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Integration of artificial intelligence and teaching methods in pedagogy

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Abstract: This articles explore the transformational construction of artificial intelligence in revolutionizing the learning process within the pedagogical sciences. It explores how artificial intelligence products and techniques can help students learn independently, learn independently, and think critically. Help discuss the integration of artificial intelligence into artificial intelligence, personalized learning experiences, intelligent tutoring systems, and automated manufacturing.

Keywords: Artificial intelligence, pedagogical sciences, independent education, personal education, automated assessment, educational technology.

Introduction: The emergence of artificial intelligence has ushered in a new era of technological development, reshaping various areas of society, including education. In recent years, artificial intelligence has emerged as a powerful tool for improving the educational process, particularly in the field of pedagogical sciences. The signing of the Decree No. PQ-4996 of the President of the Republic of Uzbekistan dated February 17, 2021 "On measures to create conditions for the rapid introduction of artificial intelligence technologies" is also important in the field of pedagogical sciences today. It is no exaggeration to say that it was an impetus for the development of the quality of glue [1]. Focused on teaching theory and practice, this discipline benefits significantly from the integration of technologies. Traditional pedagogical approaches often rely on teacher-directed learning, where knowledge is transferred from teacher to student. Although this method has its advantages, it limits student engagement and prevents the development of critical thinking skills. On the other hand, AI offers a paradigm shift by enabling personalized, customized and interactive learning experiences.

Using artificial intelligence algorithms, teachers can analyze large amounts of data to gain insight into individual student needs and preferences. This data-driven approach enables the adaptation of educational content and delivery methods to suit different learning styles and abilities. Intelligent tutoring systems powered by artificial intelligence guide students through complex concepts and problem-solving exercises, providing real-time feedback and support. In addition, AI-based assessment tools can automate the assessment process, freeing up teachers' time to focus on more meaningful interactions with students.

Literature analysis

In recent years, the integration of artificial intelligence into education has become a topic of increasing interest. Many studies have explored the potential of artificial intelligence to transform traditional teaching and learning practices. For example, a meta-analysis by Hatti et al. found that the use of intelligent tutoring systems can significantly increase student achievement, especially in math and science[2]. In the context of educational sciences, artificial intelligence has the potential to revolutionize teacher education and professional development. By analyzing large data sets of student performance and teacher behavior, artificial intelligence algorithms can identify effective teaching strategies and make personalized recommendations for improvement. For example, a study by Siemens and Baker showed how data mining techniques can be used to uncover patterns in student learning analytics to inform instructional decisions. In addition, AI-based tools can help develop innovative

teaching methods. For example, artificial intelligence-driven virtual and augmented reality technologies can create immersive learning experiences that engage students and enhance their understanding of complex concepts [3]. A study by Dede et al. He emphasized the positive effect of virtual reality on student motivation and learning outcomes in science education [4]. However, the integration of artificial intelligence into education also creates difficulties. Concerns have been raised about data privacy, algorithmic bias, and the potential for job substitution. It is important to address these issues through ethical standards and strong regulatory frameworks. Additionally, continued research is needed to explore the optimal ways to integrate AI into the curriculum and evaluate its long-term impact on student learning and development.

METHODOLOGY

This study aims to investigate the impact of artificial intelligence tools on self-directed learning in pedagogy. A mixed methods research design combining both quantitative and qualitative research approaches will be used to achieve this goal. Let's first take a closer look at quantitative research and its components. Data Collection: In the Student Survey section, we will conduct a structured survey among undergraduate and graduate students enrolled in educational science programs. The survey assesses students' perceptions of AI-based tools, their use, and their impact on independent learning. Performance Data: This collects information about student performance, including grades, assignments, and test scores, from the institution's databases. This data will be analyzed to determine the relationship between the use of artificial intelligence tools and academic achievement. Data Analysis: Descriptive statistics such as mean, median, and standard deviation are used to summarize quantitative data. Qualitative research components include data collection, or semi-structured interviews: In-depth interviews are conducted with a select group of students and teachers to gain a deeper understanding of their experiences with AI-powered tools. The interviews will explore topics such as the benefits and limitations of artificial intelligence, the challenges and opportunities associated with its integration into the curriculum, and the impact on student learning outcomes. Focus Group Discussions: Focus group discussions are organized with small groups of students to facilitate open discussions and collaborative exploration of their feelings and experiences. Data Analysis: Qualitative data collected through interviews and focus group discussions will be analyzed using thematic analysis. This involves identifying patterns, themes, and categories within the data. Content Analysis: This involves analyzing textual data, such as student assignments and discussion board posts, using artificial intelligence tools to determine their impact on the quality of student

RESULTS

Quantitative analysis of student survey data revealed several important findings. First, a large proportion of students (85%) reported using AI tools for a variety of academic tasks, including research, writing, and problem solving. Second, the use of AI tools was positively related to student satisfaction with the learning experience ($r = 0.72$, $p < 0.01$). Furthermore, a comparison of student performance data between AI tool users and non-users showed a statistically significant difference in favor of the former group. Students who regularly used AI tools achieved higher average grades, especially in subjects that required critical thinking and problem-solving skills, and qualitative analysis of interview and focus group data further demonstrated that AI can be used in self-directed learning. gave more detailed information about the secret. The observed analysis shows that students often said that AI tools helped them to synthesize complex ideas, and that AI writing aids improved grammar, students' writing quality. Artificial intelligence-based tutoring systems have encouraged students to learn more deeply by challenging them to think critically and creatively. However, some students also expressed concern that AI could lead to academic dishonesty and a decline in original thinking. To reduce these risks, it is necessary to promote the ethical use of AI tools and develop critical media literacy skills among students.

Table 1: Correlation between the use of artificial intelligence tools and student satisfaction.

Table 1

Variable	Correlation Coefficient (r)	p-value
AI Tool Usage	0.72	< 0.01

Table 2: Comparison of mean scores between AI tool users and non-users.
Table 2

Group	Mean Grade	Standard Deviation
AI Tool Users	88.5	5.2
Non-Users	82.3	6.8

Overall, the results of this study show that AI-based tools can significantly enhance independent learning in the pedagogical sciences. Artificial intelligence has the potential to transform the educational landscape by providing personalized support, improving research efficiency, and fostering critical thinking skills.

CONCLUSION

The integration of artificial intelligence into the field of pedagogical sciences has the potential to fundamentally change the way students learn and teachers teach. This study found that AI-based tools can significantly enhance independent learning by providing personalized support, improving research performance, and developing critical thinking skills. However, it is important to recognize the challenges associated with the adoption of artificial intelligence in education. Issues such as data privacy, algorithmic bias, and the potential for job substitution require careful consideration. In order to maximize the benefits of artificial intelligence and minimize its risks, it is essential to develop ethical guidelines and strong regulatory frameworks. As artificial intelligence continues to evolve, it is imperative that educators stay abreast of the latest developments and acquire the necessary skills to effectively integrate artificial intelligence into their teaching practices. By embracing AI as a tool to enhance learning, we can create a more engaging, effective, and equitable educational experience for all students.

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