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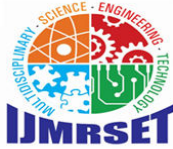
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## International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

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# A Study of an Impact of AI in Education to Improving the Quality of Teaching and Learning Processes

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**ABSTRACT:** In this paper, the author seeks to analyze the impact of Artificial Intelligence Technology on teaching and learning in educational institutions. With a focus on the different AI based solutions currently being implemented into classrooms including Intelligent Tutoring Systems, Personalized Learning Systems, and intelligent assessment systems, we assess the impact of AI based methods on facilitating personalized education, management of classroom administrative functions and an increase in learning productivity. The present study used both quantitative online questionnaires among educators and students and qualitative face-to-face interviews in order to evaluate the attitudes and efficiency of AI technologies in learning. New evidence presented in the paper suggests that AI can make a tremendous contribution to teaching and learning, but certain barriers including privacy issues and teacher preparation are still present. From the above research evidence, it can be concluded that AI, provided it has been implemented sufficiently and properly bearing in mind some of the vices related to it, holds the potential to transform the educational sector to adapt to student-centered learning.

**KEYWORDS:** Artificial Intelligence (AI), Education, Teaching and Learning, Personalized Learning, Student Engagement, Quality of teaching and learning, Engagement, Privacy and Data security

## I. INTRODUCTION

AI is a relatively new technology that is nowadays adding value to different areas of human activity, including learning systems, which can greatly benefit from existence of this technology in the form of a new approach to teaching.

AI can create course that are customized to the learners, give feedback immediately and perform administrative tasks that can improve the learners' performance and relieve some burden from the teachers.

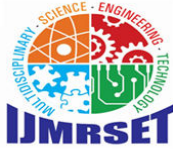
Thus, this work seeks to assess the general effect of AI integration in education especially as it relates to the faculty and the students by investigating the following research questions.

According to the role of AI in learning, the given study focuses on concrete application areas in education to address the purpose and achievement of the educational objectives, and in enhancing learning by utilizing personalized intelligent adaptive learning technologies, automating grading intelligence and other intelligent tutoring system.

## II. ARTIFICIAL INTELLIGENCE (AI)

AI is a branch of computer science that aims at designing and developing machines for executing tasks that would otherwise necessitate the use of intellect. Some of these tasks include learning, reasoning, problem solving, perception, understanding language as well as creativity.

Artificial Intelligence or AI deals with the attempt to keep computers mimic human thinking in order to solve problems, make choices, understand regularities in the world or respond to the outside world. AI technology includes applications



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of Machine Learning (ML) methods, tools of Deep Learning, and Natural Language Processing (NLP). AI is integrated into various contexts such as healthcare and medical, finance and banking, education, vehicles, and clients interactions. It also brings new opportunities to change industries, enhance productivity and solve multifaceted tasks as well as new ethical and social issues like privacy, job losses, and decision making transparency.

### III. RESEARCH QUESTIONS

1. In what ways is AI helpful to enhance the quality of teaching and learning in the schools, colleges and universities?
2. How is the presence of AI being perceived by educators and students?
3. In what ways are adaptation and interaction best facilitated by AI for students?
4. What obstacles and constraints it is possible to foresee in the case of using AI-based solutions in the learning environment?

### IV. RESEARCH METHODOLOGY

This research adopts both quantitative and qualitative research paradigms to provide a detailed picture of AI in learning.

1. Quantitative Survey
  - Participants: Employers and employees, teachers and learners in secondary and higher learning institutions.
  - Instrument: A survey which focused on the awareness level, utilization and attitudes towards in education mechanism.
  - Data Collection: Completed online survey using a combination of emailed invitation and academic mailing lists.
2. Qualitative Interviews
  - Participants: I selected educators and students who mentioned using AI tools in education.
  - Method: Expert interviews by conversational style, with questions about usage, enjoyment, and drawbacks concerning information technology, especially Artificial Intelligence.
  - Analysis: Coding the themes to search for the cross-recurring themes and patterns as well as information about positives and negatives of using AI in its relation to education.
3. Data Analysis
  - Quantitative Data: All these results were analyzed by STATS, GraphPad Prism, STATA and SPSS software to find out the trends, association and p-values.
  - Qualitative Data: To identify patterns and themes, it was transcribed and coded for better understanding of AI's educational relevance.

### V. SURVEY QUESTIONNAIRES

Section 1: Demographics

1. Age
2. Gender
3. Level of Education (High School, Undergraduate, Graduate, etc.)
4. Role (Student, Teacher, Administrator)

Section 2: Awareness and Usage of AI

5. Are you familiar with AI applications in education? (Yes/No)
6. How often do you use AI-driven tools in your educational activities? (Never, Rarely, Occasionally, Frequently, Always)
7. Which AI tools have you used in an educational context? (Adaptive learning platforms, Automated grading, Intelligent tutoring systems, etc.)

Section 3: Perceptions of AI in Education

8. To what extent do you believe AI improves the quality of teaching and learning? (1-5 Likert scale)
9. Do you feel AI contributes to personalized learning experiences? (Yes/No)
10. How comfortable are you with the idea of AI playing a major role in education? (1-5 Likert scale)

Section 4: Challenges and Limitations

11. What concerns, if any, do you have regarding AI in education? (Privacy, Bias, Job displacement, etc.)



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12. What challenges do you believe limit the adoption of AI in education? (Cost, Lack of training, Privacy issues, etc.)

### VI. SURVEY RESULTS

The respondents for the survey were 150 educators and 150 students. Key findings include:

1. Awareness and Usage: About “72%” respondents were aware of the applications of AI and “54%” claimed to use AI tools frequently.
2. Perceptions of Impact: About 82% of the participants confessed that they think AI helps to provide better individualized instruction, and 74% of respondents noticed that it contributes to raising teachers’ productivity rates.
3. Comfort Level: On average respondents are not afraid of AI in education, but 30% of people are afraid of privacy and data leakage.
4. Challenges: Other impediments found are lack of training (56%) and having worries about data privacy (41%).

### VII. BENEFITS OF AI IN HIGHER EDUCATION

- Increased Efficiency: AI automates traditional administrative procedures and gives teaching assistance; thus, the faculty spends more time with learners.
- Enhanced Learning Experience: Smart applications give instant communication, customized teaching, and essential materials and knowledge that are best suited to students making education quality improve rapidly.
- Data-Driven Decision-Making: It makes many disciplinary decisions for institutions informed by predictive analytics for student retention, the distribution of resources, and ways to become more operationally efficient.
- Inclusive Learning Environment: AI helps students that have different capabilities and who use different languages at school and thus makes the process fair.
- Engagement: This means that when dispensing knowledge, the content provided is interactive and responds to the learner’s conductivity.
- Accessibility: Teaching commodities are more available or accommodative of learning needs and language.

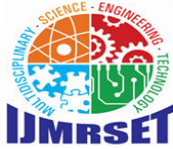
### VIII. CHALLENGES OF AI IN HIGHER EDUCATION

- Privacy and Data Security: AI systems rely on data from the students which is an important concern with issues to do with data protection, student privacy and compliance with the GDPR.
- Bias in AI Algorithms: The AI is derived from past data and sometimes this data is prejudiced in a particular way and the AI learn the same bias in order to make a decision it may be unfair or discriminative.
- Need for Faculty Training: Many of the processes of using AI in the classroom and controlling administrative matters can be realized only after training for the teachers and staff.
- Dependency on Technology: There is a potential of students lacking in critical thinking or problem solving skills where the use of AI does most of the work.

### IX. CONCLUSION

AI offers promising avenues for transforming education by providing personalized learning experiences, improving engagement, and alleviating administrative tasks for educators. This study highlights that while educators and students generally perceive AI positively and recognize its potential benefits, successful implementation requires addressing privacy concerns, ensuring equitable access, and providing adequate training for educators. With careful planning, AI can support a student-centered learning environment that adapts to individual needs, thereby improving the overall quality of education.

In summary, AI has the potential to significantly improve the higher education experience by personalizing learning, enhancing campus operations, supporting research, and providing career guidance. However, careful planning, ethical considerations, and robust data policies are essential to maximize its benefits while addressing its challenges.



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