement between coders (Landis & Koch, 1977). Any discrepancies were resolved through structured discussion, in which each coder first reviewed their own coding decisions independently before presenting their rationale to the other, continuing until full consensus was reached. Peer debriefing with the rest of the research team took place during the meeting afterward to ensure the credibility of the analysis.

Following initial coding, codes were sorted and grouped into potential themes based on conceptual similarity and coherence. The themes were then reviewed and refined iteratively to accurately represent the patterns in the data and to ensure internal coherence and meaningful distinctiveness among them (Braun & Clarke, 2006). This process yielded eight themes, organized into four overarching categories: educator-related, student-related, organization-related, and technology-related barriers. Representative quotes from the responses were selected to illustrate each theme and code and are reported with their corresponding identifier (e.g., Educator 1) to ensure transparency and anonymity. Descriptive statistics were used to analyze multiple-choice items, providing contextual background for the qualitative findings. The quantitative analysis was conducted in Microsoft Excel, and qualitative coding was conducted by the research team using the qualitative data analysis program, Dedoose. The number of relevant excerpts for the thematic analysis was also calculated by Dedoose.

Findings

Analysis yielded four overarching categories of perceived barriers: educator, student, institution, and technology. The four categories and their definitions are as follows: Educator-related barriers included educators' lack of knowledge and readiness to use AI, the need for relevant training, their pedagogical beliefs, and professional identities. Student-related barriers included concerns about students' over-reliance on AI in learning and academic integrity, as well as students' developmental appropriateness in using AI. Organization-related barriers included a lack of buy-in from the school and district regarding AI use and limited opportunities to access AI for teaching. Technology-related barriers encompass concerns about the accuracy, reliability, and quality of AI-generated output, as well as privacy, ethics, and environmental issues (see Table 1).

Table 1

Thematic Analysis Results with Categories, Themes, and Codes

Category	Theme	Code (<i>n</i> of Relevant Excerpts)
Educator-Related Barriers	Lack of AI Knowledge, Training, and Readiness	Insufficient training on AI for teaching (6)
		Not knowing how to utilize AI for teaching (9)
		Need for more time and practice to learn AI (10)

	Pedagogical Beliefs and Professional Identity	Negative impact on educators' critical thinking (6)
		Over-reliance on AI for teaching (9)
		Perceived lack of necessity (23)
		Preference for traditional teaching methods (13)
		Subject-area inapplicability (9)
Student-Related Barriers	Student Over-Reliance and Academic Integrity	Misuse of AI (e.g., cheating; 12)
		Negative impact on persistence in learning (7)
		Negative impact on student thinking (30)
	Developmental Appropriateness	Too young for AI use (13)
		Need for foundational academic skills (3)
Organization-Related Barriers	Lack of Buy-In from School and District for Using AI	Limited student technology literacy (3)
		School or district's restrictions on AI use (10)
		Lack of institutional policy/guidance (8)
	Limited Access to AI for Teaching	Negative organizational culture on AI use (3)
		Infrastructure issues (e.g., insufficient devices, weak internet connection, subscription fee; 4)
Technology-Related Barriers	Accuracy, Reliability, and Output Quality	School curriculum that does not allow for instructional adjustments (4)
		Output quality concerns (29)
		Extensive fact checking (6)
		Misalignment with curriculum/standards (3)
	Privacy, Ethics, and Environmental Concerns	Lack of personalization (8)
		Privacy and data security concerns (4)
		Ethical concerns (e.g., bias, copyright; 7)
		Environmental concerns (2)

Educator-Related Barriers. There were two major themes found for the educator-related barriers: (a) lack of AI knowledge, training, and readiness, and (b) pedagogical beliefs and professional identity. First, educators noted that they are not familiar with the AI tools and how to use them properly. However, there is a lack of training (both educator and student AI use) provided to educators, and there is not enough time or resources to learn to use GenAI. For example, Educator 8 wrote, “I feel like I need more professional development on how to effectively use it.” Also, Educator 45 mentioned, “No professional development on how to do it effectively, where students are still doing the deeper thinking.”

Educators also shared negative opinions about the use of GenAI that do not align with their pedagogical beliefs. For example, AI undermines student thinking, and its use is not necessary for

teaching. Some preferred using traditional teaching methods over using GenAI. Some subject areas were perceived as not relevant to the use of GenAI (e.g., woodworking).

I do not use it, as it divorces me from the teaching and learning process. While I have used it, I have found that it is largely detrimental to my work as it does not allow me to make critical decisions and prioritizes efficiency and complacency over quality and passion. (Educator 61)

I feel like AI diminishes my ability to adequately teach and serve my students. I think that is the “easy way out” to ask AI to generate a lesson plan when I can rely on my own knowledge and experience. (Educator 106)

Student-Related Barriers. Student-related barriers included two major themes: (a) student over-reliance and academic integrity, and (b) developmental appropriateness. Educators were concerned about students’ misuse of GenAI for cheating and over-reliance on it. For example, Educator 42 mentioned, “It just gives students an excuse to copy and paste work and get full credit for something they don’t do.” They also considered that GenAI hinders persistence in learning and students’ critical thinking by removing productive struggle.

Students use AI to replace their brains, and for the creation of ideas, they use it so they do not have to think. No matter how hard I try to teach them and show them how to properly use it, they will always take the easy way out. (Educator 68)

AI does not foster and deepen student thinking. It provides short cuts to “understanding,” but the understanding is more shallow because of the short cut. Students learn through productive struggle. AI reduces those struggles which are crucial for students’ experience. (Educator 60)

There was also concern about students’ developmental appropriateness in using GenAI. Educators thought students were too young to use AI, especially when they were teaching kindergarten and elementary students. One participant (Educator 9) mentioned, “I teach kindergarten and I have never really thought of how I could utilize AI in the classroom setting. Not necessarily because I am against it, but just not sure how it would benefit or be used for students.” Also, educators pointed out that students need to learn foundational skills (e.g., thinking, writing) before using AI, as well as how to use technology (e.g., logging in to Canvas). For example, Educator 14 noted, “My students are 6 and can’t log in on their own. I do not know how to use it for them.”

Students are currently learning to write and I think it is important for younger grades to learn how to do it themselves. They should understand how to form their ideas before they are introduced to a tool that can help assist in their future. (Educator 97)

Organization-Related Barriers. In terms of organization-related barriers, there were two major themes found: (a) lack of buy-in from the school and district for using AI, and (b) limited access to AI for teaching. Educators noted that schools or districts restrict educators’ use of GenAI at school; as Educator 92 mentioned, “Our district does not allow it.” If the school or district did not restrict the use of GenAI, there were no specific policies or guidance to use GenAI, and some reported being even “still in infancy” (Educator 25) of utilizing AI in the school and district. Educators found it hard to get other educators or directors on board with the use of GenAI. Ambiguity or even outright resistance to AI in schools or districts may even be described as a part

of the school or district culture; as one educator reported, “It is very frowned upon in my district” (Educator 86).

Additionally, educators noted a lack of access to digital devices and relevant resources, as mentioned by Educator 24, “I have not had access to technology, other than to play a song or video for my students. Therefore, I have not explored the possibilities of using generative AI in class.” The cost of using AI tools was also considered a hurdle. Educator 87 noted, “Most AI tools require payment for premium plans to use specific advanced tools. I refuse to pay at this time.” Sometimes, a weak internet connection at school causes issues when using GenAI for teaching. Educator 46 mentioned, “I have my students (use GenAI) for a short amount of time and unfortunately we often have issues with our internet and it takes a lot of class time to get students signed in and give instructions.” Some educators stated that the current curriculum they use for teaching does not have any room for adjustment. For example, Educator 86 mentioned that teachers have to “stick with only the curriculum, and not stray from it in the slightest.”

Technology-Related Barriers. Technology-related barriers included two major themes: (a) accuracy, reliability, and output quality, and (b) privacy, ethics, and environmental concerns. Regarding accuracy, reliability, and output quality, educators expressed concerns about unreliable or inaccurate outputs based on their personal experiences. For example, Educator 31 shared, “Inaccuracies in the information given. There have been times when a density problem was asking students to find the mass of a steel beam, and it gave its density as 2.4 g/ml, which is far from the density of steel.” Some educators pointed out poor quality outputs; as Educator 16 stated, “I do not feel that it gives out great ideas or worksheets. The questions always seem very vague and incomplete.” These concerns about output quality created additional work for educators to fact check. Educator 37 noted, “I have to be cautious about some of its conclusions. When I do research, the results can be produced from unreliable sources. I have to constantly ‘dig deeper’ with the questions that I ask AI.”

Educators also noted misalignment with curriculum or standards when using GenAI, especially when differentiating content levels, because it cannot personalize learning materials based on student needs to the same extent as educators can. Educator 26 stated, “When adjusting material for students at different levels, AI can completely change the core concept of the lesson.” Educator 7 also mentioned, “It doesn’t know my students like I do.” Sometimes the output format did not fit educators’ needs, which created additional work for them. Educator 75 mentioned, “Sometimes when using AI to develop lessons for students, the formatting can be weird or something can be off, it is definitely something you have to double-check.”

Additionally, privacy, ethics, and environmental concerns were another major barrier at the technology level. Educators were concerned about privacy and data security when using AI, as they use student data for work. Educator 17 mentioned, “Many models of AI save the information that it is fed, so teachers must be careful about including student names or other identifiable information in administrative tasks.” Also, educators who teach music or art worry about the copyright of the artifacts they use or create using GenAI. Educators 110 stated, “I have ethical concerns about the copyrighted nature of materials that may have been used to train AI models.” Some educators shared environmental concerns. For example, Educators 10 mentioned, “AI also

uses many times the amount of energy and water than just a regular search engine and it is incredibly harmful for the environment.”

Discussion

This study intentionally focused on the barriers to the use of GenAI in teaching as a part of the dynamic nature of GenAI integration in P-12 teaching and learning environments. The findings of this study suggest that participating educators perceive numerous barriers to adopting and using GenAI in their professional practice. The analysis of the 119 survey responses suggested interactions between individual educator beliefs, student needs, organizational conditions, and the characteristics of GenAI technology itself. Educators often show reluctance to adopt GenAI due to a misalignment between their personal beliefs and the organizational or social conditions influencing its implementation in schools. This study, although exploratory and not grounded in a specific theoretical framework, might be effectively analyzed through the lens of sociotechnical systems theory (Leavitt, 1965). Leavitt (1965) conceptualized organizations as composed of interdependent subsystems, including people, tasks, structure, and technology. When the subsystems are misaligned, friction and resistance to change can happen.

This study’s findings could be explained by the subsystems of sociotechnical system theory (Leavitt, 1965). Barriers related to educators correspond to the people subsystem, reflecting their knowledge, pedagogical beliefs, and professional identities. Barriers associated with students can also be related to the task subsystem, highlighting concerns about how GenAI transforms the core teaching and learning activities in which students participate. Organization-related barriers can fall within the structure subsystem, encompassing school and district policies, overall organizational culture, and staff buy-in. Lastly, technology-related barriers can be considered as the technology subsystem, addressing issues such as accuracy, reliability, and ethical implications. These findings align with sociotechnical research on AI adoption in other organizational contexts (e.g., Robertson et al., 2025), which similarly found that resistance originates from misalignment across multiple interdependent subsystems rather than a single subsystem alone. While this exploratory study did not directly test the sociotechnical framework, the educator, student, organizational, and technological barriers that participants perceived were broadly consistent with this pattern of cross-subsystem misalignment.

While educators often reported being unprepared or uncertain about how to use GenAI in their practice, perhaps more importantly, some expressed the view that it undermined their professional identity by shifting the educator’s role from thoughtful instructional designer to a passive user of machine-generated content. Such perceptions are particularly important because they demonstrate that technology adoption depends not only on the tool’s usability but also on whether it aligns with educators’ values and sense of professional expertise (Dangol et al., 2026). Such perceptions raise questions about whether GenAI is compatible with their perceived role as educators or with their conception of effective teaching.

Related educator concerns also focused on teaching and learning with AI, where educators already felt like capable professionals and did not need support from AI tools. Additionally, educators expressed concerns centered on AI’s effects on students’ critical thinking, problem-solving,

creativity, and fundamental writing skills, for example, which they perceived would be diminished if AI were used as a tool for student learning.

Student-related barriers further demonstrate the social dimensions of AI integration (Kayiran et al., 2026). Educators related their concerns about students misusing AI to avoid thinking, complete assignments dishonestly, or become overly dependent on automated assistance. Such concerns reflect a broader tension between the efficiency promised by AI and the educator's belief that learning requires a productive struggle (Philip, 2025). These findings are particularly relevant considering the numerous educational frameworks that emphasize higher-order thinking, inquiry, and intellectual perseverance. These concerns about students and AI use are also exacerbated by the emerging, more general backlash from schools and districts regarding technology itself, particularly screen time (Odzer, 2026; Walsh, 2026). The current educational climate, increasingly attentive to the effects of screen time on learners, has prompted many P-12 schools to pull back on technology use by shifting focus toward limiting screen exposure and favoring shared laptops "on carts" over one-to-one devices (Žmavc et al., 2025). Although the current dataset did not directly assess district-level technology policies, participants' mentions of restricted or shared device access (e.g., Educator 24, Educator 87) suggest that this broader trend may be relevant to the barriers described in this study.

Concerns about developmental appropriateness were also notable. Educators working with elementary school students dismissed GenAI as inappropriate until such students developed the essential foundational literacy, writing, and critical thinking skills. While most educator participants discussed concerns regarding elementary-aged students engaging with AI, several educators expressed their interest and need for training to consider AI use for teaching and even student learning (Alwaqadani, 2024).

P-12 educators frequently described contradictory or absent organizational support for the utilization of GenAI. Some districts or schools prohibited the use of GenAI, while others offered little guidance. Some educators also reported a lack of infrastructure (e.g., devices, weak internet connections, subscription fees) that would enable exploration of AI. The uncertainty arising from this lack of support may itself be a barrier. Educators are unlikely to experiment with AI when they lack policy guidance, administrative support, sufficient professional development, or clear ethical expectations (Eutsler et al., 2025). Currently, "Over 80% of U.S. high school and college students now use AI for school-related tasks, but only half of middle and high schools have AI policies in place, and just 6% of educators say those policies are clear" (Stanford University, 2026). Educators need clear expectations, supportive leadership, infrastructure, time, and opportunities to collaborate on exploring AI safely, all of which are supported by data on ambiguity, limited infrastructure, and inconsistent support.

Initial concerns by many users in the advent of GenAI tools were the pivot from human connection and concerns—as expressed by P-12 educators—that even pre-COVID-19, students are becoming more and more isolated, and isolation and other effects from extended screen time are perceived to lead to a host of challenges in the classroom (Delello et al., 2025; DiMartino & Schultz, 2020). As educators, even those who have not attended AI-focused PD or who have expressed limited AI literacy skills, continue to worry that students will become more disconnected, and tools such as AI that encompass greater screentime are perpetuating human disconnection and other challenges

spanning mental health and appropriate and responsible use (Borasi et al., 2026; Delello et al., 2025). Historically, the foundation of education has been centered on human connections and relationships, which became more apparent during COVID-19. From a cyclical perspective, in education and related initiatives, some of which have pushed for technology in classrooms (e.g., one-to-one devices), the need for human-to-human interaction has become even more relevant (Asrifan et al., 2025; Cao, 2024). These historical and cyclical patterns are drawn primarily from the broader literature, which may help contextualize why some participants expressed similar concerns about GenAI's role in student isolation and diminished human connection.

Central to the theme of educators' trust or academic integrity concerning the quality of GenAI output is the notion that to use AI is to know AI. As educators consider adopting or even becoming "informed non-adopters" of AI for teaching and learning, their understanding of AI output deepens, and they become keenly aware of the many nuances (e.g., detectable patterns, knowledge beyond the learner's) and the levels of output supplied by GenAI tools. Even with increasingly higher-level AI output, there are challenges, as cited by many participants, including time constraints on verifying AI output, determining whether students used AI, "proving it" when detection tools are unreliable, and bias toward certain student populations (Hadra et al., 2026; Weber-Wulff et al., 2023). At this point, even educators who "know their students' writing" and are AI users themselves are struggling to decipher AI output amongst their learners (Fleckenstein et al., 2024). Thus, educators are being forced by AI to re-evaluate assessment practices and focus on skills and learner experiences that AI cannot replace (Bowen & Watson, 2024; Uanachain & Aouad, 2025). In addition, some districts are embracing AI literacy and educating educators and students on safety, appropriate use, prompting, analyzing output, being a skeptical user, etc. Furthermore, they are doing so under the central idea that AI is not going away, and that most career fields will require basic AI literacy knowledge and skills steeped in transparency by both educator and student (Lee & Song, 2024).

Finally, to ensure that educators and students are equipped with the knowledge and skills to use AI effectively and safely, districts and schools might benefit from beginning with AI literacy professional development for educators. Educators cannot be expected to uphold district policy if they have to learn it on their own or in a one-hour breakout session. Districts and schools need to realize that AI is not going away outside of education, and the career fields students are entering will require some form of workforce readiness in AI literacy (Sobo & Goldberg, 2026; Stanford University, 2026). This possible direction for practice is offered in light of the barriers educators described in this study, rather than as a definitive policy prescription supported directly by the dataset.

Limitations

Several limitations should be considered when interpreting the findings of this exploratory study. First, participants were recruited via a convenience sample of P-12 educators enrolled in online master's degree programs at a single educator preparation institution in the Midwestern United States. Although participants represented varied school contexts, grade levels, and content areas, the sample may not be representative of the broader population of P-12 educators.

Second, the primary emphasis of this study was to understand P-12 educators' perceived barriers to using GenAI in teaching, which limited the broader view of AI use, including its benefits. Future research could adopt a more balanced approach to better understand the phenomenon of AI use in education.

Third, the data were based on self-reported survey responses, which reflect participants' perceptions, experiences, and comfort levels with GenAI rather than direct observations of classroom practice.

Fourth, because the primary data sources were open-ended survey questions, responses varied in depth and detail, limiting opportunities for follow-up clarification or deeper probing that would be possible through interviews or focus groups.

Fifth, the study employed a cross-sectional design, capturing educators' perceptions during a period of rapid evolution in GenAI technologies, school policies, and professional development opportunities. Consequently, educators' perceptions may change over time as AI becomes more established in educational settings. Consequently, as GenAI tools, school policies, and educators' experiences with AI change rapidly, the barriers identified in this study may evolve as the technology and educational context continue to mature.

Finally, while interrater reliability and peer debriefing were used to strengthen trustworthiness, qualitative thematic analysis remains interpretive in nature, and other researchers may organize or label themes differently. Despite these limitations, the findings provide transferable insights into the barriers influencing educators' current decisions about GenAI use in P-12 teaching and may inform future research and policy in similar educational contexts.

Conclusion

This study underscores that educators' perceived barriers to using GenAI in P-12 classrooms are not primarily technical but also deeply rooted in pedagogical beliefs, their own perceived roles as educators, concerns about student learning, and the realities of school contexts. Across the findings, educators consistently expressed uncertainty, not only about how to use AI, but also about whether its use aligns with the core purposes of teaching and their own identities as educators. Concerns about diminished student thinking, over-reliance, and the erosion of productive struggle suggest that many educators view GenAI as potentially misaligned with the foundational principles of learning (Kulesa et al., 2025). At the same time, issues related to inconsistent policy guidance, limited infrastructure, and the evolving capabilities of AI tools further complicate educators' willingness and ability to integrate these technologies into practice. The findings suggest that the challenge facing schools is not just one of adoption and training, but of alignment, ensuring that the use of AI supports—rather than undermines—effective teaching and meaningful student learning.

One possible implication of the data is the need for districts and district leaders to prioritize AI literacy as a foundational condition before meaningful integration of AI in P-12 education. AI literacy, supported by a host of acceptable frameworks (e.g., Digital Education Council, 2025), must extend well beyond technical skills or simply "how to use AI" toward encompassing

understanding how AI systems generate outputs, recognizing their limitations and biases, evaluating the credibility of responses, and addressing ethical and responsible use, critical thinking, and the social and emotional dimensions of humans using AI as a tool, not as a replacement for human-centered practices. AI literacy is best developed across all stakeholders, including leaders, educators, support staff, and students, where training functions not merely as professional development but as a district-wide initiative, like any other literacy, complete with an adopted framework that aligns with district goals and includes clear policies and guidelines for AI use (Kim, 2025).

Additionally, both educator and student AI use should be approached in a transparent and educative manner, with individual classroom guidelines addressing safety and responsible use, while professional development efforts move beyond tool-based training toward cultivating educators as critical and informed users capable of making intentional decisions about when, how, and whether to use these tools. Finally, AI literacy training should also preserve space for educators to become “informed non-adopters” (Daniels, 2025), supporting educators in establishing guidelines that signal when AI is and is not appropriate within the context of a given assignment. Recognizing when AI use is appropriate and when it is not appropriate would be AI literacy.

Ultimately, GenAI presents not only a technological shift but an instructional, cultural, and ethical one. The findings of this study suggest that successful integration will require coordinated efforts to build AI literacy, establish clear and supportive policies, and develop instructional models that preserve educator agency and identity and promote student AI literacy. Moving forward, it will be important to articulate the conditions under which AI can be integrated into education in ways that align with the foundational goals of the educational enterprise and are responsive to the needs of both educators and learners.

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