Benefits of Artificial Intelligence in Education: Personalized Learning and Enhanced

Classroom Management

Benjamin E. Neuenschwander

Department of English, Florida State University

ENC 2135: Research, Genre, and Context

Ann Chiodo

September 27, 2024

Benefits of Artificial Intelligence in Education: Personalized Learning and Enhanced

Classroom Management

Artificial intelligence (AI) has rapidly evolved and become increasingly prevalent in many industries, including education. With tools like ChatGPT and other AI-driven platforms, educators and students alike are beginning to see the potential of these technologies, with some instructors going as far as incorporating AI into their daily educational curriculum. AI models can now generate human-like responses, automate tasks, and personalize experiences based on user input. In the educational sector, this ability opens new avenues for personalized learning, allowing lessons to be tailored to individual students' strengths and weaknesses. It also enables teachers to focus more on engaging instruction by reducing administrative tasks like grading and attendance tracking, giving them more time to focus on meaningful classroom interactions. As AI continues to integrate into schools, it promises to enhance traditional curricula, foster personalized tutoring, and support teachers in managing their classrooms more effectively. Exploring these applications of AI in education will show how student learning and teacher management can be revolutionized, enhancing both personalized learning and classroom efficiency.

Personalized Learning Experiences through Artificial Intelligence

AI is an excellent choice for helping accommodate students who require a more personalized direction in their education, while still providing insight for teachers on how to best assist their students. According to Yuskovych-Zhukoyska et al. (2022):

AI is able to implement personalized and individualized learning, allowing obtaining

huge amounts of data and formulating conclusions that can be used to develop an

educational trajectory that takes into account the individual needs and abilities of

students. (pg. 7)

This individualized approach with AI not only benefits students who may struggle with

traditional, one-size-fits-all teaching methods, but also provides teachers with valuable insights

into how to best support their students.

Through these AI-powered platforms, students can receive lessons that are adjusted in

real-time based on their progress, ranging from whether they need extra practice on certain topics

or are ready to advance to more challenging material. For example, AI systems can analyze

student performance on quizzes, homework, and class participation to generate recommendations

that help guide future lessons; this flow ensures that students are neither held back nor

overwhelmed by the pace of instruction in the class (Qian & Feng, 2020). For students who tend

to struggle, or desire a more personalized explanation of certain concepts, AI platforms can

provide additional exercises or break down complex concepts into more digestible parts, offering

tutoring that addresses their weaknesses. The use of AI in this fashion can relieve the workload

of teachers but is most effective when used in tandem with in-person instruction as well.

AI can enhance learning by allowing teachers to better tailor their curriculum to the

class's overall needs. Instructors can use data gathered by AI from quizzes and homework to

identify trends in student performance, highlighting areas where the class is either excelling or

struggling in terms of the content. This data-driven approach towards learning enables teachers

to adjust lesson plans dynamically to meet the class's overall needs while focusing on providing

individualized attention to students who need support in tandem with the AI learning platform.

Yuskovych-Zhukovska et al. (2022) strongly supports this point, suggesting that such tools

account for differences in learning pace amongst a class of students, allowing instructors to adapt

their teaching strategies for both advanced learners and those who need extra time to master certain concepts.

An example of this is AI-powered adaptive learning platforms, such as DreamBox, Smart Sparrow, or Classavo, which adjust the difficulty and type of questions based on student responses while providing feedback to teachers on how the class is performing. These platforms can provide instant feedback on student answers and questions, reinforcing the learning process by correcting mistakes in real-time (Pan et al. 2023; see also Johnson, K., 2024). Additionally, AI can recommend additional resources, such as videos or articles that cater to each student's preferred learning modality, be it visual, auditory, or kinesthetic. There is a high plausibility that AI in the future will be able to generate these interactive resources in real-time, such as graphics or video segments that further explain concepts to students.

Artificial Intelligence as a Classroom Management Tool

AI, when effectively applied, has the potential to streamline classroom management by automating routine tasks, thereby freeing up valuable time for teachers to focus on more impactful activities like instruction and student engagement in course curricula. Classroom management typically involves a range of administrative duties—taking attendance, grading assignments, monitoring student behavior, and tracking academic progress. With AI, many of these repetitive tasks can be automated, allowing educators to spend more time on teaching and individualized student support.

Automated Attendance and Classroom Monitoring

A possible use of AI in classroom management is the automation of attendance. AI-powered systems can track student attendance through facial recognition or by integrating with

learning management systems (LMS), automatically marking who is present or absent (Pan, et al., 2023). This eliminates the need for manual roll calls and ensures that attendance data is accurately recorded in real-time. For example, systems with recent AI integrations like ClassDojo or LanSchool not only take attendance, but also allow teachers to monitor student participation and engagement throughout the lesson.

In addition to attendance, AI can be used to monitor classroom behavior; advanced systems can detect patterns of disengagement with online course content, such as students consistently being off task by switching off tabs or eye movement not following what is occurring on the screen (Pan et al. 2023). These insights can help instructors intervene early, offering support before such issues develop further, whether this be through personalized assistance or adjusting lesson strategies to re-engage students.

Automated Grading and Feedback

Another benefit of AI in classroom management is automated grading. Tools like Gradescope or Turnitin are examples of AI applications that can handle a variety of assignments, from multiple-choice quizzes to written essays. AI grading systems free up work time for instructors, while also efficiently completing grading duties. If there is an issue with grading or the AI model is unsure on how to proceed with a student's answer, the model can "flag" the question for review, allowing the instructor to manually grade the question. Some AI systems take it a step further and provide instant feedback on questions (provided it is not an exam environment), offering detailed explanations for the student in real-time, allowing them to correct their answer(s). Schools in California, according to Johnson (2024), are already

implementing such AI models into learning management platform grading systems and

instructors are already seeing the benefits:

> For the past school year, Roberts used Writable and other AI tools in the classroom, and
>
> she said it's been the best year yet of nearly three decades of teaching. Roberts said it has
>
> made her students better writers, not because AI did the writing for them, but because
>
> automated feedback can tell her students faster than she can how to improve, which in
>
> turn allows her to hand out more writing assignments. (Johnson, 2024)

Rather than AI being merely a tool to replace instructors and their duties, it is more catered

towards enhancing the workflow of said instructors. It is important to acknowledge as well that

every instructor has a varying class size, with some in the mere twenties, to some pushing

towards hundreds of students. By allowing a secondary unit of instruction of classroom, being

one that is completely automated, instructors can further develop their class curricula while also

keeping tabs on how students are performing in relation to the coursework more efficiently than

if they were burdened with the task of catering to every student's learning pace.

Behavior and Academic Tracking

AI learning systems can also assist with tracking student behavior and academic progress

over time, something that can tie in directly with assignments in class. Learning management

platforms integrated with AI can analyze student performance data and provide teachers with

detailed reports on who is excelling, who may need additional help, and what subjects are

challenging for the class as a whole. This data-driven hawk-eye view allows for more informed

decision-making, easily allowing teachers to adjust their lesson plans, differentiate instruction, and offer interventions for students at risk of falling behind in comparison to the rest of the class.

For example, AI systems like IBM's Watson Education utilize deep learning techniques to create personalized learning profiles for students, identifying which areas they struggle with, and which teaching strategies are most effective for them (Pan, M., et al., 2023) (Deep learning, in context of AI, is a learning method that teaches computers to mimic the human brain's ability to recognize complex patterns in data). This makes classroom management noticeably more efficient by offering proactive insights based on student performance trends, which can then help with informing both short-term lesson plans and long-term educational strategies (Yuskovych-Zhukovska et al., 2022).

Real-Time Feedback for Students

AI provides an opportunity for the way students receive feedback on assignments or other class activities, that is, by enabling real-time interactions with an AI tutor. This instantaneous feedback in the classroom loop allows students to identify and correct their mistakes as they make them, leading to a much more dynamic, and engaging learning process.

Instantaneous Feedback and Continuous Improvement

Traditionally, students had to wait for teachers to review assignments or exams before receiving feedback. The length of this review obviously varies depending on classroom size, but larger classrooms, students who struggle may be left behind if there was an assignment they struggled with, as its frequent that instructors will continue lesson plans before grading all turned-in materials (Yuskovych-Zhukovska et al., 2022; see also Roberts, S. 2023). This delay often disrupted the learning process as students would lose momentum or forget key points

related to their mistakes. However, AI-powered systems circumvent this obstacle by allowing immediate feedback on such assignments. As Hamilton (2024) explains in their article, "By automating grading, planning and administrative work, artificial intelligence systems can free up educators' time and energy for increased student contact" (Hamilton, 2024).

These AI systems do not just mark student's answers at right or wrong though— AI systems now commonly offer detailed explanations as to why a student was marked wrong, often having the capability to guide students on how they made their error. For example, an AI system tailored towards analyzing mathematical problems fed to it might not just mark the answer incorrect, but also highlight the step in the problem-solving process where the student went wrong (Qian & Feng, 2020). This workflow allows students to immediately improve on their mistakes, rather than relying on the availability of an instructor who might also be helping countless other students facing the same obstacle.

Personalized Recommendation and Targeted Support

In addition to providing instant feedback, AI systems can identify patterns in student performance and offer recommendations designed just for that student. If a student consistently struggles with a particular topic or problem, the AI system can suggest supporting resources, video tutorials, interactive exercises akin to games, or tutoring from the system itself (Pan, M., 2023). This level of personalization helps students to learn at their own pace while also receiving the extra support needed to overcome challenges or gaps in learning, enhancing autonomy and independent learning (Yuskovych-Zhukovska et al., 2022).

For example, an AI-based platform in a language-learning classroom could assess grammar, vocabulary, and sentence structure in real-time, offering corrections and alternative suggestions on the spot. In subjects like mathematics, AI can break down complex problems step

by step, providing real-time feedback on each phase of the problem-solving process, explaining

where the student went wrong (Qian & Feng, 2020). This individualized support is crucial in

helping students improve incrementally, without waiting for manual feedback from instructors.

While manual feedback from instructors is not inherently a bad thing, it is something that can

take a frustratingly long time from the standpoint of a student, lowering motivation for

completing schoolwork (Yuskovych-Zhukovska et al., 2022).

Concluding Remarks

The integration of AI into education offers strong potential for enhancing both

personalized learning for students and classroom efficiency for instructors. As discussed

throughout this paper, AI can foster personalized learning by adapting lessons to meet individual

student needs, making education more inclusive and tailored. AI also serves as an efficient

classroom management tool, helping teachers automate routine tasks like grading, attendance,

and behavior monitoring, which frees up time for more creative and engaging instruction.

However, the success and relevance of AI in education will strongly depend on its thoughtful

implementation, ensuring that it enhances, rather than replaces, the essential human aspects of

teaching; AI should merely be a tool to assist teachers in their instruction and students in their

education.

References

Hamilton, I. (2024, March 6). *Artificial Intelligence in Education: Teachers' opinions on AI in the classroom.* Forbes. https://www.forbes.com/advisor/education/it-and-tech/artificial-intelligence-in-school/

Johnson, K. (2024, July 7). *California teachers are using AI to grade papers. Who's grading the AI?* The 74 Million. https://www.the74million.org/article/california-teachers-are-using-ai-to-grade-papers-whos-grading-the-ai/

Pan, M., Wang, J., & Wang, J. (2023, November 24). *Application of Artificial Intelligence in Education: Opportunities, Challenges, and Suggestions.* 2023 13th International Conference on Information Technology in Medicine and Education *(ITME)*, 623–627. https://doi.org/10.1109/ITME60234.2023.00130

Qian, S., & Feng, Q. (2020). *Research on the Integration of Artificial Intelligence and Education.* Journal of Physics. Conference Series, 1570(1), 12063-. https://doi.org/10.1088/1742-6596/1570/1/012063

Roberts, S. (2023, December 12). *Helpful or harmful? How AI shaped education in 2023*. Science Friday. https://www.sciencefriday.com/articles/ai-education/

Yuskovych-Zhukovska, V., Poplavska, T., Diachenko, O., Mishenina, T., Topolnyk, Y., & Gurevych, R. (2022, March 23). *Application of Artificial Intelligence in Education. Problems and Opportunities for Sustainable Development.* Brain. Broad Research in Artificial Intelligence and Neuroscience, 13(1Sup1), 339–356. https://doi.org/10.18662/brain/13.1Sup1/322

Appendix A

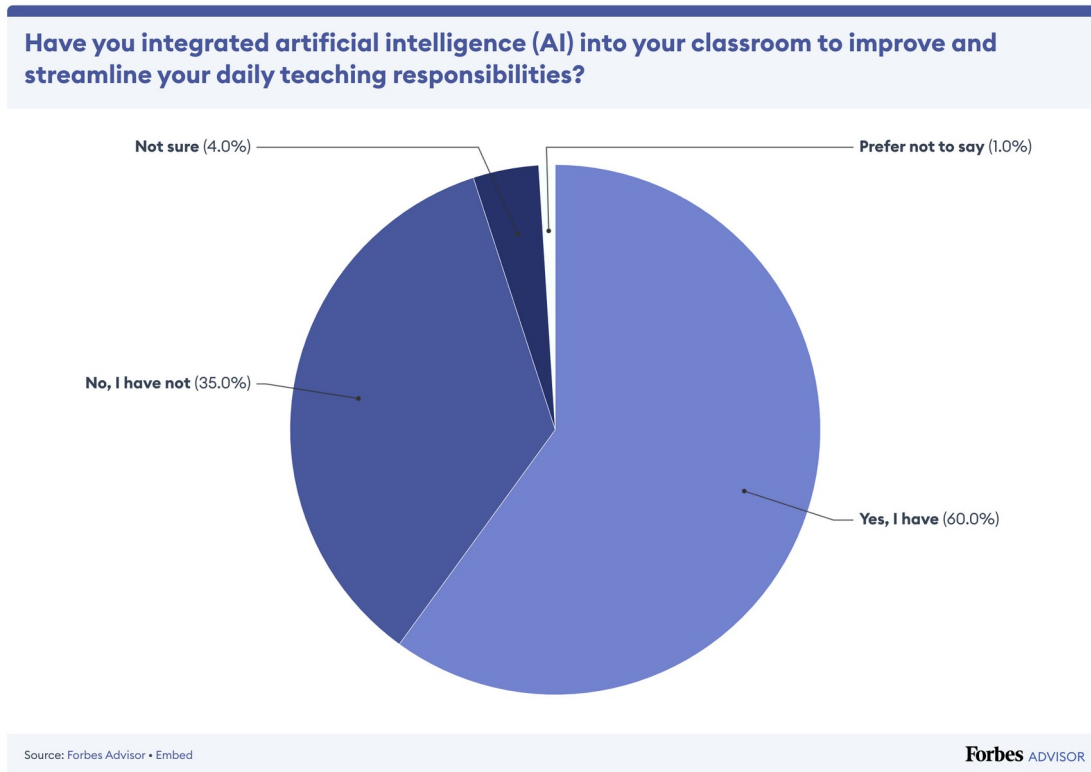**Statistical Visuals of Teachers Utilizing AI in Classrooms**

Figure A1: Survey conducted on a sample of 500 instructors from the United States of America. Taken from "Artificial Intelligence in Education: Teachers' opinions on AI in the classroom," by I. Hamilton, 2024, *Forbes*.

Figure A1 illustrates the responses of instructors regarding their integration of artificial intelligence into their classrooms to improve and streamline daily teaching responsibilities. The survey distribution is as follows:

- 60% of instructors reported that they have integrated AI into their classrooms.

- 35% of instructors indicated that they have not integrated AI.

- 4% of instructors were unsure about their use of AI in the classroom.

- 1% of instructors preferred not to answer.

The results suggest that the majority of educators have already adopted AI to some extent, while a notable minority have yet to implement AI in their daily teaching tasks.
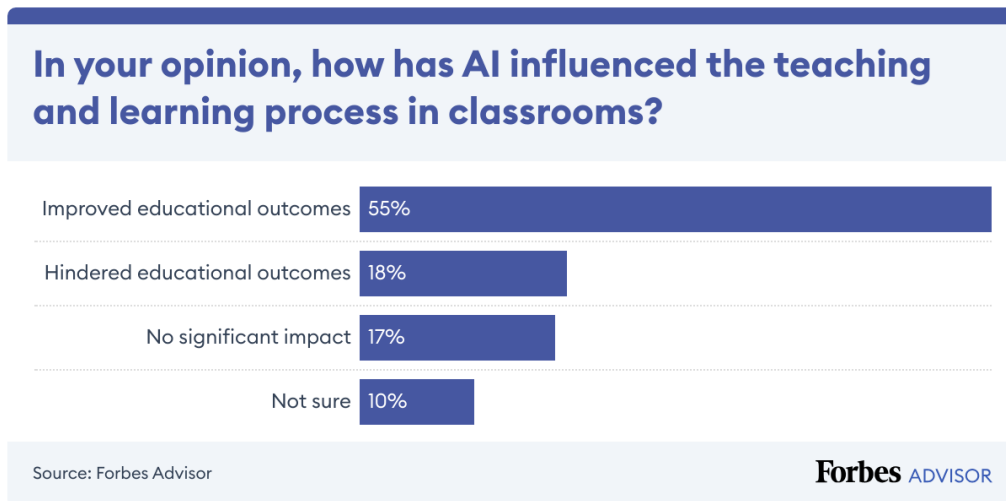

Figure A2: Survey conducted on a sample of 500 instructors from the United States of America. Taken from "Artificial Intelligence in Education: Teachers' opinions on AI in the classroom," by I. Hamilton, 2024, *Forbes*.

Figure A2 shows how educators view the influence of artificial intelligence in their classrooms. Specifically, how they think it has impacted their teaching and learning processes in regards to educational outcomes for students. The survey distribution is as follows:

- 55% of instructors stated AI had improved educational outcomes.

- 18% of instructors stated AI had hindered educational outcomes.

- 17% of instructors stated AI has no visible impact on educational outcomes.

- 10% of instructors stated they were unsure how AI impacted educational outcomes.

The survey results show that a strong majority of instructors believe that AI had improved educational outcomes to some degree. However 45% instructors are not as adamant to claim AI has had any benefits they were sure of, with 18% saying that AI had even hindered educational outcomes.
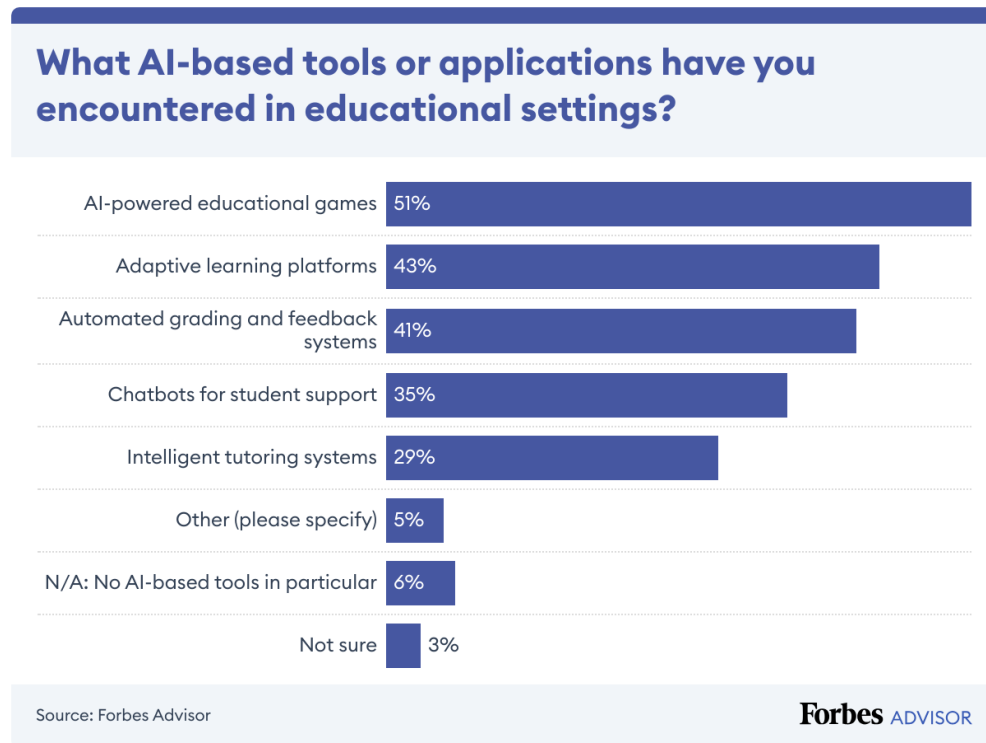
Figure A3: Survey conducted on a sample of 500 instructors from the United States of America. Taken from "Artificial Intelligence in Education: Teachers' opinions on AI in the classroom," by I. Hamilton, 2024, *Forbes*.

Figure A3 shows an overwhelming majority of instructors in the United States have encountered some form of artificial intelligence tool in educational settings. The survey distribution is as follows:

- 51% of instructors have encountered AI-powered educational games

- 43% of instructors have encountered adaptive learning platforms

- 41% of instructors have encountered automated grading and feedback systems

- 35% of instructors have encountered chatbots for student support

- 29% of instructors have encountered intelligence tutoring systems

- 5% of instructors have encountered other (unspecified) AI tools

- 6% of instructors have not encountered any specific AI tools

- 3% of instructors are unsure of any AI tools they have encountered

The most encountered tools are primarily AI-powered games, adaptive learning platforms, and automated grading/feedback systems. This survey result is not unexpected due to the amount of these types of tools being used in the present day, such as Duolingo, Canvas, Turnitin, Classavo, etc.