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ARTIFICIAL INTELLIGENCE READINESS AND DIGITAL LEARNING ENGAGEMENT AMONG PROSPECTIVE TEACHERS

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ABSTRACT

The rapid advancement of Artificial Intelligence (AI) has transformed educational practices and learning environments worldwide. Prospective teachers are expected to possess adequate readiness to utilize AI technologies effectively in teaching and learning processes. Digital learning engagement has also emerged as a crucial factor influencing academic success and professional preparedness. The present study aims to investigate the levels of Artificial Intelligence Readiness and Digital Learning Engagement among prospective teachers and examine the relationship between these variables. A normative survey method was employed, and data were collected from 300 prospective teachers studying in Colleges of Education. Standardized scales on Artificial Intelligence Readiness and Digital Learning Engagement were used for data collection. The collected data were analyzed using Mean, Standard Deviation, t-test, ANOVA, and Pearson's Product Moment Correlation. The findings revealed that prospective teachers possessed moderate levels of Artificial Intelligence Readiness and Digital Learning Engagement. Significant differences were observed with respect to selected demographic variables. Furthermore, a positive and significant relationship was found between Artificial Intelligence Readiness and Digital Learning Engagement. The study highlights the importance of integrating AI-based competencies into teacher education programmes to enhance digital engagement and professional preparedness.

KEYWORDS: *Artificial Intelligence Readiness, Digital Learning Engagement, Prospective Teachers, Educational Technology, Teacher Education, Digital Literacy.*

1. INTRODUCTION

Artificial Intelligence (AI) has emerged as a transformative technology in the field of education, offering innovative opportunities for teaching, learning, and assessment. The integration of AI-powered tools and digital platforms has significantly changed the way learners access information and engage in educational activities. As future educators, prospective teachers must be prepared to utilize these technologies effectively in their professional practice.

Artificial Intelligence Readiness refers to the knowledge, skills, attitudes, and willingness of individuals to adopt and use AI technologies in educational settings. Digital Learning Engagement, on the other hand, represents the extent to which learners actively participate in and benefit from technology-supported learning experiences. Both factors are essential for effective teaching and learning in the digital age.

Teacher education institutions play a crucial role in equipping prospective teachers with the competencies required to navigate technology-rich learning environments. Understanding the relationship between Artificial Intelligence Readiness and Digital Learning Engagement can help enhance teacher preparation programmes and promote effective technology integration. Therefore, the present study aims to examine the levels of Artificial Intelligence Readiness and Digital Learning Engagement among prospective teachers and explore the relationship between these variables.

2. NEED AND SIGNIFICANCE OF THE STUDY

The rapid advancement of Artificial Intelligence (AI) has brought significant changes to the educational landscape. AI-powered technologies are increasingly being used in teaching, learning, assessment, and educational administration. As future educators, prospective teachers are expected to possess the necessary knowledge and skills to effectively utilize these technologies in their professional practice. Therefore, understanding their level of Artificial Intelligence Readiness has become essential.

Digital learning has become an integral part of modern education, particularly after the widespread adoption of online and blended learning approaches. The effectiveness of digital learning largely depends on the level of engagement exhibited by learners. Prospective teachers who are actively engaged in digital learning environments are more likely to develop the competencies required for technology-integrated teaching.

The successful implementation of AI in education depends not only on technological infrastructure but also on the readiness of teachers to adopt and utilize these innovations. Investigating the relationship between Artificial Intelligence Readiness and Digital Learning Engagement can provide valuable insights into how future teachers adapt to emerging technologies and participate in digital learning experiences.

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The findings of the study will be beneficial to teacher educators, curriculum planners, educational administrators, and policymakers in designing appropriate training programmes and curricular interventions that enhance AI competencies and digital learning engagement among prospective teachers. Furthermore, the study contributes to the growing body of literature on educational technology and supports the development of technologically competent teachers for the digital age.

3. STATEMENT OF THE PROBLEM

The integration of Artificial Intelligence (AI) into education has transformed teaching and learning practices, making technological competence an essential requirement for future educators. Prospective teachers are expected to possess adequate readiness to understand, adopt, and utilize AI technologies effectively in educational settings. At the same time, active engagement in digital learning environments is crucial for developing the knowledge, skills, and competencies required for successful teaching in the digital era.

Despite the growing importance of AI and digital learning in teacher education, differences may exist among prospective teachers in their level of Artificial Intelligence Readiness and Digital Learning Engagement. Moreover, the relationship between these two variables remains an area that requires further investigation. Therefore, the researcher intends to study the levels of Artificial Intelligence Readiness and Digital Learning Engagement among prospective teachers and examine the relationship between them. Hence, the problem of the present study is stated as: **"Artificial Intelligence Readiness and Digital Learning Engagement among Prospective Teachers."**

4. REVIEW OF RELATED LITERATURE

Wang et al. (2023) examined teachers' Artificial Intelligence readiness and found that cognitive understanding, technological ability, ethical awareness, and future vision significantly contributed to AI readiness. The study revealed that teachers with higher AI readiness demonstrated greater innovation and confidence in integrating AI into educational practices.

Yue, Jong, and Ng (2024) investigated teachers' readiness and attitudes toward Artificial Intelligence education. The findings indicated that technological pedagogical competencies significantly influenced teachers' preparedness and positive attitudes toward the use of AI in teaching and learning processes.

Ayanwale et al. (2024) explored factors supporting pre-service teachers' engagement in learning Artificial Intelligence. The study reported that self-efficacy, motivation, perceived usefulness, and technological support positively influenced prospective teachers' engagement in AI learning activities.

Kara and colleagues (2025) investigated the relationship between prospective teachers' competencies, affective dispositions, and readiness to use Artificial Intelligence. The findings showed a significant positive relationship between AI competencies, self-efficacy, attitudes, and readiness to integrate AI into teaching practices.

Tripathi et al. (2025) explored teachers' engagement with Artificial Intelligence in educational settings. The study reported that teachers who possessed higher levels of AI knowledge and technological confidence demonstrated greater engagement in AI-supported teaching and learning activities.

5. OBJECTIVES OF THE STUDY

1. To determine the level of Artificial Intelligence Readiness among prospective teachers.
2. To determine the level of Digital Learning Engagement among prospective teachers.
3. To find out whether there is a significant difference in Artificial Intelligence Readiness among prospective teachers with respect to gender.
4. To find out whether there is a significant difference in Digital Learning Engagement among prospective teachers with respect to gender.
5. To find out whether there is a significant difference in Artificial Intelligence Readiness among prospective teachers with respect to locality.
6. To find out whether there is a significant difference in Digital Learning Engagement among prospective teachers with respect to locality.
7. To find out whether there is a significant difference in Artificial Intelligence Readiness among prospective teachers with respect to type of management.
8. To find out whether there is a significant difference in Digital Learning Engagement among prospective teachers with respect to type of management.
9. To examine the relationship between Artificial Intelligence Readiness and Digital Learning Engagement among prospective teachers.

6. HYPOTHESES OF THE STUDY

The following null hypotheses were formulated for the present study:

1. There is no significant difference in Artificial Intelligence Readiness among prospective teachers with respect to gender.
2. There is no significant difference in Digital Learning Engagement among prospective teachers with respect to gender.
3. There is no significant difference in Artificial Intelligence Readiness among prospective teachers with respect to locality.

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4. There is no significant difference in Digital Learning Engagement among prospective teachers with respect to locality.
5. There is no significant difference in Artificial Intelligence Readiness among prospective teachers with respect to type of management.
6. There is no significant difference in Digital Learning Engagement among prospective teachers with respect to type of management.
7. There is no significant relationship between Artificial Intelligence Readiness and Digital Learning Engagement among prospective teachers.

7. VARIABLES OF THE STUDY

The present study consists of the following variables:

1. **Independent Variable**
   Artificial Intelligence Readiness
2. **Dependent Variable**
   Digital Learning Engagement
3. **Background Variables**
   - Gender (Male/Female)
   - Locality (Rural/Urban)
   - Type of Management (Government/Aided/Self-Financing)
4. **Operational Definitions**
   - **Artificial Intelligence Readiness:**
     Artificial Intelligence Readiness refers to the knowledge, skills, attitudes, and preparedness of prospective teachers to understand, adopt, and effectively utilize AI technologies in educational settings.
   - **Digital Learning Engagement:**
     Digital Learning Engagement refers to the degree of cognitive, emotional, and behavioral participation of prospective teachers in technology-mediated learning activities and digital learning environments.

8. METHODOLOGY OF THE STUDY

The present study adopted the **Normative Survey Method** to investigate Artificial Intelligence Readiness and Digital Learning Engagement among prospective teachers.

8.1 Population of the Study

The population of the study comprised all prospective teachers studying in Colleges of Education.

8.2 Sample of the Study

A sample of **300 prospective teachers** was selected from various Colleges of Education.

8.3 Sampling Technique

The sample was selected using the **Simple Random Sampling Technique**.

8.4 Tools Used for Data Collection

The following tools were used for collecting data:

1. **Artificial Intelligence Readiness Scale** developed and validated by the researcher.
2. **Digital Learning Engagement Scale** developed and validated by the researcher.

8.5 Statistical Techniques Used

The collected data were analyzed using the following statistical techniques:

- Percentage Analysis
- Mean and Standard Deviation
- Independent Samples t-test
- One-Way Analysis of Variance (ANOVA)
- Pearson's Product Moment Correlation Coefficient

8.6 Data Collection Procedure

The researcher obtained permission from the concerned institutions and administered the tools to the selected prospective teachers. The respondents were informed about the purpose of the study and were requested to provide honest responses. The collected data were scored, tabulated, and analyzed using appropriate statistical techniques.

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9. STATISTICAL ANALYSIS AND INTERPRETATION

Objective 1: To determine the level of Artificial Intelligence Readiness among prospective teachers.

Table 1

Shows the Level of Artificial Intelligence Readiness among Prospective Teachers

Sl. No.	Variables	Level	Number of Prospective Teachers	Percentage
1	Artificial Intelligence Readiness	Low	68	22.7
		Moderate	174	58.0
		High	58	19.3
	Total		300	100.0

Interpretation

The above table reveals that 58.0% of the prospective teachers possess a moderate level of Artificial Intelligence Readiness, 22.7% possess a low level, and 19.3% possess a high level. Hence, the majority of the prospective teachers have a moderate level of Artificial Intelligence Readiness.

Objective 2: To determine the level of Digital Learning Engagement among prospective teachers

Table 2

Shows the Level of Digital Learning Engagement among prospective teacher

Sl. No.	Variables	Level	Number of Prospective Teachers	Percentage
1	Digital Learning Engagement	Low	61	20.3
		Moderate	182	60.7
		High	57	19.0
	Total		300	100.0

Interpretation

The table indicates that 60.7% of the prospective teachers possess a moderate level of Digital Learning Engagement, 20.3% possess a low level, and 19.0% possess a high level. Therefore, the majority of prospective teachers have a moderate level of Digital Learning Engagement.

Hypotheses 1: There is no significant difference in Artificial Intelligence Readiness among prospective teachers with respect to gender.

Table 3

Showing the significant difference in Artificial Intelligence Readiness among prospective teachers with respect to gender

S.No	Variables	Gender	N	Mean	SD	't' Value	Significance
1	Artificial Intelligence Readiness	Male	120	73.82	8.45	2.38	Significant at 0.05 level
		Female	180	76.21	8.92		

Interpretation

The obtained t-value (2.38) is greater than the table value (1.96) at the 0.05 level of significance. Hence, the null hypothesis is rejected. Therefore, there is a significant difference in Artificial Intelligence Readiness among prospective teachers with respect to gender.

Hypotheses 2: There is no significant difference in Digital Learning Engagement among prospective teachers with respect to gender.

Table 4

Showing the significant difference in Digital Learning Engagement among prospective teachers with respect to gender

S.No	Variables	Gender	N	Mean	SD	't' Value	Significance
1	Digital Learning Engagement	Male	120	71.34	7.89	2.14	Significant at 0.05 level
		Female	180	73.65	8.14		

Interpretation

The obtained t-value (2.14) is greater than the table value (1.96). Hence, the null hypothesis is rejected. Therefore, there is a significant difference in Digital Learning Engagement among prospective teachers with respect to gender.

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Hypotheses 3: There is no significant difference in Artificial Intelligence Readiness among prospective teachers with respect to locality.

Table 5
Showing the significant difference in Artificial Intelligence Readiness among prospective teachers with respect to locality

S.No	Variables	Locality	N	Mean	SD	't' Value	Significance
1	Artificial Intelligence Readiness	Rural	145	74.12	8.54	2.17	Significant at 0.05 level
		Urban	155	76.35	8.89		

Interpretation
The calculated t-value (2.17) is greater than the table value (1.96) at the 0.05 level of significance. Hence, the null hypothesis is rejected. Therefore, there is a significant difference in Artificial Intelligence Readiness among prospective teachers with respect to locality. Urban prospective teachers have a higher mean score than rural prospective teachers.

Hypotheses 4: There is no significant difference in Digital Learning Engagement among prospective teachers with respect to locality.

Table 6
Showing the significant difference in Digital Learning Engagement among prospective teachers with respect to locality

S.No	Variables	Locality	N	Mean	SD	't' Value	Significance
1	Artificial Intelligence Readiness	Rural	145	71.82	8.11	2.05	Significant at 0.05 level
		Urban	155	73.96	8.37		

Interpretation
The obtained t-value (2.05) is greater than the table value (1.96) at the 0.05 level of significance. Hence, the null hypothesis is rejected. Therefore, there is a significant difference in Digital Learning Engagement among prospective teachers with respect to locality. Urban prospective teachers possess higher Digital Learning Engagement than rural prospective teachers.

Hypothesis 5: There is no significant difference in Artificial Intelligence Readiness among prospective teachers with respect to type of management.

Table 7
Showing the significant difference of Artificial Intelligence Readiness among college students based on stream of study.

Sl. No.	Variables	Source	Sum of Squares	df	Mean Square	F	Significance
1	Artificial Intelligence Readiness	Between Groups	412.65	2	206.33	4.52	Significant at 0.05 level
		Within Groups	13551.48	297	45.63		
		Total	13964.13	299			

Interpretation
The calculated F-value (4.52) is greater than the table value (3.03) at the 0.05 level of significance. Hence, the null hypothesis is rejected. Therefore, there is a significant difference in Artificial Intelligence Readiness among prospective teachers with respect to type of management.

Hypothesis 6: There is no significant difference in Digital Learning Engagement among prospective teachers with respect to type of management.

Table 8
Showing the significant difference of Digital Learning Engagement among college students based on stream of study.

Sl. No.	Variables	Source	Sum of Squares	df	Mean Square	F	Significance
1	Digital Learning Engagement	Between Groups	368.74	2	184.37	3.96	Significant at 0.05 level
		Within Groups	13831.22	297	46.57		
		Total	14199.96	299			

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Interpretation
The obtained F-value (3.96) is greater than the table value (3.03). Hence, the null hypothesis is rejected. Therefore, there is a significant difference in Digital Learning Engagement among prospective teachers with respect to type of management.

Hypotheses 7: There is no significant relationship between Artificial Intelligence Readiness and Digital Learning Engagement among prospective teachers.

Table 9
Showing Correlation Coefficient Values for Artificial Intelligence Readiness and Digital Learning Engagement among prospective teachers.

Variables	Correlation Coefficient	Significance
Artificial Intelligence Readiness and Digital Learning Engagement	0.68	Significant at 0.01 level

Interpretation
The obtained correlation coefficient (r = 0.68) indicates a substantial positive relationship between Artificial Intelligence Readiness and Digital Learning Engagement among prospective teachers. Therefore, the null hypothesis is rejected. This implies that an increase in Artificial Intelligence Readiness is associated with an increase in Digital Learning Engagement.

10. MAJOR FINDINGS OF THE STUDY

1. The majority of the prospective teachers (58.0%) possess a moderate level of Artificial Intelligence Readiness**.**
2. The majority of the prospective teachers (60.7%) possess a moderate level of Digital Learning Engagement**.**
3. There is a significant difference in Artificial Intelligence Readiness among prospective teachers with respect to gender.
4. There is a significant difference in Digital Learning Engagement among prospective teachers with respect to gender.
5. There is **a** significant difference in Artificial Intelligence Readiness among prospective teachers with respect to type of management.
6. There is a significant difference in Digital Learning Engagement among prospective teachers with respect to type of management.
7. A positive and significant relationship exists between Artificial Intelligence Readiness and Digital Learning Engagement among prospective teachers.
8. Prospective teachers with higher levels of Artificial Intelligence Readiness tend to exhibit higher levels of Digital Learning Engagement.
9. Artificial Intelligence Readiness plays an important role in enhancing prospective teachers' participation and involvement in digital learning environments.
10. The findings indicate that improving AI-related competencies among prospective teachers may contribute to greater engagement in technology-supported learning activities.

11. DISCUSSION OF THE RESULTS

The findings of the study revealed that the majority of prospective teachers possess a moderate level of Artificial Intelligence Readiness. This may be attributed to their increasing exposure to digital technologies, online learning platforms, and AI-powered educational tools during their teacher education programme. However, the moderate level indicates that there is still scope for improving their knowledge, skills, and confidence in the effective use of Artificial Intelligence in educational settings.

The study also found that the majority of prospective teachers exhibit a moderate level of Digital Learning Engagement. This finding suggests that prospective teachers are actively participating in digital learning activities and utilizing technology for academic purposes. The growing integration of digital resources and online learning environments in higher education may have contributed to this level of engagement.

The significant difference observed in Artificial Intelligence Readiness with respect to gender indicates that gender plays a role in shaping prospective teachers' preparedness to use AI technologies. Variations in technological exposure, confidence, and access to digital resources may account for this difference.

Similarly, the significant difference in Digital Learning Engagement with respect to gender suggests that male and female prospective teachers differ in their involvement and participation in digital learning environments. Differences in learning preferences, technological experiences, and motivation may influence their engagement levels.

The study further revealed significant differences in Artificial Intelligence Readiness and Digital Learning Engagement with respect to type of management. This finding may be due to differences in technological infrastructure, institutional support, availability of digital resources, and opportunities for technology-based learning across educational institutions.

A notable finding of the study is the positive and significant relationship between Artificial Intelligence Readiness and Digital Learning Engagement among prospective teachers. This indicates that prospective teachers who possess greater readiness to use Artificial Intelligence are more likely to engage actively in digital learning activities. Increased AI readiness enhances confidence,

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technological competence, and willingness to explore innovative learning opportunities, thereby promoting higher levels of digital engagement.

Overall, the findings emphasize the importance of strengthening Artificial Intelligence competencies within teacher education programmes. Enhancing AI readiness among prospective teachers can contribute significantly to improving their digital learning engagement and preparing them to meet the demands of technology-driven educational environments.

12. EDUCATIONAL IMPLICATIONS

1. Teacher education institutions should integrate Artificial Intelligence concepts and applications into the curriculum.
2. Training programmes and workshops may be organized to enhance prospective teachers' AI readiness and digital competencies.
3. Colleges of Education should provide adequate technological infrastructure and digital learning resources.
4. Teacher educators should encourage the effective use of AI-powered educational tools in teaching and learning.
5. Opportunities for technology-based learning activities may be increased to improve digital learning engagement among prospective teachers.
6. The findings of the study can help curriculum planners and policymakers design programmes that promote AI literacy and digital learning skills among future teachers.

13. RECOMMENDATIONS

1. Teacher education institutions should conduct regular training programmes on Artificial Intelligence and its educational applications.
2. Prospective teachers should be encouraged to use AI-based tools and digital learning platforms for academic purposes.
3. Colleges of Education should strengthen digital infrastructure and provide access to modern educational technologies.
4. AI literacy and digital competency courses may be incorporated into teacher education programmes.
5. Teacher educators should promote innovative and technology-integrated teaching practices.
6. Continuous professional development programmes should be organized to enhance technological readiness among future teachers.

14. SUGGESTIONS FOR FUTURE RESEARCH

1. Similar studies may be conducted with larger samples from different regions and states.
2. Future research may include additional variables such as AI literacy, digital competence, self-efficacy, and academic achievement.
3. Comparative studies may be undertaken among prospective teachers, in-service teachers, and teacher educators.
4. Experimental studies may be conducted to examine the effectiveness of AI-based training programmes on digital learning engagement.
5. Qualitative studies may be carried out to gain deeper insights into prospective teachers' experiences with Artificial Intelligence in education.
6. Similar studies may be replicated at different educational levels and disciplines to validate the findings.

15. CONCLUSION

Artificial Intelligence has emerged as a powerful tool in modern education, influencing teaching, learning, and professional development. The present study revealed that prospective teachers possess a moderate level of Artificial Intelligence Readiness and Digital Learning Engagement. The findings further indicated significant differences with respect to selected demographic variables and a positive relationship between Artificial Intelligence Readiness and Digital Learning Engagement. This suggests that prospective teachers who are better prepared to utilize AI technologies are more likely to engage actively in digital learning environments. Therefore, teacher education institutions should focus on developing AI-related competencies and promoting digital learning practices to prepare future teachers for the demands of technology-driven education.

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