

## AI INTEGRATION INTO TEACHING: CURRENT SYSTEM PREPAREDNESS AND FUTURE PERSPECTIVES

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### Abstract

This study explores the readiness of Pakistan's education system to adopt AI tools from educators' perspectives. Using a qualitative cross-sectional design and thematic analysis of structured questionnaires, findings reveal educators recognize AI's potential for personalized learning, administrative efficiency, and teaching improvements. However, concerns include job displacement, reduced creativity, and overreliance on technology. Key barriers identified are inadequate infrastructure, insufficient teacher training, and lack of supportive policies. Despite these challenges, awareness and interest in AI integration are growing. The study recommends that policymakers focus on building robust infrastructure, formulating clear AI usage policies, and enhancing teachers' digital literacy through professional development, alongside continuous evaluation to ensure AI upholds educational integrity.



The  
Research Nexus

### INTRODUCTION

Artificial intelligence has redefined education. It has reshaped the teaching and learning processes. AI is transforming every aspect of traditional teaching [1]. AI has the potential to address challenges, increase engagement, and enhance learning experiences. AI in education has the potential to tackle the challenges of global educational systems [2] [3]. Since the scope and extent of AI use in education are increasing significantly, and AI technologies are continuously evolving, it is crucial to investigate the prospects of AI in the educational field.

### Research Objectives:

- To envision the future of teaching with AI from the perspective of educators.
- To investigate the current education system's preparedness for the integration of AI tools.

### Scope and Limitations:

The study aims to explore the prospects of the uptake of AI technology by teachers. It also looks into matters of institutional and policy support for incorporating AI. The research has certain limits. The research solely addresses the perception of educators. Secondly, the research is context-oriented and conducted within the Pakistani educational context with restricted generalizability. The relevance of the outcomes might change over time as the policies and technologies of AI continue changing. Despite these limitations, the paper presents insightful findings on the potential of incorporating AI into teaching and providing practical suggestions for improving the process of adopting it.

**Benefits of AI for Educators:**

Artificial intelligence technologies have several benefits for educators.

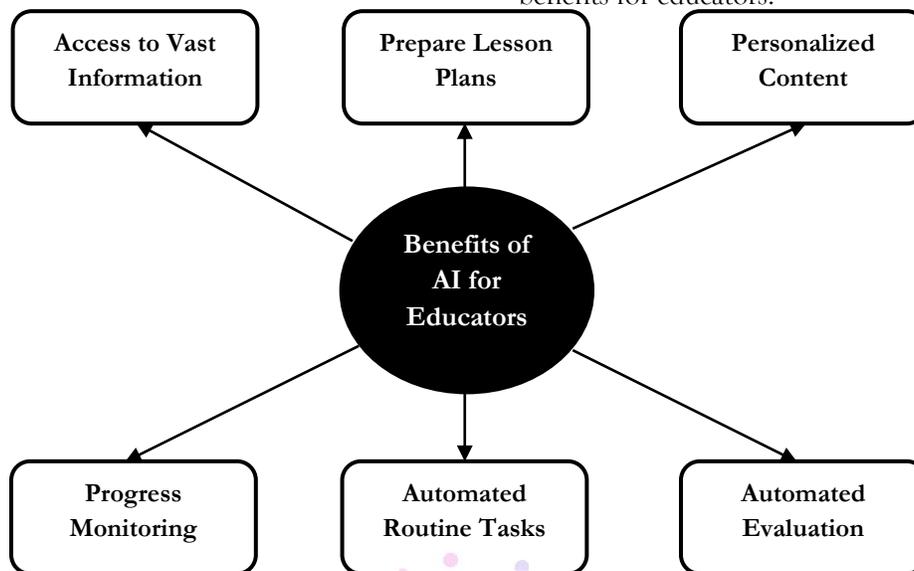


Figure 1. Key benefits of AI for educators

AI facilitates access to immense amounts of knowledge in various manners. AI presents and describes information in different ways [1].

Teachers make use of AI to prepare for lessons in a more efficient manner [4].

AI creates personalized lesson plans and materials based on the course [5]. AI creates content suitable for individual requirements [1] [4] [6].

AI analytics continually monitors the progress of students and offers helpful insights to enable educators to make more informed decisions based on the insights in analyzing students' performance and making changes in teaching strategies accordingly [1] [4] [7].

AI automates routine work, routine things like marking and grading exercises, attendance recording, report generation, etc. are carried out by AI in an automatic manner [1] [2] [4].

AI not only facilitates and simplifies teachers' work, and saves time to pay more attention to teaching [1] [6], [7]. AI has a large capacity to enhance the quality of education on all levels. Enhances time and cost efficiency, and provides global access to quality educational materials [1] [8].

**Future Prospects of AI in Teaching:**

AI integration in education holds promises of revolutionary changes in teaching and learning processes in the future.

A promising feature is developing adaptive and smart tutoring systems that provide highly interactive and individualized learning environments offering need-based support and guidance [9]. Teaching assistant is another key aspect that responds to routine queries, provides support, and additional tutoring outside of the classroom effectively expanding the teaching-learning beyond classrooms [10]. Additionally, AI platforms will make increased collaborative learning experiences possible through seamless real-time communication [11]. AI enables lifelong and remote learning by allowing flexible, self-directed, and competency-based education through online means, making education more inclusive and accessible [12]. The use of predictive analytics for student progress will enable instructors to identify struggling students for earlier interventions that make student retention and overall academic performance even better [1].

**Consideration for AI Integration in Teaching:**

Implementing AI into teaching is hindered by several challenges that limit its general adoption. A primary

challenge is the lack of digital infrastructure within educational institutions [1]. The lack of availability of teacher training in AI technologies creates apprehension and reluctance among teachers [1]. Effective implementation of AI is also in need of institutional and policymaking backing by investments in digital infrastructure, and offering continuous professional development for instructors. In addition, educators are worried about the accuracy, and bias of AI-generated content [13] [14], and the concern that extensive reliance on the technology will lower creativity and teacher-student interactions [15]. Another issue is the nonexistence of formal comprehensive formal policy guidelines in most of the institutions for the implementation of AI in education. These problems demand compound solutions that integrate the aspects of technology development, comprehensive training, and careful policymaking approaches toward ensuring an environment is supportive of the embrace of AI in teaching.

**Materials and Methods:**

**Results and Discussion:**

**Demographics:**

Table 1. Demographic profile of respondents (N=51)

Category	Group	Frequency	Percentage
Gender	Male	47	92.16
	Female	4	7.84
Age in Years	Up to 30	19	37.3
	31 to 40	20	39.2
	Over 40	12	23.5
Qualification	BS/MA/MSc	24	47.06
	M.Phil./MS	22	43.14
	Ph.D.	5	9.80
Teaching Experience in Years	Up to 5	22	43.16
	6 to 15	18	35.28
	16 or above	11	21.56

The analysis of the demographic characteristics of the respondents (N=51) reveals that: For gender distribution, male respondents (92.16%) dominate the sample over female respondents (7.84%). The age distribution of the responding educators reveals a fairly balanced representation of age groups, with the age group of 31 to 41 years

**Research Design:**

A qualitative cross-sectional research design with a descriptive research approach was adopted to investigate the current status of educational systems for integrating AI technologies into teaching, and the future of AI-integrated teaching from the perspective of educators.

**Population and Sample:**

The population for the study consisted of public and private sector educators serving at higher educational institutes, schools, and colleges across Pakistan. A purposive sampling technique was applied to select the sample of the study.

**Data Collection and Analysis:**

Data was gathered through a carefully designed questionnaire available in Google Forms. The QDA Miner 6 data analysis tool was utilized to analyze the responses for thematic analysis to explore and categorize patterns and recurrent themes in responses.

(39.2%), the age group of up to 30 years (37.3%), and the age group of above 40 years (23.5%).

For academic qualifications distribution, the group of BS/MA/MSc degrees holds nearly half of the sample representation (47.06%), followed by the group of MS/M.Phil. (43.14%), and Ph.D. (9.80%).

For teaching experience, the group with up to 5 years of experience constituted the majority of the respondents (43.16%), followed by the experience group of 6 to 15 years (35.28%), and the experience group with 16 or above years of experience (21.56%).

The demographic profile exhibits a diverse representation of educators with varying qualifications and teaching experiences, presenting a comprehensive perspective on AI integration into education.

**Thematic Analysis:**

**What new opportunities do you think AI could bring to teaching in the future?**

**Table 2.** New opportunities in teaching with AI

Themes	Sub Themes	Frequency	Percentage
Positive Opportunities	Personalized Learning	12	23.53
	Immersive Learning	10	19.61
	Enhanced Teacher Role	8	15.69
	Administrative Efficiency	6	11.76
	Assessment and Feedback	5	9.80
	Global Accessibility	4	7.84
<b>Total</b>		<b>45</b>	<b>88.23%</b>
Challenges/ Concerns	Job Displacement	5	9.80
	Over-reliance on Technology	3	5.88
	Preference for Traditional Methods	2	3.92
<b>Total</b>		<b>10</b>	<b>19.6%</b>
Neutral	Conditional Benefits	5	9.80
	No Idea	3	5.88
<b>Total</b>		<b>8</b>	<b>15.68%</b>

Regarding new opportunities in education with the integration of AI, a notable majority of educators, 45 out of 51 (88.23%), perceived positive opportunities in education such as personalized and immersive learning, enriched teacher roles, better administration and evaluation, and easier global accessibility. While a majority perceived positive occurrences, some

educators (19.6%) expressed concerns about the possibility of substituting teachers and over-dependence on AI tools in teaching, and a small number of respondents showed a preference towards conventional teaching methodologies. Further, 8 educators (15.68%) were neutral and did not support or oppose the inclusion of AI in education.

**What is your vision for the future of teaching with AI?**

**Table 3.** Future of Teaching with AI

Themes	Sub Themes	Frequency	Percentage
Positive Opportunities	Personalized Learning	8	15.69
	Professional Development	6	11.76
	Enhanced Teaching and Mentorship	5	9.80
	Assessment and Feedback	4	7.84
	Global Accessibility	3	5.88
	Administrative Efficiency	3	5.88
	Immersive Learning	2	3.92
	Simplified Teaching	2	3.92
<b>Total</b>		<b>33</b>	<b>64.71%</b>
Challenges/	Cognitive Skills Decline	5	9.80

Concerns	Job Displacement	4	7.84
	Over-reliance on AI	3	5.88
	Loss of Critical Thinking	2	3.92
	Replacement of Teachers	2	3.92
	Negative Impact on Practical Skills	2	3.92
<b>Total</b>		<b>18</b>	<b>35.29%</b>
Neutral	Conditional Acceptance	2	3.92
	Not Sure/No Idea	3	5.88
<b>Total</b>		<b>5</b>	<b>9.80%</b>

Regarding the future of AI-enriched education, a considerable proportion of educators, 33 out of 51 (64.71%), perceived positive opportunities in education such as personalized, and enhanced teaching and mentorship, assessment and feedback, global accessibility, efficient administration, immersive learning, and simplified teaching. Regardless of perceived positive perception, another

notable number of respondents (35.29%) expressed concerns about the negative effect on cognitive skills, critical thinking, and practical skills, the possibility of substituting teachers, and over-dependence on AI tools in teaching. Moreover, 5 respondents (9.80%) were neutral and did not endorse or oppose the assimilation of AI in education.

**How well is the current education system prepared to integrate AI tools?**

**Table 4.** Current educational system preparedness to integrate AI

Themes	Sub Themes	Frequency	Percentage
Not Prepared	Lack of Infrastructure	9	17.65
	Lack of Teacher Training	7	13.73
	Not Technology Oriented	6	11.76
	Not Ready	5	9.80
	Needs Upgradation	4	7.84
<b>Total</b>		<b>31</b>	<b>60.78%</b>
Partially prepared	Early Stages of Integration	6	11.76
	Requires Teacher Training and Awareness	4	7.84
	Growing Awareness and Interest	2	3.92
<b>Total</b>		<b>12</b>	<b>23.53%</b>
Uncertain	No Idea/Not Sure	9	17.65
<b>Total</b>		<b>9</b>	<b>17.65%</b>

Regarding the current educational system's preparedness to adopt AI, a majority of educators, 30 out of 51 (60.78%), believe that the current educational system is not prepared for the inclusion of AI technologies. In this regard, lack of infrastructure, lack of teacher training, and an Obsolete system are reported by the respondents. However, some educators (23.53%) believe that the system is partially prepared, as there is a growing interest and awareness regarding AI's potential in

teaching. In this regard, they urge for more awareness campaigns and teacher training programs. Further, another 17.65% of educators express no idea regarding the system's preparedness to embrace AI.

**Discussion:**

These insights are aligned with the works of literature that account for the potential and challenges linked with the integration of AI into education.

The literature consistently highlights AI's potential to support personalized education, support innovative teaching, and improve administration tasks [4]. The role of AI further grows with the capability to automate feedback and assessment [16]. However, concerns are also raised regarding the over-dependence on AI resulting in decreased problem-solving, and critical-thinking skills, and most importantly job displacement of the teachers [1].

Besides the perceived benefits of AI in teaching, the responding educators believe that the current educational system in Pakistan is not well-prepared for technology integration [17]. They cite the lack of a digital infrastructure, and insufficient teacher training programs as the main reasons causing this gap [18]. However, they are optimistic that there is a growing awareness and interest in adopting AI technologies which can help and guide a gradual integration.

The insights suggest that the integration of AI into teaching needs to be managed carefully. There must be a balanced integration of AI technology with pedagogical integrity. Concerns such as teacher training, and infrastructure development, need to be addressed for a successful integration. Policymakers and institutions should focus on AI integration as a supporting tool in education to complement teaching and learning rather than a substitute for teachers [1].

### Conclusion:

The incorporation of AI into teaching offers both prospects and challenges. Educators acknowledge AI's potential to support personalized education, make more efficient administrative tasks, and improve teaching and learning. However, the respondents also expressed concerns regarding the risk of job loss, and deterioration in problem-solving, and critical-thinking skills due to overreliance on AI technologies.

The study reveals a substantial gap between the perceived benefits of AI integration in education and the current level of educational system preparedness. The responding educators believe that the current educational system is not well-prepared to embrace the technology effectively, referring to a lack of infrastructure, unavailability, or insufficient teacher training programs. However, there is a growing awareness and interest in adopting AI technologies

which indicates a positive position for gradual integration.

### Recommendations:

#### Policy and Infrastructure Development

Policymakers and educational institutions should prioritize the development of digital infrastructure, to facilitate AI integration. Formulating clear policies on AI usage in education will ensure ethical and reasonable AI implementation.

#### Teachers' Professional Development

Consistent professional development programs including workshops, seminars, and online training should be conducted to enhance teachers' digital literacy and skills related to AI tools.

#### Continuous Assessments

There should be a continuous assessment of AI's impact on student learning, critical thinking, and practical skills to uphold a balanced educational approach.

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