Chapter-IV

Data Analysis and Interpretation

4.1 Introduction

This chapter presents the analysis and interpretation of the data collected through a structured Google Form survey. The survey aimed to assess the awareness of Artificial Intelligence (AI) among pre-service teachers at IASE, Bhopal, focusing on their general understanding, knowledge of AI applications in education, attitudes, perceived preparedness, and views on future integration.

A total of 121 responses were received. The data have been analysed using descriptive statistics such as frequency, percentage, and graphical interpretation. The findings are presented thematically, corresponding to the sections of the questionnaire.

4.2 Descriptive Analysis

4.2.1 Section A: General Awareness of Artificial Intelligence

Table 4.1: Shows Percentage & Frequency of response of Section A

	Question	Options	Frequency	Percentage
1	**Have you heard of Artificial Intelligence (AI)?**	Yes	116	95.9%
		No	5	4.1%
2	**Where did you first learn about AI? (Multiple responses)**	Media (TV, Internet, social media)	101	83.5%
		Academic Courses	14	11.6%
		Friends Circle	8	6.6%
		Workshops/Seminars	8	6.6%
3	**How would you describe your understanding of AI?**	Basic (e.g., AI is used in apps or websites)	58	47.9%
		Moderate (e.g., aware of applications like chatbots, voice assistants)	39	32.2%
		Advanced (e.g., knowledge of AI programming or algorithms)	24	19.8%
4		Rarely	46	38.0%

	How often do you encounter discussions about AI in your academic environment?	Occasionally	44	36.4%
		Frequently	25	20.7%
		Never	6	5.0%
5	Which sectors outside education do you associate most with AI? (Multiple responses)	Entertainment	72	59.5%
		Healthcare	42	34.7%
		Industry/Manufacturing	36	29.8%

Interpretation:

The data indicates that a large majority (95.9%) of the respondents have heard of Artificial Intelligence (AI), suggesting that AI has become a widely recognized concept among pre-service teachers. Most of this awareness stems from media sources such as television, the internet, and social media, as indicated by 83.5% of participants. In contrast, fewer respondents credited academic courses (11.6%) or workshops and peer discussions (6.6% each) as their source of information. Regarding their understanding of AI, nearly half (47.9%) described it as basic, such as being aware of AI in apps and websites, while 32.2% had a moderate understanding that included familiarity with applications like chatbots and voice assistants. Only 19.8% reported an advanced understanding involving programming or algorithms. When asked about how often AI is discussed in their academic environment, 38.0% mentioned such discussions were rare, and 36.4% said they occurred occasionally, reflecting a limited academic engagement with the topic. Additionally, students mostly associated AI with sectors like entertainment (59.5%) and healthcare (34.7%), indicating a broader understanding of AI's societal presence beyond the field of education.

4.2.2 Section B: Awareness of AI in Education

Table 4.2 Shows Percentage & Frequency of response of Section B

	Question	Options	Frequency	Percentage
1	Are you aware of AI applications in education?	Yes	97	80.2%
		No	24	19.8%
2	Have you used any AI tools in academics?	Yes	97	80.2%
		No	24	19.8%

3	Do you think AI can replace traditional teaching methods?	Yes	82	67.8%
		No	16	13.2%
		Not Sure	23	19.0%
4	Which areas of education can benefit most from AI? (Multiple responses)	Student assessment	83	68.6%
		Administrative tasks	53	43.8%
		Personalised Learning	64	52.9%
		Curriculum development	81	66.9%
		Career guidance	72	59.5%
5	Which AI applications in education are you aware of? (Multiple responses)	Automated grading	59	48.8%
		Personalized learning tools	43	35.5%
		Virtual teaching assistants	55	45.5%
		AI-powered administrative tools	81	66.9%
6	Common Tools Mentioned:	ChatGPT, Gemini, Duolingo		

Interpretation:

Awareness of AI applications within education is relatively high, with 80.2% of respondents indicating they are familiar with such uses. The same percentage also reported having used AI tools in their academic activities, suggesting that exposure often translates into usage. However, opinions were divided on whether AI could replace traditional teaching methods—while 67.8% believed it could, 19.0% were uncertain, and a smaller fraction (13.2%) disagreed. When asked which educational areas could benefit most from AI, student assessment (68.6%), curriculum development (66.9%), and career guidance (59.5%) were commonly selected, showing a belief in

AI's potential to support both instructional and administrative roles. As for specific AI applications known to participants, administrative tools (66.9%) and automated grading systems (48.8%) topped the list, followed by virtual assistants and personalized learning platforms. Commonly mentioned tools included ChatGPT, Google Assistant, and Duolingo, reflecting popular and accessible technologies used in academic settings.

4.2.3 Section C: Attitudes Toward AI

Table 4.3 Shows Percentage & Frequency of response of Section C

	Question	Options	Frequency	Percentage
1	**Do you believe AI can improve teaching and learning experiences?**	Strongly Agree	32	26.4%
		Agree	68	56.2%
		Neutral	17	14.0%
		Disagree	3	2.5%
		Strongly Disagree	1	0.8%
2	**What do you see as the main benefits of AI in education? (Multiple responses)**	Better engagement	79	65.3%
		Efficient assessment	66	54.5%
		Personalised learning	76	62.8%
3	**What concerns do you have about AI in education? (Multiple responses)**	Privacy and security	86	71.1%
		Over-reliance on technology	60	49.6%
		Lack of teacher involvement	70	57.9%
4	**In your opinion, how can AI assist teachers in the classroom? (Multiple responses)**	Managing administrative tasks	64	52.9%
		Providing real-time feedback to students	73	60.3%
		Developing customized lesson plans	79	65.3%
		Enhancing student engagement	80	66.1%

5	Which areas of teacher preparation should integrate AI-related skills? (Multiple responses)	Professional development	69	57%
		Lesson planning and resource development	91	75.2%
		Classroom management and student assessment	92	76%

Interpretation:

Respondents generally held a positive attitude toward the use of AI in education. A substantial majority either agreed (56.2%) or strongly agreed (26.4%) that AI can enhance teaching and learning experiences. The perceived benefits of AI included better student engagement (65.3%), personalized learning opportunities (62.8%), and more efficient assessment processes (54.5%). Despite this optimism, several concerns were also noted. The most prominent worry was related to privacy and security (71.1%), followed by the fear of over-reliance on technology (49.6%) and diminished teacher involvement (57.9%). These concerns suggest a cautious approach to integrating AI. Respondents also saw AI as a helpful tool for educators, particularly in enhancing student engagement (66.1%) and creating customized lesson plans (65.3%). Furthermore, many participants expressed a belief that AI-related skills should be incorporated into teacher training, particularly in areas such as lesson planning (75.2%) and classroom management (76%).

4.2.4 Section D: Preparedness and Training

Table 4.4 Shows Percentage & Frequency of response of Section D

	Question	Options	Frequency	Percentage
1	Have you received any training related to AI?	Yes	27	22.3%
		No	94	77.7%
2	Would you be interested in attending workshops or courses on AI in education?	Yes	111	91.7%
		No	10	8.3%
3		Basic AI concepts	94	77.7%

	What topics would you like to learn about in relation to AI? (Multiple responses)	Ethical considerations in AI	61	50.4%
		AI applications in teaching	91	75.2%
4	**Do you feel prepared to integrate AI tools into your teaching practices?**	Yes	94	77.7%
		No	6	5%
		Not Sure	21	17.4%
5	**What challenges do you anticipate in using AI in the classroom? (Multiple responses)**	Resistance from students or parents	66	54.5%
		Lack of resources	76	62.8%
		Insufficient training	79	65.3%
		Ethical concerns	49	40.5%

Interpretation:

Despite high awareness and usage, only a small proportion (22.3%) of respondents had received formal training in AI, highlighting a significant gap in teacher preparation. However, there is strong interest in learning, with 91.7% expressing willingness to attend workshops or courses on AI in education. Participants showed particular interest in topics such as basic AI concepts (77.7%), AI applications in teaching (75.2%), and ethical considerations (50.4%), indicating a desire for comprehensive and balanced knowledge. When asked about their readiness to integrate AI into teaching, 77.7% felt prepared, though 17.4% remained uncertain. Anticipated challenges included insufficient training (65.3%), lack of resources (62.8%), and resistance from students or parents (54.5%). These challenges underscore the need for institutional support and structured training programs to build confidence and competence among pre-service teachers.

4.2.5 Section E: Future Perspectives

Table 4.5 Shows Percentage & Frequency of response of Section E

	Question	Options	Frequency	Percentage
1	**What potential challenges do you foresee in integrating AI into teaching practices? (Multiple responses)**	Resistance from educators or institutions	54	44.6%
		Lack of training for teachers	93	76.9%
		High costs of implementation	60	49.6%
2	**Do you think AI will impact the role of teachers?**	Yes, it will enhance the teacher's role	58	47.9%
		Yes, it will reduce the teacher's role	51	42.1%
		No, it will not impact the teacher's role	12	9.9%
3	**Would you support the integration of AI as a core subject in teacher training programs?**	Yes	109	90.1%
		No	5	4.1%
		Not Sure	7	5.8%
4	**How would you rate your institution's efforts in preparing students for AI-driven education?**	Excellent	35	28.9%
		Good	38	38%
		Average	39	32.2%
		Poor	1	0.8%

Interpretation:

Looking ahead, the major concern regarding AI integration in education was the lack of teacher training, identified by 76.9% of respondents. Other challenges included the high cost of AI implementation (49.6%) and resistance from educators or institutions (44.6%). Regarding the future role of teachers, opinions varied—47.9% believed AI would enhance the teacher's role, while 42.1% thought it would reduce their importance, showing uncertainty about the long-term impact. A strong majority (90.1%) supported the idea of including AI as a core subject in teacher training

programs, indicating readiness for curriculum reform. Finally, when evaluating their institution's efforts in preparing students for an AI-driven future, responses were mixed: 28.9% rated them as excellent, 38.0% as good, and 32.2% as average. This highlights the need for institutions to do more to equip future teachers for the challenges and opportunities presented by AI.

4.3 Discussion Based on Research Questions

This section presents a synthesis of the major findings of the study as they relate to the five research questions.

Research Question 1: What is the level of awareness among pre-service teachers about Artificial Intelligence (AI) and its applications in education?

The data revealed that while 95.9% of pre-service teachers had heard of AI, only 19.8% rated their understanding as advanced. Most respondents had basic (47.9%) or moderate (32.2%) awareness. Although 80.2% reported being aware of AI applications in education, the depth of knowledge remains limited, highlighting a gap between general awareness and meaningful understanding.

Research Question 2: What are the major sources of AI knowledge and exposure for pre-service teachers?

Media emerged as the predominant source of information (83.5%), while only 11.6% attributed their knowledge to academic coursework. Workshops and peer interactions accounted for an even smaller fraction. This indicates a lack of structured exposure to AI within teacher education curricula and reinforces the need for institutional efforts to provide formal learning experiences.

Research Question 3: What are the attitudes of pre-service teachers toward the use of AI in education?

The majority of respondents expressed positive attitudes: 82.6% agreed or strongly agreed that AI can enhance teaching and learning. Key perceived benefits included personalized learning, improved engagement, and efficient assessment. However, concerns such as data privacy (71.1%), diminished teacher roles (57.9%), and over-reliance on technology (49.6%) were prevalent, indicating a need for ethical and pedagogical training alongside technical understanding.

Research Question 4: What level of preparedness do pre-service teachers perceive they have for integrating AI tools into their future teaching practices?

Only 22.3% of participants had received formal training in AI, yet 77.7% believed they were prepared to integrate AI into teaching. This discrepancy suggests an overestimation of readiness or a lack of awareness regarding the competencies required. Importantly, 91.7% showed interest in attending AI-related workshops, reflecting a strong willingness to learn and upskill.

Research Question 5: What challenges and concerns do pre-service teachers anticipate in using AI in educational contexts?

Participants identified multiple anticipated barriers, including lack of training (65.3%), inadequate resources (62.8%), and resistance from stakeholders (54.5%). High implementation costs and institutional inertia were also noted. These challenges highlight systemic issues in current teacher education programs that must be addressed through targeted reforms and resource allocation.

4.4 Conclusion

The interpretation of the data reveals that pre-service teachers possess a high level of general awareness about Artificial Intelligence (AI), primarily gained through media rather than formal academic channels. While most respondents have a basic to moderate understanding of AI and actively use AI tools in academic settings, their exposure to structured learning or formal training in AI remains limited. Attitudes toward AI in education are largely positive, with many recognizing its potential to enhance engagement, personalize learning, and support administrative tasks. However, concerns regarding privacy, over-reliance on technology, and the diminishing role of teachers are also prevalent.

Despite the lack of formal training, the majority of pre-service teachers express a strong interest in learning more about AI, particularly in practical and ethical domains. They also foresee challenges in implementation, such as lack of training, insufficient resources, and institutional resistance. Nonetheless, there is overwhelming support for integrating AI into teacher education programs, both as a subject and as a tool to enhance teaching practices. The findings highlight a clear readiness and willingness among pre-service teachers to embrace AI in education, provided adequate support, training, and institutional commitment are in place.