

Report on K-12 Instructors' Perceptions on Artificial Intelligence in the Classroom

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Introduction

Recent advances in generative AI have led to widespread changes, including potential for significant change in the K-12 classroom. We developed and conducted a national survey of 1,000 K-12 educators that measured their perceptions of artificial intelligence (AI) use in the classroom. This report serves as a summary of the survey data and the initial findings. Report content includes participant demographics, significant item response trends, identifying themes relating to K-12 instructor perceptions on AI use in the classroom, and reoccurring themes from participants' open responses.

Data Collection

We administered a survey to K-12 educators from 51 U.S. states or territories. The survey was administered January - May 2024. Participants were contacted via advertisements in teacher newsletters and via direct email. Participants were compensated \$20 at survey completion. A total of 1,000 K-12 educators responded to the survey consisting of 44 Likert-scale items (individual statements that participants agreed or disagreed with), three open-response questions, and fourteen demographic questions. The novel items were developed from existing subscale measures [1], Biesta and Tedder's ecological agency model [2], and Bronfenbrenner's ecological systems theory [3], and the items were refined through cognitive interviews with nine K-12 educators.

Example questions from the survey include:

- I feel like I understand how to use new AI tools.
- I experiment with using new AI tools.

- I feel confident in my ability to learn to use new AI tools for my classroom.
- My students have access to the technology necessary to engage with new AI tools in school.
- I feel like the leadership in my building (ex., team lead, department chair, vice principal, etc.) would support me using new AI tools in my classroom.
- I can make decisions about the use of new AI tools in my classroom.
- My school has explicitly supported me in using new AI tools in my classroom.

Participants

Grade and Subject

The survey sample was diverse, with at least 16% of the population teaching at each grade level (many taught multiple grade levels). At least 10% of the sample represented each core subject (science, history, English, and math), and a variety of electives were also represented (e.g., foreign languages, band, careers, computer science, business). Twenty six percent taught general education, and 14% included special education teachers. Approximately one-third each taught in the city, rural, and suburban areas. Participants taught most often at public (90%) and private (10%) schools. The political landscape of the area surrounding the teachers' school was primarily conservative (36%), moderate (26%), or liberal (21%).

The population was predominantly white (77%) and women (79%). Participants also identified as Black or African American (11%), Hispanic or Latino (10%), and Asian (4%). Participants ranged in age, with most distributed evenly between 30 and 60 years. Some participants identified as LGBTQ+ (7%).

Data Analysis

Data were analyzed by descriptive statistics on each item, exploratory factor analysis (EFA) of the developed items, linear regression modeling, thematic analysis of open-response data, and correlations and comparative analysis (ANOVAs, Chi-squared, and Fisher's tests) of items across subpopulations within the sample.

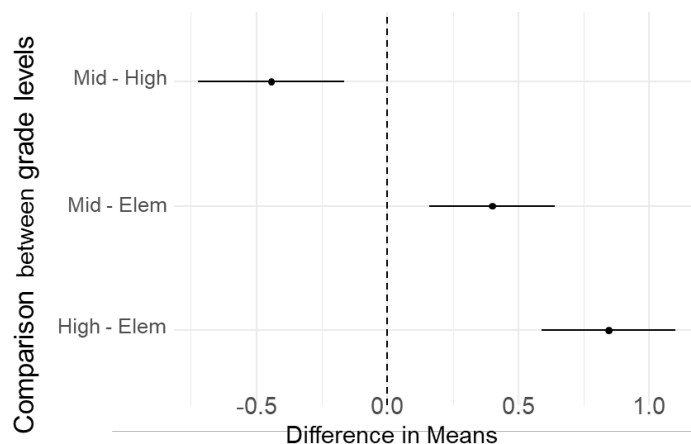
Results

AI tools as a support

Most teachers (78%) agreed that recently developed AI tools (e.g., generative AI tools) can support them with key challenges they experience in the classroom. These opinions statistically significantly differed between high, middle, and elementary school teachers.

Figure 1 describes that high school teachers were more likely to agree more strongly with AI tools supporting them than middle school teachers, who again were more likely to agree than elementary school teachers. Key challenges that participants believed AI could help with included managing classroom data, creating lesson materials (e.g., lesson planning, assessment and rubric creation), grading (especially for writing and with middle and high), detecting cheating, written communication (for example, paperwork and parent communication), and differentiation to “meet students at their level.”

Figure 1. Tukey Honestly Significant Difference results for: “New AI tools can support me with the key challenge(s) I experience as a teacher.”



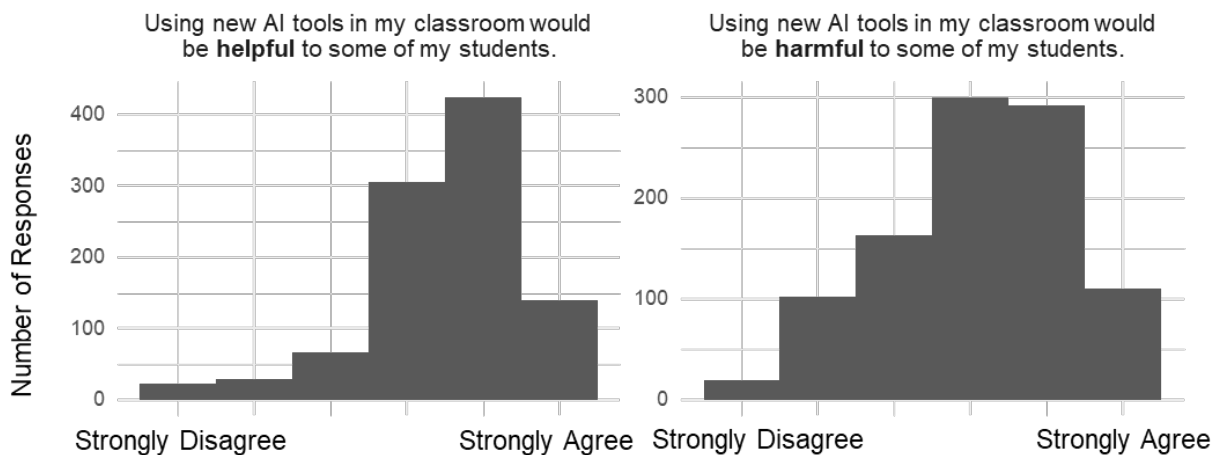
ANOVA results in Figure 1 demonstrate differences between elementary (Elem), middle (Mid), and high school teacher (High) perceptions of the extent to which AI tools can support them with key classroom challenges. When a measurement line with the dot does not overlap with the vertical dashed “0 Difference in Means,” the difference between the

two groups is considered statistically significant. Thus, all three groups answered the question differently.

AI tools as a concern

Though teachers perceived AI as potentially useful in the classroom, they also had concerns about student’s use of AI (85%) and teachers’ use of AI (52%). While many teachers found AI to be helpful to students, many also viewed AI as potentially harmful for students (Figure 2).

Figure 2. Histograms of responses to questions about AI tools being helpful and harmful.



Concerns about student use of AI included AI not being developmentally appropriate, which was most prevalent for elementary teachers. Other teachers described concerns about students cheating using AI, and this was more often reported by middle and high teachers. For example, one participant shared “I want my students to learn to use AI for help, but not to depend completely on AI.” This quote demonstrates teacher AI concerns as partially based in supporting students’ independence.

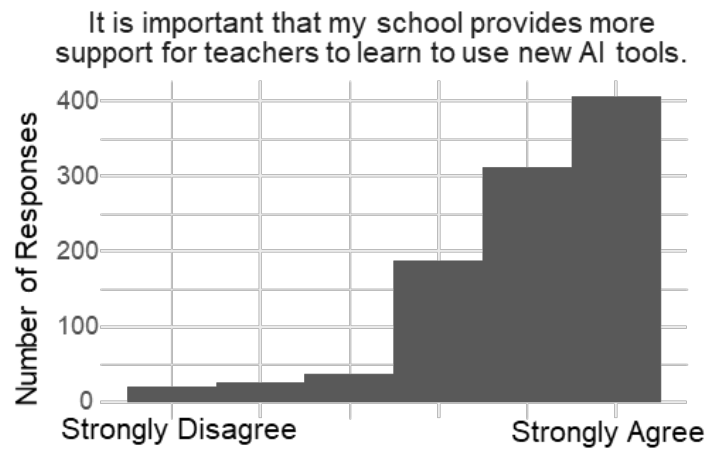
Some teachers reported student behavior as a key challenge in their classroom in an open-response question ($n=34$), and most of these participants did not find AI to be helpful with key classroom challenges. For example, one participant shared “Student behavior is another big issue that I do not think AI can help very much with.” Student behavior and reading level were ongoing challenges that teachers believed were not addressed by AI

tools. Other teachers described AI as unreliable (52%), and other teachers shared that AI was unnecessary for teaching students well. Finally, elementary and middle school teachers were more likely to report that parent and caregiver opinions as more likely to impact how they use AI in the classroom.

Impact of school policy

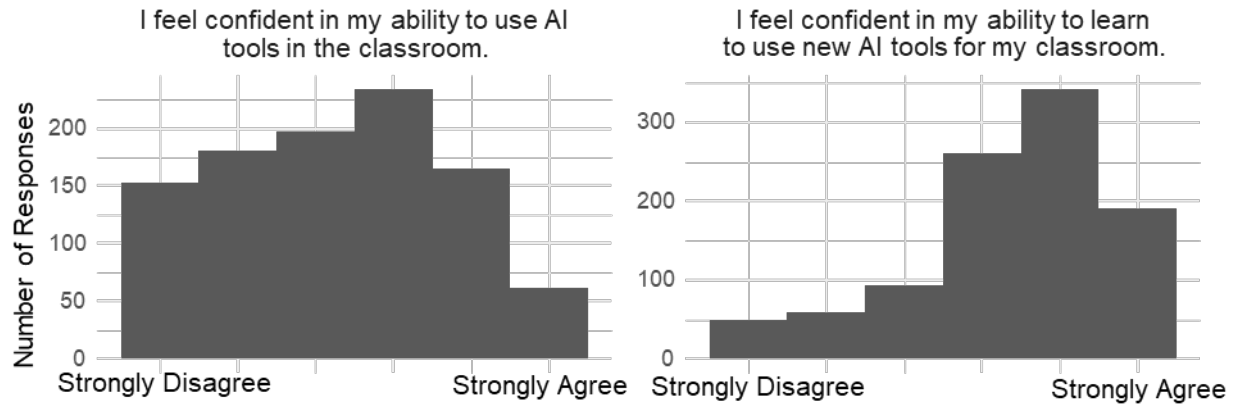
School culture and policy impacted teachers' confidence in and likelihood of using AI tools in their classrooms. Ninety percent of teachers shared that it was important for their school to provide more support for AI tools in the classroom (Figure 3). This strong response skew towards strongly agree indicates that increased support for teachers to learn to use AI tools is widely desired by K-12 teachers.

Figure 3. Histogram of responses to the importance of school providing more support for teachers to learn to use new AI tools.



Though many teachers (53%) did not feel confident in their ability to use AI tools in the classroom, a much larger majority (79%) of teachers felt confident in being able to learn to use these tools (Figure 4).

Figure 4. Histograms of responses to teachers feeling confident in their ability to use AI tools compared to their confidence in learning to use new AI tools.



Linear regression modeling demonstrated that school support positively increased the likelihood that teachers felt more confident and likely to use AI tools. All linear regression variables consisted of normally distributed items that were grouped into factors based on the results of an EFA. This process of creating factors increases the reliability of the ensuing analysis. Table 1 describes the factors, a short descriptive name, and Cronbach’s Alpha [4]. An alpha value greater than 0.7, which all factors have, indicates it is reasonable to combine these items for analysis purposes [5].

Table 1. Description of factors used in linear regression analyses

Factor Description (Abbreviation)	Alpha
Confidence in using and likelihood to use AI classroom tools (CONF)	0.90
Perceive business as a limitation to using AI classroom tools (TIME)	0.77
Perception of cultural and institutional support for AI tool use (SUPP)	0.75

Our tests confirmed that the outcome variable of CONF could be predicted by TIME and SUPP for elementary, middle, and high school teachers. This is described by the estimate of the strength of the relationship presented in Table 2, the low (below 0.05) p-values presented in Table 3, and relatively high adjusted R-squared values (close to or above 0.3

indicating a moderate impact [6]). Adjusted R-squared values for each model were 0.309 (ELE), 0.349 (MID), and 0.276 (HIGH).

Table 2. Estimates of how SUPP and TIME variables predict CONF when run separately for elementary (ELE), middle (MID), and high school teachers (HIGH). To read this table, for each point of the SUPP or TIME factor a teacher answers, you would expect the CONF value to increase by the “Estimate” amount. There were six total points on each Likert scale.

Predictive Factor	Estimate ELE	Estimate MID	Estimate HIGH
SUPP	0.53	0.53	0.40
TIME	0.36	0.38	0.42

Table 3. Outputs of linear regression for the model where CONF is predicted by SUPP + TIME when run separately for elementary (ELE), middle (MID), and high school teachers (HIGH). Asterisks indicate statistical significance.

Predictive Factor	P-Value ELE	P-Value MID	P-Value HIGH
SUPP	<2e-16 ***	6.77e-15 ***	4.05e-08 ***
TIME	< 2e-16 ***	< 2e-16 ***	< 2e-16 ***

Teachers who felt more supported by their school policies and culture and had more time to learn were more likely to feel confident in or use AI. While this impact was significant for all grade levels, elementary school teachers were more strongly impacted than high school teachers. To understand more about why support varied between grade levels, we conducted a linear analysis on the individual items of the factor comprising SUPP with CONF as the output. Particularly significant predictors of AI confidence and use for elementary school teachers included having agency to make decisions, leadership support, and access to technology.

Conclusions

Given the recent acceleration of AI technology, it is critical to understand K-12 teachers' perceptions of AI in the classroom to meet their needs for training and tool development. Our results confirm that supporting teacher agency includes individually empowering teachers and enacting supportive policies. Teachers found AI useful in class preparation, management, and paperwork; though, AI seemed to be used more often by high and middle school teachers than elementary teachers. Teachers also felt concern about using AI tools in the classroom. School support positively impacts teachers' agency with respect to new AI tool use, and results indicate a need for AI training for all K-12 teachers.

Learn more about this project: <https://sites.google.com/umich.edu/k12-teacher-ai/home>

References

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