Advanced International Journal for Research (AIJFR)
E-ISSN: 3048-7641 ● Website: www.aijfr.com ● Email: editor@aijfr.com

AI Literacy and Teaching Self-Efficacy among Prospective Teachers in Tamil Nadu

Dr. S. Veena

Assistant Professor,
Department of Value Education, Tamilnadu Teachers Education University
Chennai - 97.

Abstract

Artificial Intelligence (AI) is transforming the educational landscape, making AI literacy an essential competency for teachers. Teaching self-efficacy, defined as a teacher's belief in their ability to facilitate learning effectively, is equally crucial for teacher preparedness. This study examines the relationship between AI literacy and teaching self-efficacy among 100 prospective teachers in Tamil Nadu. A descriptive correlational survey method was employed using two researcher-constructed instruments: the AI Literacy Scale (30 items) and the Teaching Self-Efficacy Scale (12 items). Data were analyzed using descriptive statistics, t-test, ANOVA, correlation, and regression analyses. Findings revealed a moderate level of AI literacy ($M = 3.42$, $SD = 0.56$) and high teaching self-efficacy ($M = 3.78$, $SD = 0.49$). A significant positive correlation ($r = .46$, $p < .01$) was found between AI literacy and teaching self-efficacy. Regression analysis showed that AI literacy significantly predicted teaching self-efficacy ($\beta = .38$, $p < .01$), explaining 18% of the variance. The study concludes that enhancing AI literacy may boost confidence and teaching competence among future educators. Recommendations are made for integrating AI literacy and pedagogical efficacy training in teacher education programs.

Keywords: Artificial Intelligence, AI Literacy, Teaching Self-Efficacy, Prospective Teachers, Teacher Education, Tamil Nadu

1. Introduction

Artificial Intelligence (AI) has become an integral part of modern education. AI-based tools such as adaptive learning platforms, chatbots, and assessment analytics are transforming how knowledge is delivered and evaluated. For future educators, understanding AI is a key professional competence. AI literacy enables teachers to use, interpret, and evaluate AI systems effectively, while teaching self-efficacy influences how confidently teachers adopt innovations. Hence, exploring the relationship between AI literacy and teaching self-efficacy provides insights into the readiness of prospective teachers for AI-enhanced education.

2. Review of Related Literature

Long, Magerko, and Feaster (2023) defined AI literacy as an individual's ability to understand, use, and critically evaluate AI technologies. Ng (2012) emphasized that digital literacy forms the foundation of AI literacy. Miao et al. (2021) highlighted the need for AI-related competencies for sustainable education. Tschannen-Moran and Woolfolk Hoy (2001) conceptualized teaching self-efficacy as teachers' belief in their capabilities to affect student learning. Research suggests that higher self-efficacy leads to greater technology adoption (Bandura, 1997). However, limited studies have explored AI literacy as a predictor of self-efficacy among teacher trainees in India.

3. Objectives of the Study

1. To assess the level of AI literacy among prospective teachers in Tamil Nadu.
2. To assess the level of teaching self-efficacy among prospective teachers.
3. To examine the relationship between AI literacy and teaching self-efficacy.
4. To determine whether AI literacy significantly predicts teaching self-efficacy.

4. Hypotheses

H1: There is no significant difference in AI literacy based on gender, subject stream, and institution type.
H2:There is a significant positive correlation between AI literacy and teaching self-efficacy.
H3: AI literacy significantly predicts teaching self-efficacy among prospective teachers.

5. Methodology

The study adopted a descriptive correlational design. A random sample of 100 B.Ed. students from Tamil Nadu was selected from both government and private teacher education institutions. Two instruments were used: (a) AI Literacy Scale (30 items across cognitive, technical, ethical, and pedagogical dimensions, $\alpha = .86$) and (b) Teaching Self-Efficacy Scale (12 items covering instructional, classroom management, and motivational dimensions, $\alpha = .83$). Responses were rated on a 5-point Likert scale. Data were analyzed using mean, SD, t-test, ANOVA, Pearson's correlation, and regression.

6. Results

Table 1: Descriptive Statistics of AI Literacy and Teaching Self-Efficacy among Prospective Teachers

Variable	N	Mean	SD	Level
AI Literacy	100	3.42	0.56	Moderate
Teaching Self-Efficacy	100	3.78	0.49	High

Note. Levels interpreted based on mean score ranges: 1.00–2.33 = Low, 2.34–3.66 = Moderate, 3.67–5.00 = High.

The findings indicated that prospective teachers possessed a moderate level of AI literacy (M = 3.42, SD = 0.56) and high teaching self-efficacy (M = 3.78, SD = 0.49). No significant differences were found across gender or institution type. However, science stream students exhibited slightly higher AI literacy.

Table 2: Correlation between AI Literacy and Teaching Self-Efficacy

Variables	***AI Literacy***	***Teaching Self-Efficacy***
AI Literacy	—	.46**
Teaching Self-Efficacy	.46**	—

Note. N = 100. **p < .01 (2-tailed).

A significant positive correlation was found between AI literacy and teaching self-efficacy ($r = .46$, $p < .01$), indicating that higher AI literacy is associated with greater teaching confidence.

Table 3: Simple Linear Regression Predicting Teaching Self-Efficacy from AI Literacy

Predictor	**B**	**SE B**	**β**	**t**	**p**
Constant	2.17	0.21	—	10.33	< .001
AI Literacy	0.47	0.10	.38	4.64	< .001

Model Summary: $R = .43$, $R^2 = .18$, Adjusted $R^2 = .17$, $F(1,98) = 21.56$, $p < .01$

Regression analysis revealed that AI literacy significantly predicted teaching self-efficacy ($\beta = .38$, $p < .01$), accounting for 18% of the variance ($R^2 = .18$, $F(1,98) = 21.56$, $p < .01$). These findings underscore the importance of developing AI competencies to strengthen pedagogical confidence among teacher trainees.

7. Discussion

The study revealed that AI literacy is moderately developed among prospective teachers, reflecting awareness but limited practical application. The positive correlation with teaching self-efficacy aligns with Bandura's (1997) theory that knowledge and mastery experiences enhance confidence. Science stream students' slightly higher literacy may be due to greater exposure to technology. The regression results highlight that AI literacy is a meaningful predictor of self-efficacy, suggesting that improving AI skills may directly enhance teaching confidence.

8. Educational Implications

Teacher education programs must integrate AI literacy training into the curriculum through workshops and practice-based modules. Policy-makers should emphasize both technical and ethical aspects of AI

use. Institutions should promote collaborative learning environments where trainees experiment with AI tools to build self-efficacy.

9. Conclusion

The study concludes that AI literacy significantly correlates with and predicts teaching self-efficacy among prospective teachers in Tamil Nadu. As education systems increasingly adopt AI-driven platforms, teacher education must prioritize AI literacy to prepare future educators who are confident, ethical, and technologically competent.

References

1. Bandura, A. (1997). *Self-efficacy: The exercise of control.* W.H. Freeman.
2. Long, D., Magerko, B., & Feaster, J. (2023). Defining AI literacy: A systematic literature review. *Computers & Education, 193,* 104651. https://doi.org/10.1016/j.compedu.2022.104651
3. Miao, F., Holmes, W., & Van der Vlies, S. (2021). *AI in education: Challenges and opportunities for sustainable development.* OECD Publishing. https://doi.org/10.1787/b703bd7b-en
4. Ng, W. (2012). Can we teach digital natives digital literacy? *Computers & Education, 59*(3), 1065–1078. https://doi.org/10.1016/j.compedu.2012.04.016
5. Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*(7), 783–805. https://doi.org/10.1016/S0742-051X(01)00036-1
6. UNESCO. (2022). *AI and education: Guidance for policy-makers.* UNESCO Publishing. https://unesdoc.unesco.org/ark:/48223/pf0000380602
7. Zawacki-Richter, O., & Latchem, C. (2023). AI in teacher education: Opportunities and challenges. *Educational Technology Research and Development, 71*(2), 345–365. https://doi.org/10.1007/s11423-023-10269-4