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# Perceptions of AI Among K–12 Educators and Administrators: A Mixed-Methods Study

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ABSTRACT: This project explores how teachers and school administrators in a New Jersey public school district perceive and use artificial intelligence (AI) in education. Using the Technology Acceptance Model (TAM) and the Zone of Proximal Development (ZPD) theory, the study examines educators' perceptions of usefulness, ease of use, preparedness, beliefs about student learning, and intention to adopt AI in K–12 settings. Seventy-one educators completed a survey, and responses were analyzed using descriptive statistics, correlations, k-means clustering, and one-way ANOVA with post hoc comparisons. Cluster-based analyses conducted with teachers identified three groups—AI Advocates, Curious but Cautious, and Skeptics—which differed significantly in their perceptions of AI's usefulness, ease of use, preparedness, and intention to adopt it. An interview and open-ended responses provided qualitative insights into educators' training needs, ethical concerns, and beliefs about student learning. Correlations between overall AI sentiment and TAM and ZPD measures highlighted the importance of mindset, confidence, and teacher beliefs in shaping AI adoption.

KEYWORDS: Behavioral and Social Sciences, Clinical and Developmental Psychology, Artificial Intelligence in Education, Technology Acceptance Model, Zone of Proximal Development.

## Introduction

Artificial intelligence (AI) has become increasingly visible across many domains, including education, prompting discussion about its role in professional practice. With tools like ChatGPT, Gemini, and Microsoft Copilot becoming widely available, discussions about the benefits, challenges, and ethical concerns of AI in education have become increasingly prominent in educational environments. However, rapid technological advancements have outpaced research into educators' and administrators' real-world experiences and attitudes about AI.

Artificial intelligence (AI) is a term that encompasses a wide range of computational techniques and applications. In this study, AI is operationally defined as user-facing software tools that educators are likely to come across in contemporary K–12 settings. These include general-purpose AI assistants (e.g., ChatGPT, Gemini, Microsoft Copilot), AI-supported writing and grammar tools (e.g., Grammarly, Quillbot, Hemingway Editor), AI-based research assistance platforms (e.g., Elicit, Scite, Consensus), and AI-powered instructional or lesson-planning tools (e.g., Khanmigo, Curipod, MagicSchool AI).

Prior research suggests that AI-supported tools may support student learning in several ways, including assistance with homework and studying, personalized learning experiences, and skill development.[1] In 2021, Zhai *et al*. analyzed studies from 2010 to 2020 to identify trends and challenges of AI in education.[2] Much of this research was prior to the widespread availability of generative AI tools and focused on earlier forms of educational AI. From a theoretical perspective, these studies highlighted how AI systems were often designed to adapt content to learners' current abilities, which aligns with Vygotsky's Zone of Proximal Development (ZPD).

The Zone of Proximal Development (ZPD) is the range between what a student can do independently and what they can do with assistance from someone more experienced, such as a teacher, coach, or peer. It represents the "sweet spot" for learning, where students are challenged just beyond their current abilities but can still succeed with the right support. In this sense, AI-supported tools can be conceptualized as aligning with the ZPD through features such as:

- Customized learning activities that address the student's current gaps in knowledge and skills.
- Adaptive content that adjusts in real time to deliver the appropriate complexity based on the student's ongoing performance.
- Immediate feedback and corrections that help students understand their mistakes and learn from them in real time.
- Scaffolded support that provides temporary help for tasks just beyond the student's current ability, and is gradually removed as competence increases.

The use of AI in educational settings has raised substantial concerns. Educators and researchers have expressed apprehension about student overreliance on AI-generated content, erosion of critical thinking skills, accuracy of AI outputs, and challenges related to academic integrity and data privacy.[5] These concerns complicate educators' decisions about when and how to use AI in classrooms and emphasize the importance of examining perceived risks and ethical implications in addition to potential instructional benefits.

Some studies report that educators perceive AI tools as time-saving, as they support instructional planning and con-



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tent development, but educators also have concerns about reliability, accuracy, and ethical use.[1,3] In particular, Bergdahl and Sjöberg found that teachers have greater confidence in using AI chatbots for teaching when they feel clear about the ethics and safety of the tools.[3]

One factor associated with educators' use of AI in classrooms is their confidence in their ability to do so, which is often referred to as AI self-efficacy. Research shows that teachers with higher AI self-efficacy are more likely to have positive attitudes toward AI and integrate it into their teaching practices.[4] Several factors shape this confidence, including previous experience with technology, professional training, and whether teachers view AI as relevant to their work.[5]

The Technology Acceptance Model (TAM), developed by Fred Davis in 1989,[6] is one of the most widely used models to explain and predict the adoption of new technologies. While TAM originally focused on two core factors, this study incorporates two additional measures commonly used in extended versions of the model:

- Perceived Usefulness: how much a person believes a technology will enhance their job performance
- Perceived Ease of Use: how much effort they think it will take to use the technology effectively
- Preparedness: how ready they feel to integrate AI into their roles
- Intention to Use: how likely they are to adopt AI in the near future

In the original TAM framework, perceived usefulness and ease of use shape a person's attitude toward the technology, which then influences their intention to use it and, ultimately, their actual use. Although educational settings are inherently collaborative, the focus of this study is on educators' individual use of AI tools as professional supports (e.g., lesson planning, content creation, feedback, and administrative assistance), rather than on shared or mandated technologies. In this context, individual beliefs, confidence, and perceived readiness are central to adoption decisions, making the Technology Acceptance Model particularly appropriate. Intention to use serves as a meaningful outcome measure for understanding educators' likelihood of adopting AI in practice.

This study captures a comprehensive picture of educators' readiness and likelihood of adopting AI by incorporating preparedness and intention, extending Davis's model in ways supported by subsequent research, including Mun and Hwang's work on teacher adoption of digital tools.[7]

Research in language instruction settings suggests that some educators perceive AI tools, such as ChatGPT, as improving their efficiency, reducing some aspects of their workload, and increasing their confidence in technology use.[8] Similarly, studies report that educators may view AI as helpful for streamlining lesson planning and content creation, enabling them to produce customized materials while saving time.[9] Some research also indicates that school principals perceive AI as useful for automating administrative tasks and supporting data analysis.[10]

While AI's potential in education is widely discussed, prior research has disproportionately focused on technical applications rather than educators' perspectives, leaving gaps in understanding teachers' readiness, attitudes, and self-efficacy related to AI use.[5] There is also limited research examining training tailored to educators, as well as administrators' attitudes toward AI. Understanding these factors can help clarify how educators interpret, respond to, and make decisions about AI use in educational settings. Although AI is often framed as offering efficiency and instructional support, its educational value, particularly in the context of newer generative tools, remains contested, with educators weighing potential benefits against concerns related to ethics, learning, and student development.

This study uses a mixed-methods approach, based on the Technology Acceptance Model (TAM) and Vygotsky's Zone of Proximal Development (ZPD) theory, to investigate how K–12 educators and administrators perceive, use, and evaluate AI in their professional roles.

## Methods

This study employed a mixed-methods approach to investigate how educators and administrators in K–12 schools perceive AI. A mixed-methods design was appropriate because quantitative survey data were used to identify broad patterns in attitudes and adoption, while qualitative data from open-ended responses and an interview were used to help contextualize and explain those quantitative findings, consistent with an explanatory mixed-methods approach. This explanatory approach enabled the interpretation of statistical results through educators' experiences and concerns. We collected data from three sources: survey responses, written comments, and an interview with a high school teacher. To analyze the results, we used a combination of statistical analysis, a review of common themes in written responses, and a machine learning method known as k-means clustering to group participants based on their responses to key questions related to the Technology Acceptance Model (TAM). This helped reveal patterns in attitudes toward AI that did not follow job roles or grade levels. By combining statistics with personal insights, the study captured both broad trends and deeper perspectives on educators' thinking about AI.

A total of 71 educators from a public school district in New Jersey participated in the survey. Respondents included 57 teachers and 14 administrators or staff members in student services. Because the sample included relatively few administrators (14 out of 71 respondents), most of the analysis focuses on patterns among teachers. Teachers represented a range of grade levels as shown in Table 1. Table 2 shows the number of teacher participants by subject area; participants could select more than one subject. Administrators held various leadership and support roles as shown in Table 3. Participants were recruited through district-wide email outreach and completed the survey voluntarily and anonymously during a two-week window in April 2025. The survey was distributed broadly via email, so a precise response rate could not be calculated, but with 71 completed responses in a district with approximately 600 total staff, the sample represents a sizable portion of the district's workforce.

**Table 1:** Number of teacher participants by grade level.

| | |
|---|---|
| Elementary (K-5) | 26 |
| Middle School (6-8) | 18 |
| High School (9-12) | 13 |
| **Total** | **57** |

**Table 2:** Number of teacher participants by subject area. Participants could select more than one subject.

| | |
|---|---|
| English Language Arts | 24 |
| Social Studies | 22 |
| Math | 20 |
| Science | 14 |
| Special Education | 8 |
| Fine Arts | 3 |
| Physical Education | 2 |
| Electives | 2 |
| World Languages | 2 |
| Business | 1 |

**Table 3:** Roles of administrator participants.

| | |
|---|---|
| School or district leadership | 6 |
| Student services | 6 |
| Operations | 1 |
| Technology and IT | 1 |
| **Total** | **14** |

The survey consisted of 52 items across three main areas: (1) Technology Acceptance Model (TAM) constructs such as perceived usefulness, perceived ease of use, behavioral intention to use, and preparedness; (2) Zone of Proximal Development (ZPD) aligned items assessing the ability of AI to support adaptive and independent learning; and (3) ethical concerns and perceived challenges related to AI use in education. Survey items were designed from established Technology Acceptance Model (TAM) instruments and supplemented with items aligned with current AI-in-education concerns. Items were informally reviewed for clarity and relevance to K–12 contexts. To support consistent interpretation, examples of widely used AI tools (e.g., ChatGPT, Grammarly, MagicSchool AI) were embedded in relevant survey items. This helped anchor responses to common applications, while acknowledging that individual definitions of AI might vary. A copy of the survey instrument is available online for review (https://tinyurl.com/5x9harxy). Most Likert-scale items used a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).

To assess the internal consistency of the TAM instruments, we used Cronbach's alpha for each multi-item dimension. Internal consistency was good for perceived usefulness ($\alpha = .825$) and perceived ease of use ($\alpha = .826$), and acceptable for behavioral intention ($\alpha = .711$). Preparedness was assessed using a single item, so Cronbach's alpha was not applicable.

We used descriptive statistics and Pearson correlations to examine relationships between overall AI sentiment and the TAM and ZPD dimensions. One-way analyses of variance (ANOVA) with Tukey *post hoc* tests were conducted using SPSS to determine if mean differences across clusters were statistically significant.

To identify natural groupings in attitudes toward AI, exploratory k-means clustering was applied to the four TAM dimensions (perceived usefulness, ease of use, preparedness, and intention to use). This analysis was performed using the scikit-learn Python library (facilitated by ChatGPT). The researcher maintained full analytical oversight by specifying the input variables, determining the optimal number of clusters (k=3), and verifying all cluster memberships against the raw data to ensure accuracy.

We grouped open-ended survey responses by overall sentiment and looked for common themes. These included concerns about ethics, the benefits of AI, its application in education, and challenges to its broader adoption. We also interviewed a high school German teacher who volunteered to participate and had been using AI in her classroom. Her answers helped us see how the survey results connected to the ideas in our study, like the TAM and the ZPD. What she shared also helped us better understand the differences between the three groups we found through machine learning.

## Results

To examine patterns in educators' attitudes toward AI, k-means clustering was conducted using 13 Likert-scale items related to perceived usefulness, perceived ease of use, preparedness, and behavioral intention to use. This analysis identified three distinct clusters (Cluster 1, n=21; Cluster 2, n=22; and Cluster 3, n=14). Mean scores for each Technology Acceptance Model (TAM) dimension by cluster are shown in Table 4.

**Table 4:** Mean Survey Scores by cluster across TAM dimensions.

| Cluster | Perceived Usefulness | Behavioral Intention to Use | Preparedness | Perceived Ease of Use |
|---|---|---|---|---|
| Cluster 1 | 4.76 | 4.29 | 4.00 | 4.19 |
| Cluster 2 | 4.29 | 3.86 | 2.79 | 2.07 |
| Cluster 3 | 3.21 | 2.64 | 1.79 | 2.50 |

One-way analyses of variance (ANOVAs) were conducted to examine differences among the three clusters across the Technology Acceptance Model (TAM) dimensions using composite scores. Because the three clusters were generated from the TAM dimensions (Perceived Usefulness, Perceived Ease of Use, Behavioral Intention, and Preparedness), high F-statistics and significant p-values in the ANOVA results are expected. These analyses are presented not as independent hypothesis tests, but as a method of internal validation to profile the distinct characteristics of each cluster and to confirm the statistical separation achieved by the k-means algorithm. Significant differences were found across clusters for perceived usefulness, $F(2, 54) = 69.21$, $p < .001$; perceived ease of use, $F(2, 54) = 65.13$, $p < .001$; behavioral intention to use AI, $F(2, 54) = 40.99$, $p < .001$; and preparedness to integrate AI, $F(2, 54) = 31.88$, $p < .001$. These results indicate that cluster membership was associated with meaningful differences across all core TAM constructs and preparedness.

Post-hoc Tukey HSD tests were conducted to identify where specific cluster differences occurred. For perceived usefulness, all pairwise comparisons were statistically significant: Cluster


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1 differed from Cluster 2 (p = .0003) and Cluster 3 (p < .001), and Cluster 2 differed from Cluster 3 (p < .001). For behavioral intention to use AI, all cluster comparisons were also significant, including Cluster 1 versus Cluster 2 (p = .0326), Cluster 1 versus Cluster 3 (p < .001), and Cluster 2 versus Cluster 3 (p < .001). Similarly, preparedness differed significantly across all cluster pairs (Cluster 1 vs. 2, p < .001; Cluster 1 vs. 3, p < .001; Cluster 2 vs. 3, p = .0025). For perceived ease of use, Cluster 1 differed significantly from both Cluster 2 (p < .001) and Cluster 3 (p < .001), but the difference between Clusters 2 and 3 was not statistically significant (p = .202). While a slight trend suggests Skeptics found tools marginally easier than the Curious but Cautious group, the two clusters demonstrated comparable levels of perceived ease of use.

Based on these distinct statistical profiles and the qualitative themes described below, the clusters were labeled to reflect their overall perspectives on AI: Cluster 1 (AI Advocates), Cluster 2 (Curious but Cautious), and Cluster 3 (Skeptics). These differences are visualized in Figure 1, which illustrates the mean TAM scores across dimensions for each group.

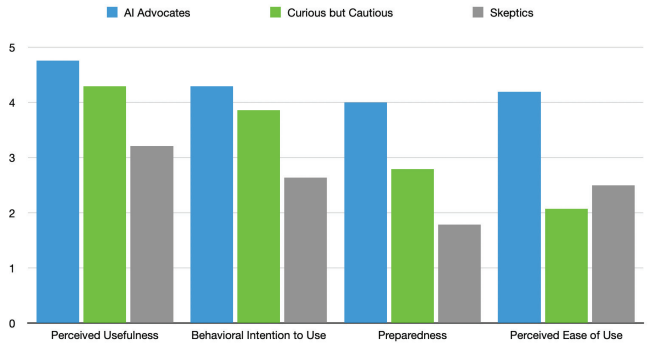


**Figure 1:** Average TAM scores by cluster. AI Advocates exhibited the highest mean scores across all four TAM dimensions: perceived usefulness, behavioral intention to use, preparedness, and perceived ease of use. Skeptics scored lowest on all dimensions except ease of use, where their scores were slightly above those in the Curious but Cautious cluster.

To provide context for these clusters, we examined general usage patterns across the district. A moderate correlation (r = 0.41, p < .001) was found between the frequency of teachers' use of AI assistants and their overall positive feelings about AI. This suggests that teachers who used AI more frequently were also more likely to hold favorable attitudes toward it. Educators and administrators reported moderate use of AI tools overall, though most had at least some experience with them. Writing tools like Grammarly appeared to be the most commonly adopted AI applications among teachers, with a large majority reporting at least occasional use. Elementary teachers were especially likely to use lesson planning platforms such as MagicSchool. Use of general AI assistants like ChatGPT varied. While some teachers used them often, most reported using them only occasionally or rarely. Data tools, such as AI dashboards or gradebook analytics, were the least used, with over half of teachers stating they never used them. In contrast, administrators reported using both data tools and general AI assistants more regularly, likely due to their operational responsibilities. These findings reflect self-reported usage trends rather than statistically tested differences.

***AI Advocates (Cluster 1):***

Qualitative data showed that AI Advocates viewed AI as a helpful, intuitive tool that could support differentiated instruction, content creation, and student learning. Many already use AI regularly and are confident in their ability to integrate it effectively. Their comments reflected comfort, enthusiasm, and practical alignment with teaching needs.

"I've used AI to reword things for different reading levels. It's been very helpful for students who need accommodations."

"AI can scaffold learning, but only if you know how to prompt it at the right level."

"Creating report card comments."

"Generating multiple choice questions. I'm terrible at writing those."

"Emails and writing report card comments!"

These educators believe in the ethical and purposeful use of AI and have already begun using it in their classrooms.

***Curious but Cautious (Cluster 2):***

Survey comments from this cluster showed moderate optimism about AI's potential but lower confidence and readiness. Curious but Cautious educators saw potential in AI but expressed hesitation about its limits, ethical implications, and impact on student learning. They were interested in learning more, but often cited a lack of training or clarity.

"It's helpful, but I don't feel confident enough to use it consistently yet."

"Teachers shouldn't lose that personal connection with their students' abilities and progress."

"I have limited knowledge of what is available and how to use it."

"Training would be helpful for understanding the best ways to use it effectively and ethically."

This group would benefit from more structured training, policy clarity, and real-world examples of how AI can align with their teaching goals.

***Skeptics (Cluster 3):***

This group scored lowest on perceived usefulness, behavioral intention, and preparedness, but reported slightly higher ease of use than the Curious but Cautious group. Skeptics were unsure of AI's educational value and were most concerned about its potential risks. Their comments reflected discomfort with AI as an instructional tool, particularly regarding student overreliance, loss of critical thinking, and academic integrity:

"Students… are not able to think critically anymore… they can barely write a complete sentence… AI just makes this more noticeable."

"It's like whack-a-mole… how am I going to figure out where the mole's coming from next?"

"AI could be used for the wrong reasons / the potential for students to misuse it is high."

"Plagiarism, not learning or creatively thinking, just copying."

Although some Skeptics acknowledged that AI could be useful for administrative tasks, they were unlikely to adopt it without strong guardrails.

***Training Needs:***

Training emerged as a common theme across all groups, but was especially important for the Curious but Cautious group. While this group rated AI as useful, they reported lower confidence in their ability to implement it effectively. Their Preparedness and Ease of Use scores were both substantially lower than their Usefulness and Intention scores, revealing a gap between interest and readiness.

The German teacher interviewed for this study echoed this sentiment:

"You can't just tell students to use AI and expect it to go well. You need to know how to prompt, guide, and set limits. That takes time and training."

Additional quotes reinforced this theme:

AI Advocate: "The potential is there, but we need time and training to do it right."

Curious but Cautious: "I want to use it more, but I don't know where to start or what tools are even allowed."

Curious but Cautious: "I feel like I'm being asked to use something I don't fully understand yet."

***Technology Acceptance Model (TAM) Findings:***

In addition to clustering, we also examined how teachers' overall perception of AI correlated with four TAM-related items. More positive sentiment about AI was associated with higher levels of:

- Perceived Usefulness ($r = 0.54$, $p < .001$)
- Behavioral Intention ($r = 0.57$, $p < .001$)
- Preparedness ($r = 0.37$, $p < .001$)
- Ease of Use ($r = 0.47$, $p < .001$)

All reported correlations were statistically significant ($p < .001$). These moderate correlations are consistent with the TAM framework, suggesting that as teachers view AI more favorably overall, they are more likely to find it useful, feel confident in integrating it, and intend to adopt it. The strongest correlation was between overall perception and Behavioral Intention.

Among administrators, the same sentiment question correlated even more strongly with TAM variables, including Perceived Usefulness ($r = 0.88$, $p < .001$), Behavioral Intention ($r = 0.82$, $p < .001$), and belief in AI's ability to personalize learning ($r = 0.78$, $p < .001$). These results suggest that administrators may be more attuned to AI's strategic potential in education, although the small sample size ($n = 14$) limits the strength of this conclusion.

***Zone of Proximal Development (ZPD) Findings:***

Teachers who felt more positively about AI were moderately likely to agree that it can support adaptive learning at the right level ($r = 0.54$, $p < .001$), but less so with its ability to support independent learning ($r = 0.31$, $p < .001$). Among all items, "Support adaptive learning" had one of the highest mean scores, showing broad agreement that AI can help tailor instruction. The related item about providing feedback for independent learning received lower but still favorable ratings. These findings suggest that while educators recognize the value of AI in scaffolding learning, they remain cautious about its potential to replace teacher-led guidance or foster autonomy.

***Concerns and Challenges:***

Educators expressed a range of concerns about using AI in schools. Figure 2 shows the frequency of concerns selected by respondents in a "select all that apply" survey item assessing perceived challenges related to AI use in education. Percentages reflect the proportion of respondents who selected each concern. The most commonly cited issues were the potential inaccuracy of AI-generated content, followed closely by the need for more training and the risk that AI could hinder student critical thinking. Ethical concerns, including bias, fairness, and privacy, were also frequently mentioned. Some respondents were skeptical of AI's guidance or reliability, and a smaller number felt that school or district policies limited their ability to use AI effectively.

These results highlight the importance of policies, professional development, and implementation strategies. While many educators are open to using AI in their work, their concerns suggest that effective integration depends not only on access to tools but also on support, trust, and alignment with educational goals.

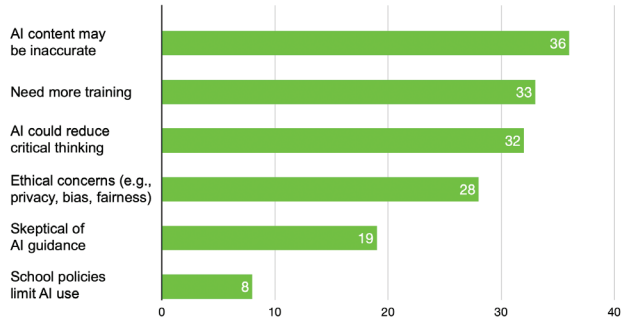


**Figure 2:** Frequency of top concerns about AI in education reported by all respondents. The most common concerns included the potential inaccuracy of AI-generated content, the need for more training, fears that AI could hinder students' critical thinking, and ethical concerns. A smaller number of respondents indicated distrust in AI's ability to provide reliable guidance to students, and a few noted that school or district policies limited their ability to use AI effectively.

***Ethical Concerns:***

Most teachers and administrators agreed that AI is acceptable for generating study materials, tutoring, and offering hints or suggestions as long as it helps students think for themselves rather than solving the problem for them. Unsurprisingly, nearly all strongly opposed using AI during tests or to complete assignments, reflecting shared concerns about academic integrity.

Teachers expressed greater concern about student over-reliance on AI (median 3.6) than administrators (median 2.36), as indicated by their agreement with the statement, "Students are becoming overly reliant on AI, which may negatively affect their ability to problem-solve without technological assistance."

Many teachers were especially concerned about how AI could affect student independence and long-term learning.


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One wrote, "I worry about students becoming over-reliant on AI. I also worry that they will not be able to discern whether or not what AI has provided is reliable or applicable to the situation." Another teacher noted, "Many students currently use it simply to complete assignments and are not able to or do not vet the accuracy of information that AI generates."

Some responses went beyond academic concerns and spoke to broader issues of motivation, curiosity, and skill development. One teacher explained, "It is essential to address several logistical, ethical, and critical thinking concerns that arise when students engage with this technology… With growing concerns about student independence and motivation, we must consider how the introduction of AI could either challenge or enhance these dynamics."

The most consistent message was that AI should support learning, but not replace the thinking and effort students need to grow.

## Discussion

This study reveals that K–12 educators and administrators hold distinctly different perceptions of AI that cannot be explained by frequency of use or awareness alone. Through a mixed-methods approach combining clustering, survey data, and qualitative insights, three profiles emerged—AI Advocates, Curious but Cautious, and Skeptics—each characterized by differing views of AI's usefulness and ease of use, and their preparedness and intention to use it. These differences were also reflected in educators' beliefs about how AI should support student learning and in recurring concerns about training needs, ethical risks, student over-reliance, critical thinking, and academic integrity.

While survey-based research at the higher-education level has explored educators' attitudes toward AI, far fewer studies have examined the K–12 context, where instructional demands, developmental needs, and accountability pressures differ significantly. This study helps fill that gap by offering one of the first mixed-methods investigations of AI adoption in K-12 schools. These patterns echo findings from a 2025 multi-state study in which educators expressed both optimism and concern about AI's role in schools. While nearly 60% of educators in that study strongly agreed on the importance of having school or district policies guiding AI use, a high percentage disagreed that their district provided sufficient support or infrastructure for effective implementation.[11] That study, like the present one, revealed that many educators believed AI could enhance student learning, yet simultaneously worried about cheating, overreliance, and ethical boundaries. This tension was especially pronounced among the Curious but Cautious and Skeptics clusters in the current study, reinforcing the need for district-level policies and targeted professional development.

At the same time, a national survey of US K-12 educators found that many teachers were already using AI for instructional tasks, including personalizing learning (56%), providing real-time feedback (52%), lesson planning (44%), and proofreading (47%).[12] These use cases align closely with comments from AI Advocates in this study, who described using AI to reword content for different learners, co-create lesson materials, and scaffold student learning. The national survey and this local study suggest that when teachers see an instructional benefit, they are more likely to experiment with AI, particularly in ways that support differentiated instruction and reduced workload. Taken together, these findings can be interpreted through the lens of the Zone of Proximal Development (ZPD). Educators across groups in this study were more comfortable using AI to scaffold learning, such as adapting content or providing feedback at an appropriate level, than to support fully independent learning. This pattern reflects a view of AI as a supplementary tool that operates within students' proximal learning space rather than as a replacement for teacher guidance or student effort.

***Limitations of the Research:***

This study has several limitations that should be considered when interpreting the findings. First, the study was conducted with a small sample size within a single public school district in New Jersey, which may limit generalizability to districts with different demographics, governance structures, resources, or policies. The district examined is relatively well-resourced and higher-performing than many public school districts, which may influence educators' access to technology, professional development opportunities, and perceptions of AI. These variables were not directly measured in the present study and therefore cannot be shown through the reported data. Future research should examine how district-level context interacts with educators' attitudes toward AI to better assess the generalizability of findings across diverse educational settings. Additionally, the selection of a three-cluster solution represents one analytic choice; alternative cluster solutions may yield different groupings and should be explored in future research. Because k-means clustering requires the number of clusters to be specified a priori, its use in this study reflects an exploratory analytic judgment rather than a definitive determination of the true number of latent groups.

Participation was voluntary, introducing potential self-selection bias, as respondents may have had stronger opinions about AI or greater availability to complete the survey than non-respondents.

Although respondents were provided with examples of specific AI tools, participants may still have had differing interpretations of what the researcher meant by "AI," particularly regarding the differentiation between traditional educational software and newer generative AI systems. This construct ambiguity may have influenced self-reported usage levels, attitudes, and cluster membership. However, this limitation does not invalidate the findings. It suggests that reported perceptions reflect educators' understanding of AI as they experience it in their daily work. Future research could reduce ambiguity by focusing on specific categories of AI tools or by asking participants to define AI before completing the survey.

Several items in the survey were newly developed or adapted to address emerging AI-in-education contexts and have not undergone formal psychometric validation. As a result, some constructs, particularly those outside the core TAM measures,

should be interpreted as exploratory. Future research should further refine and validate these items using larger samples and psychometric techniques.

The qualitative component included a single interview and open-ended survey questions. The interview was conducted with an educator supportive of AI use, which may have biased some of the qualitative data toward more favorable insights. As a result, the qualitative findings may not fully represent the range of educator viewpoints. Future studies should include interviews with educators representing multiple sentiment groups and roles to capture a broader range of perspectives. Additionally, responses to the open-ended survey questions were optional, which may have introduced selection bias, as participants with stronger opinions or greater interest in AI could be more likely to respond. This could have influenced the themes that emerged from the qualitative data.

Given the exploratory nature of this study, findings that did not reach conventional levels of statistical significance should be interpreted as trends that point toward directions for future research.

While the Technology Acceptance Model (TAM) is useful for examining adoption attitudes, it does not explicitly model ethical concerns or perceived risks, which emerged prominently in qualitative responses. Although educational settings are inherently collaborative, the present study focused specifically on educators' individual perceptions, intentions, and preparedness related to AI use, rather than collective or policy-driven adoption. In this context, the TAM is well-suited to the research questions examined. Future research could extend this work by pairing TAM with complementary frameworks that more directly capture ethical considerations, perceived risk, and the collaborative dynamics of educational environments.

Because significant differences and correlations involving perceived usefulness were still observed despite lower internal consistency, these findings may represent conservative estimates of the true relationships, suggesting that effects could be stronger with a more refined instrument.

## Conclusion

The three educator groups identified through k-means clustering—AI Advocates, Curious but Cautious, and Skeptics—differed significantly across all Technology Acceptance Model (TAM) measures. This suggests that attitudes toward AI reflect patterns in mindset, confidence, and instructional philosophy. Teachers who viewed AI more positively were more likely to feel confident using it, believe it was helpful, and report a stronger intention to adopt it in the future. Most educators saw value in AI's ability to adjust content to individual students' needs, but were less confident in its ability to support independent learning or replace teacher feedback. They were especially confident in AI's ability to scaffold learning at the right level, though less so in its potential to foster independent learning, which is consistent with Vygotsky's Zone of Proximal Development.

To support the responsible and effective use of AI in schools, leaders should prioritize teacher training, establish clear ethical guidelines, and provide real-world examples. Teachers need time and support to explore how AI can enhance planning, instruction, and differentiation while also ensuring that students stay engaged in thinking and learning for themselves. Schools that invest in this kind of support are more likely to see thoughtful, effective, and ethical adoption.

Future research should examine how AI use affects student outcomes over time, particularly how students at different developmental stages engage with these tools. This study suggests that teacher perception and preparation matter as much as the technology itself. To ensure AI enhances learning rather than undermines it, schools must invest in the people who use it by providing clear policies, strong training, and time to experiment.

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## References

1. Labadze, L.; Grigolia, M.; Machaidze, L. Role of AI Chatbots in Education: Systematic Literature Review. *Int. J. Educ. Technol. High. Educ.* **2023**, 20, 56. DOI: https://doi.org/10.1186/s41239-023-00426-1
2. Zhai, X.; Chu, X.; Chai, C. S.; Jong, M. S. Y.; Spector, M.; Liu, J.-B.; Yuan, J.; Li, Y. A Review of Artificial Intelligence (AI) in Education from 2010 to 2020. *Complexity*, **2021**, Article ID 8812542. DOI: https://doi.org/10.1155/2021/8812542
3. Bergdahl, N.; Sjöberg, J. Attitudes, Perceptions and AI Self-Efficacy in K–12 Education. *Comput. Educ.: Artif. Intell.* **2025**, 6, 100358. DOI: https://doi.org/10.1016/j.caeai.2024.100358
4. Viberg, O.; Cukurova, M.; Feldman-Maggor, Y.; Alexandron, G.; Shirai, S.; Kanemune, S.; Wasson, B.; Spikol, D.; Milrad, M.; Coelho, R.; Kizilcec, R. F. Teachers' Trust and Perceptions of AI in Education: The Role of Culture and AI Self-Efficacy in Six Countries. arXiv **2023**, arXiv:2312.01627. DOI: https://doi.org/10.48550/arXiv.2312.01627
5. Zawacki-Richter, O.; Marín, V. I.; Bond, M.; Gouverneur, F. Systematic Review of Research on Artificial Intelligence Applications in Higher Education—Where Are the Educators? *Int. J. Educ. Technol. High. Educ.* **2019**, 16, 1. DOI: https://doi.org/10.1186/s41239-019-0171-0
6. Davis, F. D. Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Q.* **1989**, 13(3), 319–340. DOI: https://doi.org/10.2307/249008
7. Mun, Y. Y.; Hwang, Y. Predicting the Use of Web-Based Information Systems: Self-Efficacy, Enjoyment, Learning Goal Orientation, and the Technology Acceptance Model. *Int. J. Hum.-Comput. Stud.* **2003**, 59, 431–449. DOI: https://doi.org/10.1016/S1071-5819(03)00114-9
8. Ghafouri, M.; Hassaskhah, J.; Mahdavi-Zafarghandi, A. From Virtual Assistant to Writing Mentor: Exploring the Impact of a ChatGPT-Based Writing Instruction Protocol on EFL Teachers' Self-Efficacy and Learners' Writing Skill. *Lang. Teach. Res.* **2024**. DOI: https://doi.org/10.1177/13621688241239764


DOI: 10.36838/IJHSR812.1

9. Ma, S. How Generative AI Tools Assist with Lesson Planning. *Edutopia* **2024**. DOI: https://www.edutopia.org/article/how-generative-ai-tools-assist-lesson-planning
10. Banerji, O. How Principals Are Outsourcing Their Busywork to AI. *Educ. Week* **2024**. DOI: https://www.edweek.org/technology/how-principals-are-outsourcing-their-busywork-to-ai/2024/01
11. Riegel, C.; Brown, B.; Medley, A. Exploring AI in Education: A Multi-State Study on K–12 Teachers' and Administrators' Knowledge, Use, and Perceptions of Artificial Intelligence. *Issues and Trends in Learning Technologies* **2025**. DOI: https://journals.library-publishing.arizona.edu/itlt/article/id/7512/
12. Cambium Learning Group. K–12 Educator + AI Survey Report. **2024**. DOI: https://www.cambiumlearning.com/user_area/uploads/CambiumK-12EducatorAISurveyReport.pdf

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