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Insights into Teachers' Perspectives on Artificial Intelligence: An Exploratory Study

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Abstract

This exploratory study examines the current use and perceptions of Artificial Intelligence (AI) among K-12 educators. The research aimed to answer three key questions: 1) How is artificial intelligence being used by K-12 educators? 2) How do K-12 educators see artificial intelligence impacting their students? 3) What knowledge do K-12 teachers believe their students need to know about artificial intelligence?

A mixed-methods approach was employed. A survey with closed and open-ended questions was distributed to K-12 educators in Missouri. Results from this exploratory study indicate that while 46.7% of respondents use AI in their work, only 15.2% have their students use AI in class. Educators reported using AI primarily for instructional planning, administrative tasks, and assessment and feedback.

The exploratory study revealed mixed perceptions about AI's impact. Many teachers emphasized the need for students to learn about responsible AI use and to develop skills that complement AI capabilities. As a small-scale exploratory study, these findings are not broadly generalizable and should be interpreted with caution. However, the results do highlight the need for targeted professional development and suggest important areas for future research. While limited in scope, the study points to the value of proactive engagement with AI in education, both to help students develop responsible and informed uses of AI and to ensure teachers are equipped to address the emerging challenges AI brings to the classroom.

Keywords

Artificial Intelligence, Educational Technology, K-12 Education, Professional Development, Pedagogy, Teacher Perceptions

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Introduction

What exactly is artificial intelligence, and what is its place in today's classroom? According to Russell and Norvig's (2016) book titled *Artificial Intelligence: A Modern Approach,* artificial intelligence (AI) is defined as a method for making computers behave intelligently. But what does AI look like, and how does it fit into the lives of teachers and students? It has been established that K-12 classrooms should be fully equipped with a variety of technology tools, as well as teachers prepared to actively embed technology-based strategies into the curriculum. However, this need becomes more evident with rapid technological advances like the boom of AI that is occurring. The rapid pace of technological change can make it difficult for schools to keep up, both in terms of infrastructure and teacher professional development.

More specific than AI, is Generative Artificial Intelligence (GenAI). GenAI is described as "a type of AI system that can generate new content, such as text, images, audio, or even computer code. These models are trained on large datasets and learn patterns and relationships within the data, allowing them to create original outputs that resemble the training data" (Claude.ai, 2024). GenAI has rapidly integrated into various aspects of daily life and into the field of K-12 education. The advent of GenAI models like ChatGPT in November 2022 marked a significant milestone, sparking both excitement and concern among educators and stakeholders in the K-12 education system. On one hand, AI-powered tools have the potential to enhance and personalize learning, automate administrative tasks, and provide new avenues for creativity and exploration. However, there are also concerns about potential misuse, the impact on student learning and skill development, and broader ethical considerations around AI in education.

As AI continues to evolve and permeate daily lives and educational practices, it becomes increasingly crucial to understand its current and potential impacts on K-12 teaching and learning. While some research has begun to emerge on AI in education, there remains a significant gap in understanding its practical implementation and implications in K-12 classrooms. Su et al. (2023) noted the "absence of an overarching picture showing how AI in K–12 classrooms should be taught" (p. 2). This study aimed to contribute to filling this gap by providing insights into the state of AI use in K-12 teaching and learning, as well as K-12 educators' perspectives on its future impact. The study captures K-12 educators' views on AI and identifies potential directions for future investigation.

According to Cai et al. (2021), it was 1956 when AI was born. The birth of AI was followed by many years of progress until 2022, when ChatGPT was publicly released (Moorhouse, 2024). "(GenAI) represents a dramatic advancement from previous AI models. (GenAI) leverages deep learning models to generate human-like content, including audio, code, images, text, simulations, 3D objects, and videos" (Moorhouse, 2024, p. 1). This release raised more social awareness of AI and caused concern for many who were unsure of its capabilities.

AI took a big leap forward with the release of ChatGPT by OpenAI in November 2022 (Marr, 2023). Until the release of ChatGPT, AI applications primarily focused on the completion of specific tasks such as email filtering, voice assistants, and chatbots. While ChatGPT was not the first generative AI model, it was the first one that was widely available (Zewe, 2023). Since November 2022, additional generative AI models have been released: Gemini from Google, Claude from Anthropic, CoPilot from Microsoft, as well as generative AI image generators such as DALL-E from OpenAI, Stable Diffusion, and Midjourney. The rapid development and proliferation of these advanced AI systems had a significant impact on various industries, including K-12 education, raising both excitement and concerns among stakeholders.

Today, AI has become an integral part of almost all areas of people's daily lives (Su et al., 2023). Individuals often utilize AI-powered tools without even realizing it. For example, virtual assistants like Siri and Alexa, real-time traffic information on navigation apps, and facial recognition features in smartphones are all powered by artificial intelligence. The pervasive integration of AI into our daily activities has become increasingly ubiquitous.

On a more global scale, according to Miailhe (2018) as early as 2014 France, Canada, China, Denmark, the European Commission, Finland, India, Italy, Japan, Mexico, the Scandinavian and Baltic region, Singapore, South Korea, Sweden, Taiwan, the United Arab Emirates, and the United Kingdom all had a formalized plan to promote AI use. The United States was not included in this endeavor. However, now that GenAI has become widely available, individual states in the United States have started to release AI-specific guidelines for K-12 schools and educators to reference (AI for Education, 2023).

With the increased use of AI across various domains of our daily lives, it is critical that researchers and K-12 technology coaches identify and respond to the needs in K-12 education. Particular attention must be given to supporting teachers, guiding students in the K-12 education setting. As AI continues to evolve and become more prevalent, it is essential to ensure that teachers are equipped with the knowledge, skills, and resources necessary to integrate AI-powered tools and applications into their teaching practices effectively.

Literature Review

When considering how AI is taught and supported in K–12 education, it is important to recognize that AI education extends beyond teaching scientific and technological concepts. It also involves fostering critical reflection on how trustworthy AI should be developed and the potential consequences of failing to do so (Casal-Otero et al., 2023). Ethical considerations must be integrated into instruction, along with intentional scaffolding of AI use across different age groups and subject areas (AI for Education, 2023). The technological pedagogical content knowledge (TPACK) framework offers valuable guidance for educators as they navigate the integration of

GenAI, helping them balance technological, pedagogical, and content knowledge effectively (Mishra et al., 2023; Ning et al., 2024).

To meet the needs of K-12 educators and students, it is important to identify the current state of AI being used in teaching and learning. Exploring the perceptions of educators in the K-12 setting, specifically regarding what, if any, implementation of AI is being used in the classroom, is needed. Furthermore, what AI-specific professional development plans would be helpful should also be discussed. Darling-Hammond et al. (2017) stated that professional development "that focuses on teaching strategies associated with specific curriculum content supports teacher learning within teachers' classroom contexts. This element includes an intentional focus on discipline-specific curriculum development and pedagogies in areas such as mathematics, science, or literacy" (p. 5). This professional development should be explicit to the K-12 needs of AI.

Specifically, Wang and Lester (2023) stated, "We must develop an understanding of how to create the most effective AI professional development (PD) for K-12 teachers" (p. 231). To develop a professional development plan, a better understanding of teachers' perceptions of AI use will address gaps in the literature and broaden considerations as to what supports may be beneficial in helping move forward with identifying appropriate methods of AI use in teaching and learning, resulting in better preparation for real-world jobs post-high school.

With increasing access to AI tools available to teachers and students, this exploratory study sought to update teachers' perceptions of AI use in teaching and learning. This data may inform recommendations for supporting existing practices, guiding professional development to enhance teaching competencies, and primarily identifying priorities for subsequent research initiatives.

The purpose of this small-scale exploratory research was to identify how artificial intelligence is currently being used and how it may potentially be embraced by K-12 teachers to inform research. The research questions were:

1. How is artificial intelligence being used by K-12 educators?
2. How do K-12 educators see artificial intelligence impacting their students?
3. What knowledge do K-12 teachers believe their students need to know about artificial intelligence?

Methods

The research was approved by the Institutional Review Board at the University of Central Missouri (protocol# 2358). The survey was emailed to 6,805 educators in Missouri, and 92 surveys were returned for a response rate of .0135%. Email addresses were obtained from school websites.

This exploratory study employed a mixed-methods approach, combining quantitative survey data with qualitative thematic analysis of open-ended survey questions to provide an understanding of AI's role in Missouri K-12 education. For the qualitative data, first-order codes were developed after an initial review of the data. Thematic analysis was used as the researchers interpreted the meanings of the participants' answers using latent coding (Braun & Clark, 2006; Neuendorf, 2018). To conduct thematic analysis, the researchers hand-coded the responses to identify common ideas. Then, the researchers assigned overarching themes to organize the results. Reliability and validity were established by both researchers reaching consensus on the interpretation of the data by independently coding the qualitative responses and reaching consensus through discussion. Once the initial codes were created, the researchers collapsed the codes (Bingham, 2023).

Limitations

The researchers acknowledge that the low response rate limits the generalizability of their findings and should be interpreted with caution. The low response rate may suggest a response bias, as those who chose to participate were likely individuals with strong opinions about AI or the time available to complete the survey. This may have resulted in an overrepresentation of certain viewpoints and an underrepresentation of others, leading to a distorted understanding of the broader population's attitudes. Additionally, time constraints and survey fatigue among educators may have further influenced who responded, favoring participants with more flexible schedules or a higher personal interest in AI.

Recognizing and addressing response bias is critical for interpreting the findings accurately and for designing future studies that aim to capture a more representative sample of the target population. To improve participation in future studies, the researchers suggest using follow-up communications or focusing on a single district while partnering with administrators to encourage survey completion. Despite the limitations, they view the results as valuable for an exploratory study, offering a cross-sectional snapshot of perspectives across Missouri. While not widely generalizable, the findings highlight that K–12 teachers hold clear views about AI, providing meaningful insights that help shape future research directions, which the researchers address in the paper's conclusion.

Results

Ninety-two educators responded to the survey. Of the responses, 53.3% (n=49) said they did not use AI in their work as an educator, while 46.7% (n=43) said that they did use AI. For those educators who reported utilizing artificial intelligence (AI) in their professional work, they employed AI in a variety of ways (see Table 1).

Table 1

How do you use generative AI in your work as an educator?

Ways Educators Use AI In Their Work	Frequency of Example
Instructional Planning and Development	23
Administrative Tasks	23
Assessment and Feedback	12
Content Creation	11
Student Support	2

Some teachers (n=10) indicated that they used GenAI to create rubrics, while two other respondents said they used AI to give student feedback and grade writing assignments. Many teachers (n=23) indicated they have found GenAI useful for administrative tasks such as writing emails, recommendation letters, and interview questions. Other teachers (n=23) have found GenAI beneficial for creating lessons. Specific examples of AI tools used are listed in Table 2.

Table 2

What AI tools do you use?

AI Tools that Educators Use	Frequency
ChatGPT	26
MagicSchool.ai	9
EduAide	3
Brisk	2
CoGrader	2
AI Features in Quizziz	2
Claude	1
Grammarly	1
CoPilot	1
Canva	1
HeyGen	1
PlayLab	1
Sori Music	1
Bard (now Gemini)	1
Midjourney	1
Bing	1
AI Features in Kahoot	1
Fusion 360	1
Writable	1
Quillbot	1
Adobe Illustrator and Photoshop	1

Only 15.2% (n=14) of the respondents indicated they had students use AI in their K-12 classes. While 84.8% (n=78) of respondents shared they do not have their students use AI in their K-12 classes. A follow-up question was asked of the teachers who did have students use GenAI in their K-12 classes to find out how students are using it in class. Three examples of student use were identified (see Table 3).

Table 3

How do your students use generative AI in your classes?

Ways Students Use AI	Frequency of Example
Creative Tasks	7
Academic Support	6
Non-ethically	4

K-12 educators shared creative AI tasks, including making images, creating music, and developing custom graphics. Regarding AI for academic support, teachers shared that students used tools such as Grammarly to assist with grammar. Specifically, one K-12 educator participant wrote about students:

> They typically use it to try and cheat with writing assignments. We have had to have several talks about academic honesty and work ethic. They typically don't see how it is harmful since it is not another real person's writing, so they don't consider it plagiarism. They are struggling to understand that using AI does not demonstrate their own capabilities. "Learning" in their minds becomes a series of tasks to complete rather than concepts to learn, and AI not only facilitates that mindset but arguably encourages it.

Even though many K-12 educators indicated they did not have students use AI, of those who did, the researchers wanted to understand what tools their students used. When K-12 educators were asked what AI tools were specifically used in their classroom instruction, ChatGPT was the most common, with Grammarly being the second most used tool (see Table 4).

Table 4

What AI tools do you ask your students to use?

AI Tools Teachers Ask Students To Use	Frequency of Example
ChatGPT	6
Grammarly	4
Canva	2
Photoshop and Illustrator	1
IXL	1

Even though many K-12 educators did not have their students use AI at the time of the survey, one educator participant wrote that they do not currently ask students to use AI "but that will change next year."

An interesting insight was that one K-12 educator participant wrote, "I have heard some of them (students) talk about using ChatGPT, but we do not have any school-sanctioned programs in use." The K-12 educator was looking for school approval before introducing any AI into their class. Even though relatively few K-12 educators asked their students to use AI, teachers indicated that it still impacted their students (see Table 5).

Table 5

How is AI currently impacting your students?

How is AI Impacting Students	Frequency of Example
Negatively Impacting Academics	33
Little or no impact	14
Positive Academic Impacts	13

With AI's impact on K-12 students, some of the reasons respondents said it was not impacting students are that AI is not used in a particular subject area, or the teacher does not have students use it. Yet, most respondents indicated there was either a positive or a negative impact on students. Most respondents felt that AI was negatively impacting students' academics, while others did see a positive impact, as one respondent explained that students' "using Grammarly is positively impacting their writing skills." Overall, though, more instruction is likely to be needed, as one respondent wrote, "I think they (students) are confused about it (AI) and are receiving mixed messages. I think schools are going to have to consider teaching ethical use of AI."

In addition to understanding how AI is impacting students, the researchers sought to understand how AI is impacting K-12 educators' teaching and how they anticipate it impacting their teaching in the future (see Table 6).

Table 6

Impacts of AI on current and future teaching

Impact theme	Current impact on teaching	Anticipated future impact
Positive impacts (time-saving, creativity, customization, feedback)	27	—
Negative impacts (harder to teach, skepticism about work, tech avoidance)	19	—
No impact / "It will not"	14	9
Pedagogical impacts (changes in how lessons are delivered, assessment challenges, need for greater teacher creativity)	—	28
Increase in productivity	—	9
Curricular impacts (media- and AI-literacy instruction, ethics coverage, research uses)	—	8
Unsure	—	6

The majority of teachers (55%) felt that AI was either negatively impacting their teaching or not having any impact at all. For specific negative impacts, some teachers specifically indicated that AI makes teaching harder (n=11), it makes them (educators) more skeptical of student work (n=7), and it makes them (educators) want to use technology less in their instruction (n=1).

However, 45% of the educators who responded to this question (n=27) saw more positive impacts of AI in their classroom and felt that AI saves them time and increases their productivity (n=11), increases creativity (n=1), assists in customizing lessons (n=10), providing feedback/grading (n=3), and helps students (n=2).

Even though many teachers felt that AI is not impacting their teaching now, the researchers wanted to determine what they thought about AI's impact on their teaching in the future (see Table 6).

The 28 responses about the pedagogical impact of AI in the future varied. Eleven teachers felt that there would be AI tools for better teaching, that more students would end up working with paper instead of technology (n=2) to avoid cheating, and that overall more students would use AI (n=8) which would allow students to be more creative (n=2), and therefore, teachers will also need to be more creative in their teaching (n=2). Two respondents feel that the ability to detect work created by AI will be harder. Lastly, one respondent felt that AI might make teachers unnecessary.

Additionally, nine K-12 educators felt that AI would increase their productivity. Six respondents are unsure, and nine respondents feel that it will not impact their teaching. Of the nine respondents

who believe AI will not impact their teaching, three specifically wrote that they anticipate avoiding the use of AI in their teaching.

Eight teachers spoke about the future curricular impact of AI. One teacher said that there will be a greater need to teach media literacy, six said that there will be a greater need to teach about AI and its ethics, and one said they will use it to conduct more research.

Overall, there seemed to be confusion about the ways AI could possibly impact future teaching in K-12. For example, one respondent wrote, "How will we teach critical thinking?" and another respondent wrote, "I'm planning to use it in the future, but not sure how much at this point. It was very helpful to get simple notes quickly. I will probably use it for that again. I'm not sure yet what other ways I will use it, but I know as the technology improves, there will be uses I'm not even aware of yet that I will utilize AI for." Finally, a third example of confusion about the future impact of AI on teaching was demonstrated in this response: "It probably will not impact my teaching. I teach 1st grade, and I do not see a reason to use AI." In addition to the future impact of AI on K-12 teaching, the researchers wanted to understand K-12 educators' perspectives on how AI will impact future students (see Table 7).

Table 7

How will AI impact your students in the future?

AI's Future Impact on Students	Frequency of Example
Unsure	20
Negative Impact	18
Neutral	9
Positive Impact	5
Learn new skills	5
It will not	4

The highest frequency of K-12 educators (n=20), indicating their belief about the impact of AI on their future students, was that they were not sure how AI would impact their future students. Of the 20 educators who were unsure, 12 (n=12) educators said that it depends on how students learn to use AI. For example, one respondent wrote, "It depends on the perspective. I think AI helps me provide better resources for students, but I also have seen students use AI to complete their assignments when they are intimidated by the rigor of an activity."

Many respondents felt that AI would negatively impact their future students. Of the 18 respondents indicating a negative impact, nine wrote that it will make students lazier, five wrote that it will diminish important skills such as creativity, critical thinking, and self-determination, and four wrote that they will not learn as much.

Fewer respondents felt that AI would ultimately have a positive impact on their future students. Of the five that wrote about a positive impact, one wrote that students will develop new ways of learning, another respondent said that AI will help them, a third respondent wrote that it will make students more active in their learning, a fourth respondent felt that it would free up time for students, and a fifth respondent wrote that AI will allow students to develop higher order thinking skills. Specifically, one respondent wrote, "I think in the next 10 years AI could completely change the way students do things as well as the way we teach content."

Nine individuals said students will use AI on assignments without indicating whether that had a negative or positive impact. Therefore, those responses were coded as neutral.
Five of the respondents felt that AI will require students to learn new skills such as the ability to recognize AI (n=2), AI ethics (n=1), the ability to work with AI (n=1), and how to live in a world where AI is integrated into all aspects of their lives (n=1). Finally, four respondents believed that AI will have no impact on their future students.

In addition to learning about what skills educators believe their students will need in the future, the researchers wanted to understand what AI skills the same educators believed their students need now, what K-12 educators in Missouri believe about the AI skills their students will need in their future jobs, and what AI skills Missouri educators their future students will need (see Table 8).

Table 8

AI Skills Needed Now, for Future Jobs, and for Future Students

AI skill theme	Students Need Now	Needed for Future Jobs	Needed by Future Students
Appropriate / Responsible use (ethics, when & when *not* to use AI)	21	5	16
Understand how AI works & spot inaccuracies	18	5	—
Practical applications – prompt engineering, job tasks, creative use	—	25	7
Digital & media literacies / critical-thinking skills	6	3	—
Continuous learning / up-skilling	—	2	2
Believe no AI skills are necessary	17	4	2
Unsure / depends on context	1	17	13

The skill that was mentioned by most K-12 educator respondents was that students need to learn the appropriate uses of AI (n=21). Of the 21 who said appropriate uses of AI were the top skill students need to know now, two of those specifically stated that students needed to know when not to use it. This was represented in statements from K-12 educators, such as "The ethical considerations and how to use it in a responsible manner" and "Using AI ethically and responsibly, knowing when to use AI."

Many respondents felt that students need to know how AI works (n=18). Of those 18, two stated they believe students today need to know how to check AI for accuracy. Seventeen K-12 educators wrote that students did not need any current AI skills. In response to the question, one respondent wrote:

> None. I honestly don't believe adolescents are mature enough to use AI in a responsible way that fosters actual learning. It has had a major effect on students who already struggle in school or have a disability. It is a very easy out for difficult or challenging assignments.

Then, six respondents said that students need skills and literacies such as media literacy (n=2), creativity (n=1), digital citizenship (n=1), critical thinking (n=1), and the ability to navigate a world of AI (n=1). Finally, one K-12 educator was unsure about what skills students need now.

In addition to educators' perspectives on the AI skills current students need, the researchers also sought information on educators' perspectives about students' AI skills in their future jobs. Table 8 shows that respondents (n=25) wrote about practical applications they believe their students will need to know including how to evaluate AI results (n=5), how to use AI for creativity (n=1), how to use AI for problem-solving (n=2), how to use AI for basic job tasks (n=5), how to engineer prompts (n=4), how to write with AI (n=2), how to program (n=1), and a basic understanding of how AI works (n=5). These practical applications were highlighted by this quote: "The ability to adapt and work with AI in order to better perform their careers." Seventeen respondents were unsure about what skills their future students would need, with four of the 17 respondents specifically stating that it would depend on the student's career choice.

In students' future jobs, some respondents (n=5) felt that their students will need to know how to use AI responsibly, including the ability to know how to use it ethically (n=4) and when not to use AI (n=1). Three respondents believed their future students would need digital literacy skills, and two believed their students would need the ability to continue learning. Four respondents did not believe their future students would need any AI skills. One K-12 educator wrote:

> My particular students will more than likely never need to use AI. The 5% of my students who don't want to work basic jobs or trades may end up using AI. The only

> thing would be to use it to help with basic information, but not to complete work for them.

Table 8 also includes information about the AI skills teachers believe their future students will need. Sixteen respondents felt that their future students will need to know how to use AI responsibly, including one respondent who specifically mentioned that students will need to understand the legal ramifications of using AI. Thirteen were unsure what AI skills their future students would need. This was highlighted in the following quote: "It is honestly hard to tell. As I have mentioned in the form, it is right now, it is not broad enough in scope to have as strong of a niche for it to be a major focus in school. There's a chance, however, like with all things, that this will advance over time. Currently, it is mainly a nuisance, however, there is a strong chance that in time it will become an important tool that we use in our everyday lives. Only time will tell."

Seven respondents felt that their future students would need specific AI skills, including prompt engineering (n=4), the ability to discern AI outputs (n=2), and literacy skills (n=1). Lastly, two respondents felt that their students would need continued education on the use of AI, and two other respondents felt that their future students would not need any AI skills.

The final question asked on the survey was: Is there anything else you would like to share? Participants wrote a variety of responses. Ten individuals said "no," there was nothing else they wanted to share. Others wrote the following:

> I think AI could be more useful to me as a teacher, but I am not familiar enough with it. I do not think elementary students need to use it. We are trying to teach students to be problem-solvers and critical thinkers. I believe AI should be used to support critical thinking and problem-solving, not do critical thinking and problem-solving. In order for students to be able to utilize AI in this way, they must first be taught to problem solve and think critically on their own.

"AI is both positive and negative. It is just going to take time for students and teachers a little while to figure out the proper way to use (sic)."

"I think that math teachers have faced a lot of the same questions that English teachers are now facing when the calculator was introduced."

Discussion

To inform future research, the survey results provide insights into the current state and potential future of AI integration in K-12 education. The survey revealed a nearly even split between educators who use AI in their work (46.7%) and those who do not (53.3%). This suggests that AI

adoption in education may be at a critical juncture, with some educators already embracing the technology while others remain hesitant or unaware of its potential applications.

Among those using AI, the specific uses ranged from administrative tasks such as writing emails and recommendation letters to instructional planning and development. This diversity of applications highlights the versatility of AI tools in supporting various aspects of an educator's work.

Notably, only 15.2% of respondents reported having their students use AI in K-12 classes. This low rate of student use encouraged by teachers contrasts with the higher rate of AI use among educators themselves. The discrepancy may stem from several factors: 1) Ethical concerns: Some educators expressed worries about academic honesty and the potential for AI to encourage a task-completion mindset rather than genuine learning. 2) Lack of institutional support: One respondent mentioned waiting for "school approval" before introducing AI tools, suggesting that institutional policies may be lagging behind technological advancements. 3) Uncertainty about appropriate use: Many educators seem unsure about how to effectively integrate AI into student learning experiences.

The perceived impact of AI on students was mixed, with more educators reporting negative impacts than positive ones. Concerns about academic integrity, diminished critical thinking skills, and reduced student effort were common themes. However, some educators recognized potential benefits, such as improved writing skills through tools like Grammarly.
Interestingly, educators were more likely to see positive impacts of AI on their own teaching, citing increased productivity and creativity in lesson planning. This discrepancy between perceived benefits for teachers and students suggests a need for more research and professional development on how to translate AI's benefits for educators into meaningful learning experiences for students. It also highlights an important point about the value of AI for those who already possess expertise in a topic, which should be explored in future research.

Looking to the future, educators expressed a range of expectations about AI's impact on teaching and learning. Many anticipate significant changes in pedagogical approaches and curriculum content, including a greater emphasis on media literacy and AI ethics. However, a notable number of respondents were unsure about the future impact, reflecting the rapid pace of AI development and the uncertainty it brings to the field of education.

Overall, the survey results highlight several challenges and opportunities facing educators as they navigate the integration of AI in education. Challenges include balancing the benefits of AI with concerns about academic integrity and authentic learning, developing institutional policies and support structures for AI use in schools, addressing the knowledge gap among educators about AI capabilities and best practices for integration, and ensuring equitable access to AI tools and skills development for all students so that the digital divide is not widened.

Despite these challenges, there are opportunities for meaningful integration of AI in education that can be explored with further research. Continued research will be necessary as AI usage grows and becomes more deeply embedded in professional contexts. Major advances in technology lead to paradigm shifts that impact how teaching is designed and delivered (Harasim, 2020; O'Dea, 2024). Following the trajectory of earlier tools like calculators and learning management systems, educators must adapt their practices to effectively incorporate AI technologies (Crow et al., 2024; Harasim, 2020).

Implications

As previously mentioned, while the low response rate limits generalizability, the researchers emphasize key implications from these findings. Due to the resistance shown by some teachers towards AI, the researchers believe it would behoove teachers to hear about how AI is being used in the workplace and higher education. AI is rapidly transforming many industries and professions. Teachers who are aware of these changes can better prepare their students for the evolving job market and future careers that may heavily involve AI technologies. Additionally, understanding AI applications in higher education can help teachers incorporate relevant tools and techniques into their own classrooms, potentially enhancing student learning and engagement.

Some resistance to AI is understandable and even appropriate, as students need to learn content knowledge in order to think critically. Students need to learn how to read, write, and evaluate, so that they can determine if AI content meets their needs, in addition to many important skills. To help prepare teachers to teach their students in the age of AI, teachers need awareness of AI's role in various fields, allowing them to emphasize the development of skills that complement AI, such as critical thinking, creativity, and emotional intelligence - abilities that remain uniquely human. Therefore, based on the findings, the researchers recommend that professional development specific to the needs of AI in teaching and learning be implemented and researched. State education agencies have started to provide guidance on how AI can be incorporated into schools, and some districts have fully embraced AI by allowing teachers and students access to resources. As Moorehouse (2024) wrote, "it is essential that pre-service and in-service teachers receive relevant subject-specific professional development and (initial teacher training) ITE on the use of (GenAI) tools" (p. 7). The researchers suggest that teacher preparation programs include instruction on GenAI.

AI is poised to significantly transform both education and the workforce in numerous ways. As this study identified, K-12 educators recognize the need for AI in future job-related tasks. As this technology continues to advance rapidly, its influence on how we teach, learn, and work is becoming increasingly apparent. If educators choose to ignore AI or fail to invest time in understanding its capabilities and implications, they risk being caught off guard by its rapid integration into various aspects of society. A lack of preparedness could lead to a reactive approach

when AI inevitably becomes more prevalent in educational settings. Such a reactive stance may result in educators struggling to effectively incorporate AI tools and methodologies into their teaching practices, potentially hindering students' ability to leverage these technologies in their learning and future careers.

Moreover, without proper guidance from knowledgeable educators, students may develop misconceptions about AI or miss out on critical discussions about its ethical use and societal impact. This could leave them ill-equipped to navigate the AI landscape they will encounter in higher education and the job market. However, educators currently have a unique opportunity to be proactive in addressing AI's role in education and society. As AI is still in its relatively early stages of widespread adoption, there is a window of time for teachers to:

1. Educate themselves about AI technologies, their potential applications, and their limitations.
2. Engage students in meaningful discussions about AI's impact on various fields and industries.
3. Develop curricula that incorporate AI literacy and skills.
4. Explore and experiment with AI tools that can enhance teaching and learning experiences.
5. Address ethical considerations and potential biases in AI systems.
6. Collaborate with colleagues and experts to develop best practices for AI integration in education.

By taking a proactive approach, educators can help shape the narrative around AI in education and guide students toward responsible and effective use of these technologies. This proactive stance can also help ensure that AI is used as a tool to augment and enhance human capabilities rather than replace them.

Furthermore, by fostering an environment of openness and curiosity about AI, educators can help students develop the critical thinking skills necessary to evaluate and leverage AI technologies in their future academic and professional work. This approach can contribute to supporting students who are not only adaptable to technological changes but are also capable of steering the development and application of AI in ethical and beneficial directions. Overall, we are at a critical juncture for K-12 educators to take the lead in embracing, understanding, discussing, and appropriately integrating AI into educational contexts. By doing so, they can better prepare students for a future where AI will likely play an increasingly significant role in both their personal and professional lives.

Future Research

Due to the negative feedback received about AI, it will be important for future research to seek out why some teachers are resistant to using AI in their classrooms. There are many possible reasons

for their resistance, including fear of the unknown, a belief that society relies too much on technology, or concerns about educational quality are all possibilities. An understanding of why, specifically, teachers have concerns with AI will help increase the relevance of professional development and overcome barriers that exist. Relatedly, research is needed on teacher professional development regarding AI implementation, as many educators indicated uncertainty about proper AI integration.

Furthermore, the researchers recommend studying effective AI integration models for K-12 classrooms, particularly given the divide between educators who use AI (46.7%) and those who don't (53.3%). Research on developing age-appropriate AI ethics curricula, as many educators emphasized the need for teaching responsible AI use.

Lastly, the researchers recommend investigating how AI affects student learning outcomes. They note that most current research, including this study, primarily examines teacher and student perceptions of AI. They suggest that empirical studies measuring AI's concrete impact on learning processes and educational achievement would be a valuable contribution to the field. Specifically, the researchers suggest longitudinal studies tracking how student skills develop with and without AI assistance, addressing concerns about potential negative impacts on learning. Another area for further research related to student learning is studies examining the pedagogical impacts of AI on different subject areas, as some educators noted AI might be more relevant to certain disciplines than others. Further, a comparative analysis of student outcomes between classrooms that integrate AI as a creative/supportive tool versus those that restrict AI usage would enhance educators' understanding of AI in K-12 education.

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