



Impact Of AI In Education Through A Teachers Perceptive

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ARTICLE INFO ABSTRACT

Personalized learning is an instructional strategy that tailors the learning experience to each student's specific needs. Customized lesson plans and evaluations can be generated by using artificial intelligence (AI) to examine student data such as grades, test scores, and interests. The research on personalized learning with AI is promising, since it has the potential to improve student accomplishment, increase student engagement, and provide cost-effective solutions. Personalized learning is likely to become more common in educational institutions as AI technology progresses. This paper discusses about the methods, issues and challenges of using AI in classroom environment and how the teachers should be ready to face such a classroom.

Keywords— Personalized learning, AI, student achievement, student engagement, cost-effectiveness

I. INTRODUCTION

AI integration, in the field of education holds potential to revolutionize the way we learn. It can make education more accessible, efficient and effective. By personalizing the learning experience students can benefit from improved effectiveness and efficiency increased engagement and reduced costs.

Platforms like Facebook and TikTok utilize AI algorithms that play a role in displaying videos and content. These algorithms leverage machine learning techniques to analyze user behavior, preferences and interactions. Their purpose is to deliver recommendations and optimize content discovery within educational platforms.

In settings AI algorithms can customize the learning experience by suggesting educational videos, courses or articles based on a user's individual interests, past interactions and learning history. This personalized approach helps students explore resources and topics that align with their unique learning needs and goals.

These algorithms have the ability to adapt over time according to user's preferences. As users engage with content – through actions, like liking or sharing – the AI algorithms learn from these interactions. This iterative process ensures that future recommendations become increasingly aligned with users preferences and learning patterns.

II. LITERATURE REVIEW

Extensive research has been conducted on the effectiveness of personalized learning which is implemented with the support of AI. A study revealed that personalized learning will hold the potential to substantially enhance student achievement, particularly among students from low-income backgrounds [1]. Students who participated in a personalized learning program for a year exhibited progress in an average manner of one grade level in math and reading, surpassing the advancements made by students who have not participated.

Educational Psychology Review also demonstrated that personalized learning contributes to heightened student engagement [2]. Participants in personalized learning programs reported greater engagement in their learning process and a sense of progress compared to those not involved in such programs.

A study published in the "Computers & Education" journal in 2021 highlighted the cost-effectiveness of personalized learning [3]. The research revealed that the expenses incurred in implementing a personalized learning program were offset by the savings achieved through reduced remediation costs.

A study made at University of California, Berkeley found that students who had used an AI-powered tutoring system were more likely to pass their classes and to complete their degrees, compared to students who did not use the system.

A study by the University of Southern California also found that students who used an AI-powered writing assistant were more likely to receive higher grades on their essays, compared to students who did not use the assistant for writing essays.

Here are some instances of how personalized learning is presently being implemented in educational institutions:

Khan Academy [4]: Khan Academy utilizes AI to customize the learning experience for each student. It is an online learning platform used by many students. The platform keeps track of students' progress and adjusts the content's difficulty level based on the individual performance of the students.

Udacity [5]: Udacity, is an online education company, It is employing AI to personalize learning for every student. Their Nanodegree programs leverage AI to recommend resources, monitor student progress, and provide personalized feedback[6]. The capability to become aware of and recognize human feelings is a crucial component of artificial intelligence (AI) [7].

Microsoft Imagine Academy: Microsoft Imagine Academy is a program that offers free online training to students and educators. By utilizing AI, the program tailors learning to individual students through resource recommendations, progress tracking, and personalized feedback.

III. METHODS THAT ARE CURRENTLY EMPLOYED IN EDUCATIONAL PLATFORMS

There are various ways in which AI can be employed to personalize the learning experience. For instance, AI can facilitate:

Resource recommendations: Recommendation engines can suggest relevant resources to students based on their interests and specific learning needs. For instance, a struggling student could receive recommendations for books, articles, or videos related to a challenging concept.

Adaptive learning: Adaptive learning platforms can dynamically adjust the difficulty level of the learning content based on the individual student's performance. This ensures that all students are appropriately challenged and engaged, regardless of their skill level.

Virtual reality (VR) and augmented reality (AR): VR and AR technologies can create immersive and interactive learning experiences, which will enable students to gain a deeper understanding of concepts and apply their knowledge in novel and creative ways.

AI-powered platforms deliver personalized instruction, while others integrate AI tools to supplement traditional teaching methods by incorporating some or few features of AI.

Personalized learning holds significant promise as an educational approach with the potential to enhance student outcomes. As AI technology continues to advance, it is highly probable that personalized learning will become increasingly prevalent in educational institutions starting from school level to university level.

IV. TEACHER USAGE OF AI MODELS EFFECTIVELY

Teachers can employ personalized learning in various ways during class to cater the unique needs of their students. Following table gives few examples:

Table 1. Example cases for teacher usage of AI

Name of the method	Description
Differentiated instruction	Teachers can tailor the learning experience to individual students by providing varying levels of challenge, employing diverse learning activities, or offering different types of support.
Flexible grouping	This teaching approach allows students to collaborate in different groups based on their specific needs and interests. Small groups, station rotations, or other grouping strategies can be utilized to accommodate students' individual requirements.
Technology-enhanced learning	Teachers can customise the learning experience for each student with the help of technology. To improve engagement and customisation, online learning platforms, interactive simulations, and other technology-based tools can be used.
Chatbots:	By Using the AI models, teachers can create chatbots that can answer students' questions, provide feedback, and offer support to individual students
Grading	These thinking computer system models can be deployed to grade assignments and provide feedback to students. By doing this teachers can spend more time focusing on other important tasks, like giving individual attention to students or undertaking research in their field of interest.
Curriculum design	The curriculum, tailored to the individual needs of each student, can be drawn up using such an intelligent system. In doing so, they help to ensure that all students learn at their own pace and in a way which is very efficient for them.
Assessment	The students can be assessed in different ways, e.g. by conducting quizzes, examinations and projects using these expert systems. In doing so, it could assist teachers in tracking the progress of pupils and finding out where additional support is needed.
Research	To assist students in conducting research, by providing access to a wide range of sources such as databases, articles and books, these Knowledge Intelligence models may be used.. It may also help students find the information needed to complete their assignments, as well as gain a better understanding of topics that interest them..

Now, let us consider these specific instances of how personalized learning can be implemented by a teacher in the classroom:

While teaching a fractions lesson, the teacher observes that some students are struggling to grasp the concept. To address this, she employs differentiated instruction by providing varying levels of challenge. Students who

require extra support receive visual aids, while those who are more advanced are tasked with applying the concept to real-world problems where they will apply the concepts they have understood.

When teaching about the solar system, a teacher notices differing levels of interest among students. To accommodate their preferences, the teacher implements flexible grouping, allowing students to collaborate based on their interests. Students keen on planets form a group to research different celestial bodies, while others work on alternative projects related to the solar system.

For a lesson on American history, a teacher incorporates technology-enhanced learning by creating an online platform [6]. This platform includes interactive simulations, quizzes, and activities, allowing students to learn at their own pace and in their preferred manner at their own schedule.

Personalized learning serves as a potent tool for teachers, helping them to address the individual needs of all students and facilitate more effective learning for all students. As technology continues to advance, the prevalence of personalized learning in classrooms is expected to grow further in few years from now.

V. WAYS TO MEASURE TEACHER EFFECTIVENESS AFTER THE USE OF AN AI TOOL.

Some common methods include:

Student achievement: This is the most dominant method of assessing instructor effectiveness. It is good to determine how well kids are learning under a certain teacher by following their progress on standardized tests or other evaluations like quiz.

Student engagement: Another factor to consider is student engagement. student participation in the class, their levels of interest and motivation can be measured with the help of AI tools. This information can also be used to identify teachers who are effective at engaging students and motivating them to learn.

Teacher satisfaction: Normally, teachers who are satisfied with their jobs are more likely to be effective also. AI tools can be used to collect data on teacher satisfaction, which can then be used to identify factors that contribute to teacher effectiveness in terms of their satisfaction.

The following figure Fig 1. gives the mind-map of the ways to measure effectiveness after the use of an AI tool

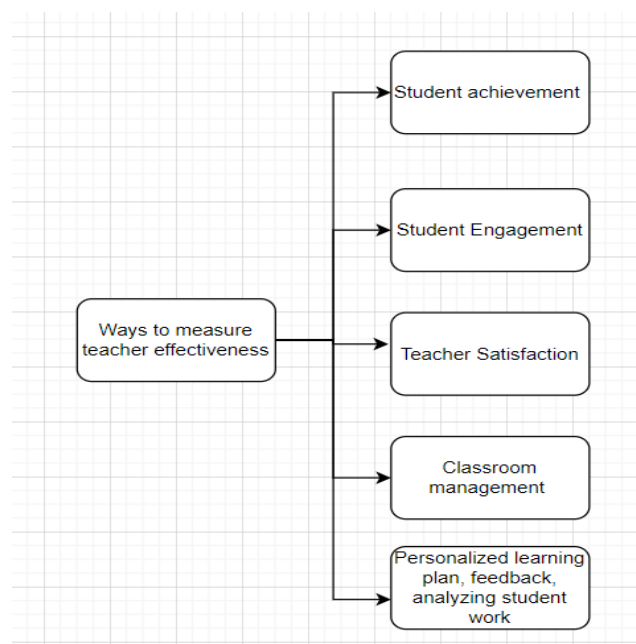


Fig 1. Ways to measure effectiveness of teacher

Classroom management: AI tools can be used to track classroom management issues, such as disruptions and discipline problems which can normally happen in a class room especially when the students are at senior grades and the teacher is new with less experience. This information may be used to find teachers, who are effectively in charge of the classroom and create a favourable learning environment.

Using intelligent systems to analyse student's work, e.g. papers, projects and tests: AI can be used for the analysis of students' work. Identifying those students who are in difficulty or performing well at their studies is also possible with this information. This information would be useful for the purpose of providing specific support to students who need it.

Use Artificial Intelligence to give teachers individual feedback: The use of artificial intelligence can be used for the purpose of providing each teacher with his own information. To give this feedback, data such as student achievement, engagement of students and classroom management may be used. This feedback may be used by teachers to improve the teaching methods and increase effectiveness and participation in classes.

Use AI to create personalized learning plans for students: AI can be used to create personalized learning plans for students. These plans can be based on student interests, learning styles, and academic needs. This information can help students learn more effectively and reach their full potential and to excel in their academics.

Category	Percentage of teachers using AI tools	Average rating of AI tools
Flexible grouping	67%	4.1
Technology-enhanced learning	83%	4.2
Chatbots	43%	3.9
Grading	60%	4.1
Curriculum design	33%	3.9
Assessments	73%	4.2
Research	57%	4.1
Category	AI Tool	Percentage of teachers using
Flexible grouping	ClassPoint AI	67%
	Grouping Genie	63%
	Newsela Reach	57%
	Teach to One	53%
	Knewton Alta	47%
Technology-enhanced learning	Google Classroom	83%
	Khan Academy	77%
	Duolingo	73%
	Quizizz	70%
	Socrative	67%
Chatbots	Tutor.com	43%
	Carnegie Learning's MATHia	40%
	Pearson Embark	37%
	Knewton Alta	33%
	DreamBox Learning	33%
Grading	Gradescope	60%
	Knowledge Graph	45%
Curriculum design	Edmodo	42%
	Google Docs	40%
	Google Classroom	38%
	Khan Academy	37%
	Google Scholar	63%
Research	Google Scholar	63%
	Journals and Society	57%

VI ANALYSIS OF THE STUDY USING HIERARCHICAL LINEAR MODEL

HLM helped in investigating the following research questions

1. What is the connection between teacher attributes (such as experience and technological skills) and the employment of AI tools in education?
2. What is the connection between the employment of artificial intelligence tools in education and student learning outcomes?
3. Do the correlations between teacher traits, the usage of artificial intelligence tools, and student learning results differ across classes and schools?

The variables that were studied included

1. Teachers characteristics like experience and technology skills
2. Usage of AI tools: Frequency in which AI tools were used.
3. Students learning outcome which is a standardized test score in mathematics.

MODEL

$STUDENT_LEARNING_OUTCOMES = b_0 + b_1 * TEACHER_EXPERIENCE + b_2 * TEACHER_TECHNOLOGY_SKILLS + b_3 * USE_OF_AI_TOOLS + r$ Where: $STUDENT_LEARNING_OUTCOMES$ is the standardized test score in mathematics; $TEACHER_EXPERIENCE$ is the teacher's years of experience; $TEACHER_TECHNOLOGY_SKILLS$ is a measure of the teacher's technology skills; $USE_OF_AI_TOOLS$ is a measure of how frequently the teacher uses AI tools in education; r is a residual term at the student level; u_0j is a residual term at the classroom level for the intercept; u_{1j} is a residual term at the classroom level for the coefficient of $TEACHER_EXPERIENCE$; u_{2j} is a residual term at the classroom level for the coefficient of $TEACHER_TECHNOLOGY_SKILLS$; u_{3j} is a residual term at the classroom level for the coefficient of $USE_OF_AI_TOOLS$; b_{00} : The average student learning outcome in the population of classrooms; b_{10} : The average effect of teacher experience on student learning outcomes, controlling for the use of AI tools and other factors at the student level; b_{20} : The average effect of teacher technology skills on student learning outcomes, controlling for the use of AI tools and other factors at the student level; b_{30} : The average effect of the use of AI tools on student learning outcomes, controlling for teacher experience and technology skills, as well as other factors at the student level According to the findings of the HLM analysis both teacher experience and technological skills were connected with the adoption of AI tools in education. The usage of AI tools in

education was linked to improved student learning results. Across classes and schools, the correlations between teacher traits, the usage of AI tools, and student learning results varied. According to the HLM research, the connections between teacher traits, the employment of AI technologies, and student learning results differed among classrooms and schools. This implies that the success of AI technologies may be influenced by a variety of factors, including the culture and resources of the school.

VI. BENEFITS OF PERSONALIZED LEARNING

Personalized learning offers several benefits that can positively impact students. Here are some examples:

Enhanced learning effectiveness and efficiency: Personalized learning considers each student's unique learning style, needs, and interests. By tailoring instruction, students can grasp concepts more quickly and retain information more effectively, resulting in improved learning outcomes.

Increased student engagement: Personalized learning fosters greater student engagement compared to traditional instruction. The relevance and interest generated by personalized approaches motivate students to actively participate in their learning, leading to higher levels of motivation and progress.

Cost reduction: Personalized learning has the potential to reduce costs by minimizing the reliance on large-scale standardized testing and remediation programs. It can also help decrease the dropout rate, saving resources associated with interventions for struggling students.

VII. CHALLENGES

Data collection and privacy concerns: Personalized learning necessitates gathering significant amounts of student data to personalize instruction. While this data can be used to benefit students, it raises issues related to data privacy and the ethical use of student information.

Implementation costs: Implementing personalized learning can be financially demanding, as it requires the utilization of AI-powered platforms and tools, which may involve significant upfront investments.

Teacher training: Teachers need to be adequately trained in the use of AI-powered platforms and tools to effectively implement personalized learning. This can pose a challenge, particularly for educators who may have limited familiarity with technology.

Notwithstanding these challenges, personalized learning holds promise as an educational approach that can enhance student outcomes. As AI technology continues to advance, personalized learning is expected to gain broader adoption in educational settings.

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