

ARTIFICIAL INTELLIGENCE AND PRE SERVICE TEACHER: A STUDY TO ASSESS THE AWARENESS AND KNOWLEDGE

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ABSTRACT

Teachers have historically played a crucial role in driving societal change. However, the current cohort of prospective teachers enrolled in professional degree programs often lacks an understanding of the applications of artificial intelligence (AI) in classrooms and school environments. The study explores the integration of Artificial Intelligence (AI) education in Azad Jammu & Kashmir (AJK) Pakistan. It addresses the AI education in the AJK to empower educators to effectively introduce AI concepts to students. The research objectives focus on assessing the awareness and knowledge of AI in pre-service teachers and its integration in the curriculum. A mixed-methods approach was used, involving questionnaire comprised of 10 items for pre-service teachers from various universities of AJK. The findings revealed that most participants had a reasonable understanding of AI but felt that the current curriculum lacked sufficient AI content.

Keywords: Artificial intelligence, Pre-service teachers, Teacher Educators, Professional development, Curriculum development

INTRODUCTION

Artificial intelligence (AI) integration into education has received visible attention in recent times due to its potential impact on both teaching and learning. As a result, there is an increasing emphasis on training and developing pre-service teachers to effectively use the power of artificial intelligence in their teaching practices. The advancement in technologies and the fast adoption of smart approaches to global development have made it important for every nation to develop strong information and communication technologies (ICT) and artificial intelligence (AI) systems. (Korinek & Stiglitz, 2021); (Sanusi et al., 2022). The advantages of AI systems, such as their efficiency in completing tasks and the ability to handle more sophisticated and complex

responsibilities without interruption (Bang et al., 2020), have resulted in a broad support for using AI solutions to address global issues. In developed countries especially USA, KOREA, JAPAN, and CHINA, AI has become an essential component for driving economic growth through its application in numerous aspects of life, including communication, infrastructure, health, and education (Popkova, 2020); (Vazhayil et al., 2019). Whereas, developing countries like Pakistan and its administrated state AJK lack attention to AI. There is no research yet been conducted within the country that could explore AI and its potential impact on education. On the other hand, the increasing prevalence of AI suggests that the future will be strongly linked to it.

Therefore, it is important for children and people of all ages to be adequately prepared for the AI-driven future in light of its crucial role in finding answers to present and upcoming worldwide problems (Johnson & Lee, 2022). To this end, it is necessary to include AI throughout the educational system. (Touretzky & Seehorn, July 2019); (Johnson & Lee, 2022). Guidelines should be established and implemented to make learning about AI mandatory at all grades of schooling.

1.1. Research Objective

- i. Assess the current level of awareness and knowledge in pre-service teachers in AJK regarding artificial intelligence (AI).

1.2. Research Questions

- i. How familiar are pre-service teachers with the concepts of artificial intelligence and its application?
- ii. Have pre service teachers received any training?
- iii. Is there enough AI content in the curriculum?

2. LITERATURE REVIEW

The motivations for incorporating artificial intelligence into K-12 education have taken different trajectories in various parts of the world, with distinctions between developed and developing countries.

2.1. Notions of Artificial Intelligence

Notion of artificial intelligence (AI) refer to people's perspectives, opinions, and beliefs regarding AI systems and technologies. These understandings and beliefs can vary depending on an individual's attitude toward and interaction with AI technologies. In general, AI is seen as a potential solution to various contemporary technological challenges, particularly in the context of modern education (Atherton, 2023); (Ma, Yu, & Zheng, 2023). To cultivate positive conceptions of AI among students today, it is essential to provide them with comprehensive knowledge about AI, including its definition, functioning,

practical applications in daily life, and potential future uses. This is because effectively harnessing AI requires more than just the ability to develop and use technology (Hind et al., 2019).

Some research findings suggest that individuals' conceptions of AI are influenced by factors such as age, geographic location, personal orientation, and speculations (Mertala et al., 2022). These factors give rise to two distinct categories of AI conceptions. The first category is known as the anthropomorphic conception, where individuals draw parallels between AI and human emotions and cognition (Salles et al., 2020). The second category involves likening AI to the human brain, implying that AI possesses the capability to think and function similarly to the human brain (Emmert-Streib et al., 2020). Enhancing people's perceptions of AI is crucial for AI education, and this can be facilitated by the availability of vast data, powerful computing capabilities, and trainable AI algorithms, which can improve understanding of AI processes (Mirbabaie, Felix, & Nicholas, 2022).

In order to adequately prepare individuals either to contribute to the development of the next generation of AI technology or to responsibly and ethically utilize AI, a deeper understanding of AI is essential (Mirbabaie et al., 2022). While some educators hold positive views regarding the use of AI to enhance educational scaffolding (Sanusi I. T et al., 2022), they also harbor concerns about potential challenges associated with its use. These concerns encompass the potential shift in the role of teachers in the classroom and the transparency of decisions made by AI systems.

2.2. Empowering Teachers with AI

The subject that has been extensively discussed and researched revolves around the role of teachers in the face of advancing AI technology, which has the potential to replace their work with intelligent software-equipped machines. The

current focus is on developing AI to support educators in various aspects of teaching and learning process, ranging from the automation of mundane tasks to choosing the most suitable content to share (Lee & Lee, 2021). Thomas Arnett's 2016 article for the Christensen Institute has an intriguing title which reflects its content. As AI technology grows more advanced, numerous fields will be drastically reshaped, giving machines more of the capabilities that humans alone used to have (Arnett, 2016). According to UNESCO, teachers frequently allocate most of their time performing repetitive and administrative work. Therefore, it can be thought of as a collaborative teacher model which involves both a teacher and a virtual assistant, who could manage routine chores to free up time for the teacher to concentrate on guiding students and individualized communication (Villar & Herrero, 2022).

3. METHODOLOGY

The research methodology involves a mixed approach involving both qualitative and quantitative methods to provide a holistic understanding of the chosen topic. The use of mixed methods allows to triangulate the findings and thus ensure a more robust and comprehensive analysis.

3.1. Population and Sampling

Two distinct cohorts of participants hailing from various universities within the region of Azad Jammu & Kashmir were engaged in this study. The first group comprised a total of 70 individuals, all of whom were actively pursuing their academic endeavors as prospective teachers within the University. The second group consisted of 20 experienced teacher educators who were currently serving as esteemed instructors within the Universities in Azad Jammu & Kashmir.

3.2. Data Analysis

The analysis was done with the help of Google Forms and excel software to calculate percentage and frequency of the data. Google Forms offers all the necessary tools needed for the analysis of the data. This

approach made sure the data was reliable and made it easier to understand what the responses meant.

4. RESULTS

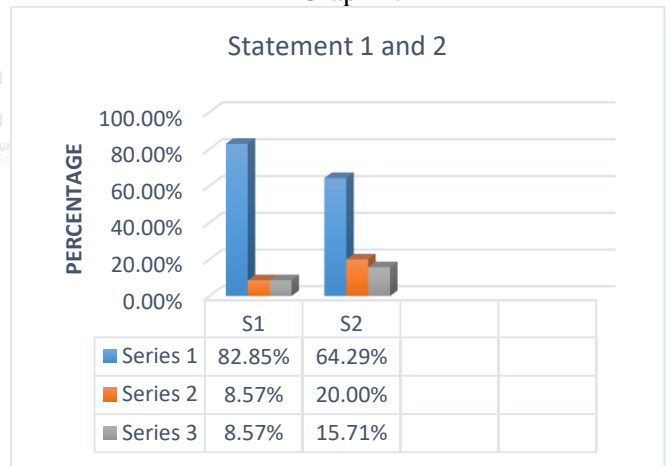
Statement 1. “As a prospective teacher I feel confident in my understanding of AI”.

Statement 2. “As a prospective teacher, I know the difference between AI and traditional programming”

Table 4.1

		Agree	Neutral	Disagree
S1	Frequency	58	6	6
	%age	82.85%	8.57%	8.57%
S2	Frequency	45	14	11
	%age	64.29%	20%	15.71%

Graph 4.1



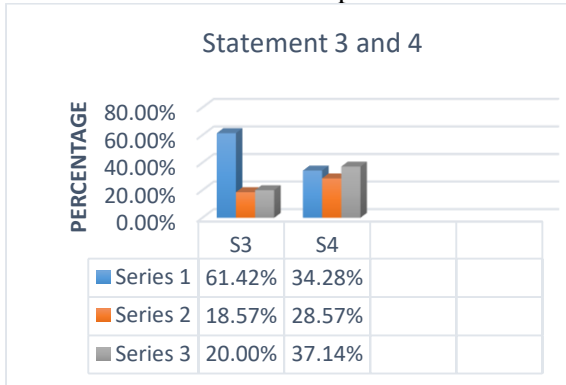
Statement 3. “I am learning about AI during my degree”.

Statement 4. “Current curriculum has enough content about AI”.

Table 4.2

		Agree	Neutral	Disagree
S3	Frequency	43	13	14
	%age	61.42%	18.57%	20%
S4	Frequency	24	20	26
	%age	34.28%	28.57%	37.14%

Graph 4.2



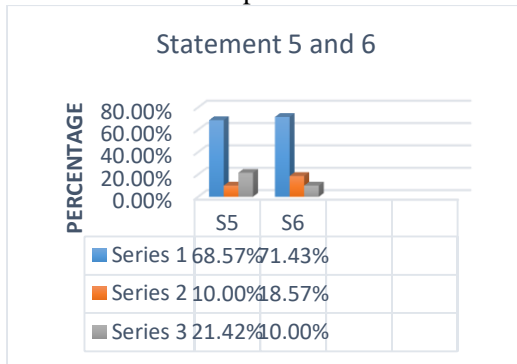
Statement 5. “I am aware of the various AI tools & technologies available for education.”

Statement 6. AI integration in curriculum can lead to more personalized learning.”

Table 4.3

		Agree	Neutral	Disagree
S5	Frequency	48	07	15
	%age	68.57%	10%	21.42%
S6	Frequency	50	13	7
	%age	71.43%	18.57%	10%

Graph 4.3



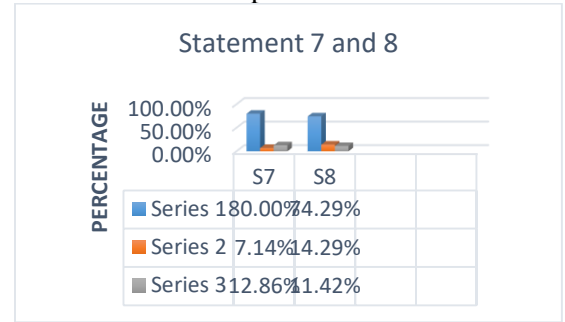
Statement 7. “AI integration in curriculum may enhance student learning outcomes (SLO’s).”

Statement 8. AI integration in curriculum can lead to more personalized learning.”

Table 4.4

		Agree	Neutral	Disagree
S7	Frequency	56	09	05
	%age	80%	7.14%	12.86%
S8	Frequency	52	10	7
	%age	74.29%	14.29%	11.42%

Graph 4.4



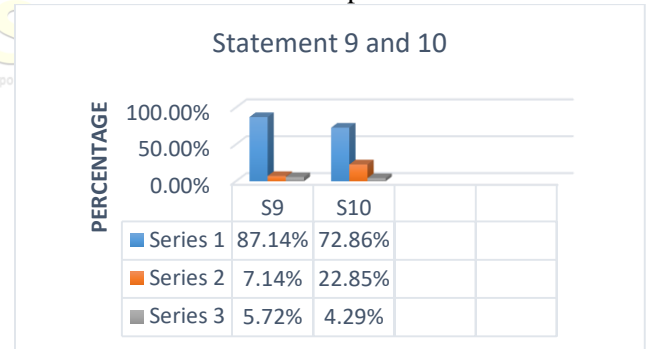
Statement 9. “AI integration in curriculum may improve students’ skills as a whole”.

Statement 10. “AI integration may identify the limitations in education”

Table 4.5

		Agree	Neutral	Disagree
S9	Frequency	61	05	04
	%age	87.14%	7.14%	5.72%
S10	Frequency	51	16	13
	%age	72.86%	22.85%	4.29%

Graph 4.5



4.1. FINDINGS

1. The majority of the respondents agreed with the statements that I feel confident about my understanding of AI and know the difference between AI and traditional programming. However, a very less no. of prospective teachers showed disagreement on the above mentioned statements (Table 4.1).
2. The Majority of the prospective teachers agreed with the statement that I am learning about AI during my

degree. However, a very less number of respondents disagreed with the statement. On the other hand, responses obtained on the statement that Current curriculum has enough content about AI. While a significant proportion held a concurring opinion (Table 4.2).

3. A significant majority of respondents agreed upon the statement that I am aware of the various AI tools & technologies available for education and AI integration in curriculum can lead to more personalize learning. While only a small number expressing disagreements (Table 4.3).
4. The majority of respondents were in alignment with the statements that AI integration in curriculum can lead to enhance student learning outcomes (SLO's) and achievement of the Intended Learning Outcomes (ILOs). Whereas, a minority showed disagreement (Table 4.4).
5. A large number of respondents concurred with the statements that AI integration in curriculum can lead to improve students' skills as a whole and identify the limitations in education. However, very less number of respondents disagreed with the statements (Table 4.5).

4.2. Conclusion

The findings from this study shed light on various aspects of AI integration in educational programs, with a focus on the perceptions of prospective teachers and teacher educators. Concerning AI perception and its integration into the curriculum, it is evident that a majority of respondents expressed confidence in their understanding of AI and its distinction from traditional programming. Furthermore, many prospective teachers reported learning about AI during their degree programs, while a significant proportion felt that the current curriculum lacked sufficient AI content. However, a majority were aware of various AI tools and technologies for education and

believed in the potential for AI integration to enhance student learning outcomes and skills while identifying limitations in education. Ultimately, the findings indicate a growing awareness and positive perception of AI among prospective teachers.

4.3. Discussion

Comparing the findings from this research with those in developed countries reveals noteworthy disparities. In developed nations, there is a higher level of AI awareness and integration into curricula, and educators are often well-equipped with the latest ICT skills (Zhang & Schiebl, 2023). Students in these countries benefit from more personalized and efficient learning experiences, thanks to the incorporation of AI technologies in classrooms. However, in contrast, your research in AJK and Pakistan highlights that many pre-service teachers are not adequately informed about AI's applications in education, reflecting a gap in their training. The lack of AI education in the formal curriculum also hinders students' access to this transformative technology.

The research study has certain limitations, including a relatively small sample size that may not fully capture the breadth of knowledge among pre-service teachers regarding AI. Additionally, the study relied on self-reported data provided by participants, which could introduce bias or potential inaccuracies.

4.4. Recommendations

The following recommendations can be made to further the research and address the identified issues related to AI integration in teacher education programs which are running in education departments of different tertiary institutes in Azad Jammu & Kashmir (AJK):

- It is recommended that universities may develop a standardized curriculum for instructors in AJK that includes comprehensive AI content. This curriculum should be regularly updated to keep pace with the rapidly evolving field of AI.
- It is recommended that universities incorporate AI-related courses and modules into pre-service teacher education programs to enhance the awareness and knowledge of

prospective teachers regarding AI integration in education.

- It is recommended that universities may establish AI-related training and professional development programs for in-service teachers to bridge the knowledge gap and equip them with the necessary skills to integrate AI into their teaching practices.

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