

AWARENESS, ATTITUDES AND PERCEPTIONS OF TEACHER EDUCATORS AND PUPIL TEACHERS TOWARD ARTIFICIAL INTELLIGENCE IN TEACHER EDUCATION: A STUDY IN KOLKATA, WEST BENGAL

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Abstract: This study investigates the extent to which teacher educators and pupil teachers at Teacher Education Institutions (TEIs) in Kolkata are aware of, feel about, and perceive AI in teacher education. The study adopted a quantitative survey method, using three self-developed, validated questionnaires administered to 200 respondents selected through simple random sampling from government, government-aided, and private TEIs. Descriptive statistics, *t*-test, ANOVA, and correlation were used for data analysis. Findings revealed moderate awareness, positive attitudes, and balanced perceptions towards AI among both teacher educators and pupil teachers. No significant differences were found across designation and academic stream; however, the type of institution significantly influenced awareness and perceptions, with private institutions scoring relatively lower than government and government-aided ones. Respondents generally viewed AI as a supportive tool rather than a replacement for teachers, emphasizing the irreplaceable human qualities of empathy, judgment, and emotional connection in teaching. Positive correlations among awareness, attitudes, and perceptions further indicated that greater AI awareness was associated with more positive attitudes and perceptions towards AI in pedagogical contexts. The study concludes that systematic AI training, improved digital infrastructure, and ethical guidelines are essential for meaningful AI integration in teacher education.

Keywords: *Awareness, Attitude, Perception, Teacher Educators, Pupil Teachers, Artificial Intelligence (AI), Teacher Education*

INTRODUCTION

The rapid advancement of Artificial Intelligence (AI) has brought significant changes across various sectors, and education is no exception. In recent years, AI has increasingly transformed education through applications such as virtual classrooms, personalised learning, and AI-based assessment. This raises an important question: will AI replace teachers or serve as a tool to enhance their roles? (Mundra & Kataria, 2024). This issue is particularly relevant to Teacher Education Institutions (TEIs) in Kolkata, West Bengal, which are expected to prepare pupil teachers and teacher educators to respond effectively to the opportunities and challenges of AI in teaching and learning (Jamal, 2023). While AI can support lesson planning, teaching, assessment, and personalised learning, human qualities such as empathy, creativity, moral reasoning, and interpersonal connection remain essential to teaching (Chan & Tsi, 2023). Understanding the familiarity, readiness, and pedagogical viewpoints of teacher educators and pupil teachers is therefore important for developing appropriate curricula, training, and policies for the responsible integration of AI in teacher education.

REVIEW OF RELATED LITERATURE

Existing studies have explored how teachers and students understand, respond to, and perceive the growing use

of Artificial Intelligence (AI) in education. Dorongon and Sarmiento (2025) found that teachers in the Philippines had positive attitudes and awareness of AI but faced limitations due to inadequate training, digital skills, and institutional support. Çayak (2024) reported positive attitudes among public school teachers in Istanbul, with higher AI literacy associated with greater acceptance and adoption of AI. Uygun (2024) found that teachers viewed AI as useful for personalized learning and knowledge management but expressed concerns about ethical and privacy issues, reduced emotional connection, and learner passivity.

Fitria (2023), Chan and Tsi (2023), and Mundra and Kataria (2024) similarly concluded that AI can support teaching but cannot replace teachers' essential human qualities, including empathy, creativity, critical thinking, moral reasoning, and emotional support. Jamal (2023) highlighted AI's potential in teacher education to provide access to quality resources and professional development while noting ethical, technical, social, and legal challenges. Kumar and Raman (2022) found that students recognized AI's usefulness in teaching-learning and administration but opposed its use in sensitive areas such as admission and examinations. Mandal and Mete (2023) surveyed teachers' and students' perceptions toward integrating AI into the school curriculum among CBSE classes IX–X in West Bengal and reported positive perceptions among students and cautious acceptance among teachers, particularly regarding assessment, training, and ethical concerns, making it especially relevant to the present study.

Despite growing discussions on AI in education, its integration in teacher education remains limited and underexplored in Kolkata, West Bengal, creating a significant research gap.

OBJECTIVES OF THE STUDY

1. To compare the awareness of Artificial Intelligence (AI) tools in teacher education among respondents with respect to their designation, type of institution, and academic stream.
2. To compare the attitudes of respondents towards the integration of AI in teaching–learning processes with respect to designation, type of institution, and academic stream.
3. To compare the perceptions of respondents regarding the potentiality of AI to replace or support human educators with respect to designation, type of institution, and academic stream.
4. To assess the relationship among awareness of AI tools in teacher education, attitudes towards the integration of AI in teaching–learning processes, and perceptions regarding the potentiality of AI to replace or support human educators.

HYPOTHESES

H₀₁: There is no significant difference between the pupil teachers and teacher educators in their awareness of Artificial Intelligence (AI) tools in teacher education.

H₀₂: There is no significant difference among the respondents of government, government-aided, and private teacher education institutions in their awareness of Artificial Intelligence (AI) tools in teacher education.

H₀₃: There is no significant difference between the respondents of arts and science streams in their awareness of Artificial Intelligence (AI) tools in teacher education.

H₀₄: There is no significant difference between the pupil teachers and teacher educators in their attitudes toward integrating AI into teaching-learning processes.

H₀₅: There is no significant difference among the respondents of government, government-aided, and private teacher education institutions in their attitudes toward integrating AI into teaching-learning processes.

H₀₆: There is no significant difference between the respondents of arts and science streams in their attitudes toward integrating AI into teaching-learning processes.

H₀₇: There is no significant difference between the pupil teachers and teacher educators in their perceptions regarding the potentiality of AI to replace or support human educators.

H₀₈: There is no significant difference among the respondents of government, government-aided, and private teacher education institutions in their perceptions regarding the potentiality of AI to replace or support human educators.

H₀₉: There is no significant difference between the respondents of arts and science streams in their perceptions regarding the potentiality of AI to replace or support human educators.

H₀₁₀: There is no significant relationship between awareness of Artificial Intelligence (AI) tools in teacher education and attitudes toward integrating AI into teaching-learning processes.

H₀₁₁: There is no significant relationship between attitudes towards the integration of AI in teaching-learning processes and perceptions regarding the potentiality of AI to replace or support human educators.

H₀₁₂: There is no significant relationship between awareness of Artificial Intelligence (AI) tools in teacher education and perceptions regarding the potentiality of AI to replace or support human educators.

SIGNIFICANCE OF THE STUDY

The present study provides an understanding of the awareness, attitudes, and perceptions of teacher educators and pupil teachers towards AI in teacher education. Its findings may help TEIs identify the need for AI literacy, training, digital infrastructure, and ethical guidelines for responsible AI use. The study may also assist teacher educators and pupil teachers in understanding AI as a supportive tool while recognising the continuing importance of human qualities in teaching. Furthermore, the findings may be useful to curriculum planners and policymakers in developing appropriate strategies for meaningful AI integration in teacher education, particularly in the context of Kolkata, West Bengal.

DELIMITATIONS

The study was delimited to the following:

- **Area and Institutions:** Selected TEIs in Kolkata district only, excluding all other districts and higher education institutions.
- **Sample:** 200 respondents, selected through simple random sampling.
- **Variables:** Focused on awareness, attitudes, and perceptions regarding AI in teacher education.
- **Design:** Restricted to a quantitative survey design.
- **Time:** 2024–2025 academic session.

RESEARCH METHODOLOGY

Research Design: The present research adopted a quantitative research approach using a questionnaire survey method.

Sample & Sampling Technique: The sample for the study consisted of a total number of 200 respondents selected through simple random sampling from the target population. The classification of the sample is presented below-

Table 1 - Classification of Samples According to Designation

Designation	Number of Respondents
Pupil Teachers	170
Teacher Educators	30
Total	200

Table 2 - Classification of Samples According to Type of Institution

Type of Institution	Number of Respondents
Government	100
Government-aided	40
Private	60
Total	200

Table 3 - Classification of Samples According to Academic Stream

Academic Stream	Number of Respondents
Arts	128
Science	72
Total	200

Variables: The following are the key variables of the study-

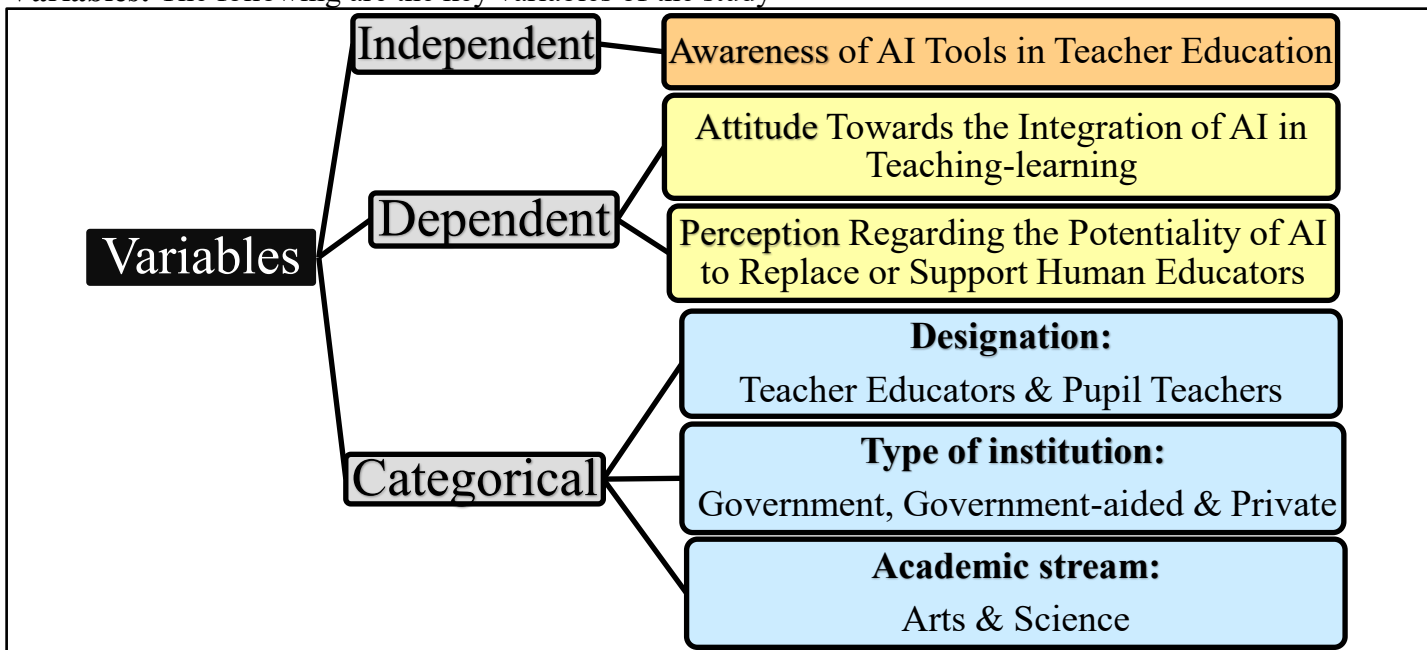


Fig 1: Variables of the Study

Tools for Data Collection: Three self-developed, structured questionnaires—Awareness, Attitude, and Perception Scales were used as the primary tools. Developed through an extensive literature review and validated by experts, each scale comprised 20 items rated on a 5-point Likert scale from Strongly Disagree (1) to Strongly Agree (5). **Cronbach's Alpha** was used to assess the reliability using IBM SPSS 23.00. The specifications are as follows:

Table 4 - Reliability Statistics of Awareness, Attitude & Perception Scale		
Scale	Cronbach's Alpha	N of Items
Awareness of AI Tools in Teacher Education	.843	20
Attitudes Toward Integrating AI into Teaching-Learning	.847	20
Perceptions Regarding the Potentiality of AI to Replace or Support Human Educators	.716	20

All three tools demonstrated reliability coefficients above 0.70, confirming their internal consistency and suitability for data collection and analysis.

Tools for Data Analysis: Collected data were coded using MS Excel 2019 and analyzed using IBM SPSS Statistics 23.00. Descriptive statistics were used to assess normality, while the independent-samples *t*-test, one-way ANOVA, and Pearson's correlation were used to examine differences and relationships at the 0.05 significance level.

DATA ANALYSIS AND INTERPRETATION

Test of Normality and Hypothesis Testing

I. Normality of Awareness of AI Tools in Teacher Education w.r.t. Designation

Table 5: Descriptive Statistics of Awareness Scores w.r.t. Designation										
Designation	N	Mean	Std. Error	Median	Variance	Std. Dev.	Skewness	Std. Error	Kurtosis	Std. Error
Pupil Teacher	170	78.629	0.613	79.000	63.880	7.992	-0.166	0.186	-0.565	0.370
Teacher Educator	30	78.133	2.067	76.500	128.189	11.322	0.054	0.427	-0.983	0.833

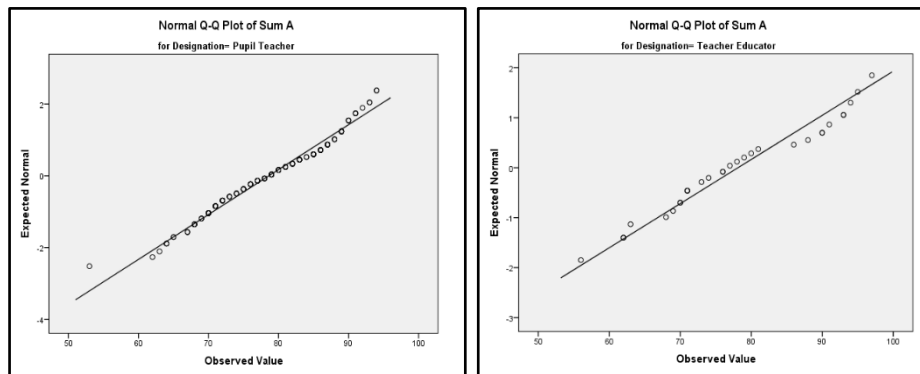


Fig 2 - Normal Q-Q Plots Showing Awareness Scores w.r.t. Designation

The descriptive statistics (Table 5) of Awareness scores w.r.t. designation & Q-Q plots (Fig. 2) indicate that the score distribution tends toward normality, satisfying the assumption for parametric tests such as the independent samples *t*-test.

Testing of H_{01}

Table 6 - Independent Samples Test Between the Groups (Pupil Teacher & Teacher Educator)

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference
Sum A	Equal variances not assumed	8.813	.003	.230	34.279	.819	.496078

- Table 6 shows that $F = 8.813$ with an associated significance value of $p = .003$, since $p < 0.05$, we reject the assumption that the variances are equal. Therefore, the row “Equal variances not assumed” is used for interpretation.
- The *t*-test for Equality of Means between the two groups yielded $t(34.279) = 0.230$, and its associated significance value is $p = .819$ (that means, $p > 0.05$). Thus, the *t*-value is not significant at the 0.05 level, and the study **fails to reject the stated null hypothesis**. Therefore, there is no significant difference between teacher educators and pupil teachers in their Awareness of AI tools in teacher education.

II. Normality of Awareness of AI Tools in Teacher Education w.r.t. Type of Institution

Table 7: Descriptive Statistics of Awareness Scores w.r.t. Type of Institution

Type of Institution	N	Mean	Std. Error	Median	Variance	Std. Dev.	Skewness	Std. Error	Kurtosis	Std. Error
Government	100	79.760	0.797	80.000	63.598	7.975	-0.197	0.241	-1.092	0.478
Government-aided	40	79.600	1.169	79.000	54.656	7.393	0.060	0.374	-0.266	0.733
Private	60	75.850	1.242	75.500	92.604	9.623	0.203	0.309	-0.193	0.608

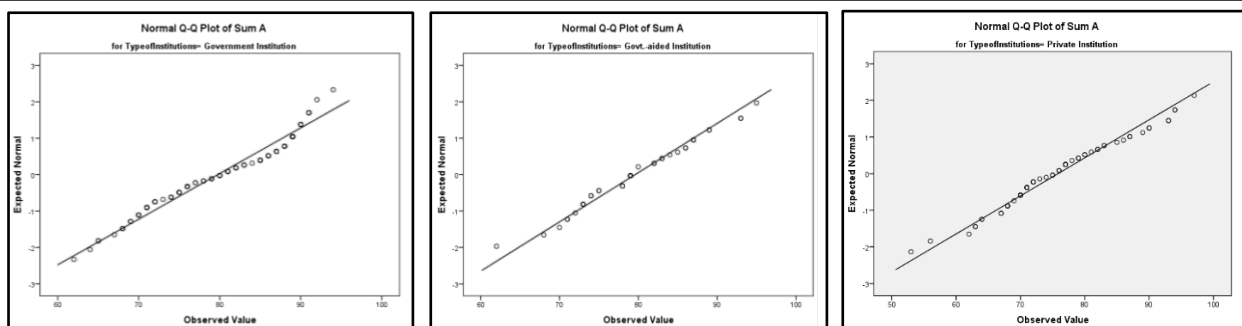


Fig 3 - Normal Q-Q Plots Showing Awareness Scores w.r.t. Type of Institution

The descriptive statistics & Q-Q plots (Table 7 & Fig 3) of Awareness scores w.r.t. type of institution exhibit an approximately normal distribution of data, allowing the use of parametric tests like one-way ANOVA.

Testing of H_0

Table 8 - ANOVA of Awareness Scores w.r.t. Type of Institution

Sum A					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	627.905	2	313.953	4.452	.013
Within Groups	13891.490	197	70.515		
Total	14519.395	199			

Table 9 - Multiple Comparisons of Awareness Scores w.r.t. Type of Institution

Dependent Variable: Sum A						
LSD						
(I) Type of Institutions	(J) Type of Institutions	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Government Institution	Govt.-aided Institution	.160000	1.570997	.919	-2.93813	3.25813
	Private Institution	3.910000*	1.371279	.005	1.20573	6.61427
Govt.-aided Institution	Government Institution	-.160000	1.570997	.919	-3.25813	2.93813
	Private Institution	3.750000*	1.714098	.030	.36966	7.13034
Private Institution	Government Institution	-3.910000*	1.371279	.005	-6.61427	-1.20573
	Govt.-aided Institution	-3.750000*	1.714098	.030	-7.13034	-.36966

*. The mean difference is significant at the 0.05 level.

- Table 8 shows the results of one-way ANOVA where the obtained value of $F(2, 197) = 4.452$, with a significance value $p = .013$. As $p < .05$ so, the ANOVA is significant. Thus, the study **rejects the null hypothesis** and concludes that there is a significant difference in Awareness of AI tools in teacher education across the three types of institutions. Post-hoc (Table 9) reveals that **Private institutions differ significantly** from both Government & Government-aided institutions, while Government & Government-aided do not differ significantly. Therefore, the type of institution plays a significant role in influencing awareness levels among the respondents.

III. Normality of Awareness of AI Tools in Teacher Education w.r.t. Academic Stream

Table 10: Descriptive Statistics of Awareness Scores w.r.t. Academic Stream

Academic Stream	N	Mean	Std. Error	Median	Variance	Std. Dev.	Skewness	Std. Error	Kurtosis	Std. Error
Arts	128	78.313	0.768	77.500	75.508	8.690	0.027	0.214	-0.600	0.425
Science	72	78.986	0.980	79.000	69.141	8.315	-0.401	0.283	-0.316	0.559

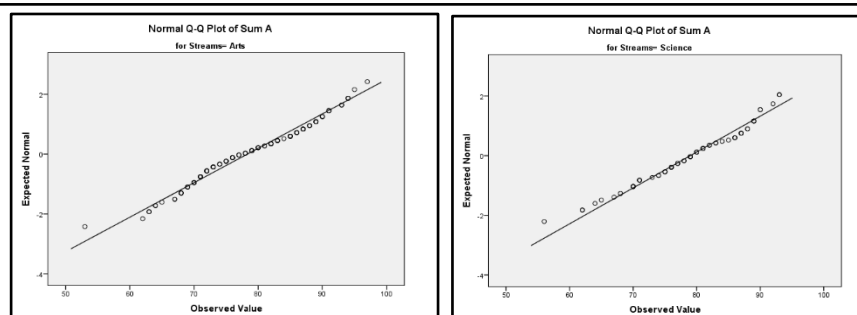


Fig 4 - Normal Q-Q Plots Showing Awareness Scores w.r.t. Academic Stream

The descriptive statistics (Table 10) & Q-Q plots (Fig 4) of Awareness scores w.r.t. academic stream meet the normality assumption, supporting the use of parametric tests like *t*-test.

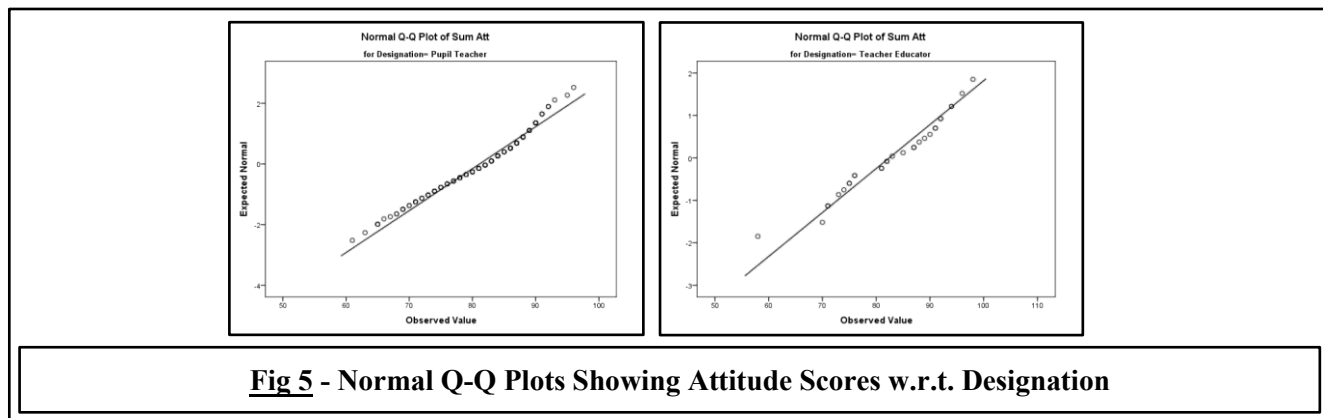
Testing of H₀₃

Table 11 - Independent Samples Test Between the Groups (Arts & Science)							
		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference
Sum A	Equal variances assumed	.909	.342	-.534	198	.594	-.673611

- Table 11 presents Levene's test and an independent samples *t*-test. Levene's test shows $F = 0.909$, $p = .342$ ($p > 0.05$), indicating that equal variances are assumed. The *t*-test shows $t_{(198)} = -0.534$, with a significance value $p = .594$ ($p > 0.05$). Since the *p*-value exceeds 0.05, the test is not significant. Hence, the study **fails to reject the null hypothesis**, concluding that the Arts and Science group **do not differ significantly** in their awareness of AI tools in teacher education.

IV. Normality of Attitudes Towards Integrating AI into Teaching-learning w.r.t. Designation

Table 12: Descriptive Statistics of Attitude Scores w.r.t. Designation										
Designation	N	Mean	Std. Error	Median	Variance	Std. Dev.	Skewness	Std. Error	Kurtosis	Std. Error
Pupil Teacher	170	81.118	0.554	82.000	52.223	7.227	-0.477	0.186	-0.402	0.370
Teacher Educator	30	82.433	1.763	82.500	93.289	9.659	-0.423	0.427	-0.330	0.833



The descriptive statistics (Table 12) & Q-Q plots (Fig 5) of Attitude scores were assessed for both groups, which showed symmetric distribution, allowing the use of parametric tests such as an independent-samples *t*-test for comparing the attitude scores.

Testing of H₀₄

Table 13 - Independent Samples Test Between the Groups (Pupil Teacher & Teacher Educator)							
		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference
Sum Att.	Equal variances not assumed	6.112	.014	-.712	34.954	.481	-1.315686

- Table 13 shows two subsequent tests. Firstly, Levene's test for equality of variances yields $F = 6.112$, $p = .014$ ($p < 0.05$). Therefore, equal variances are not assumed for the two groups.

Secondly, the t -test (equal variances not assumed) produces $t_{(34.954)} = -0.712$, $p = .481$ ($p > 0.05$). As the p -value is greater than 0.05, the test is not significant. Thus, the study **fails to reject the null hypothesis**, indicating no significant difference between teacher educators and pupil teachers in their attitudes toward integrating AI into teaching-learning processes.

V. Normality of Attitudes Towards Integrating AI into Teaching-learning w.r.t. Type of Institution

Table 14: Descriptive Statistics of Attitude Scores w.r.t. Type of Institution

Type of Institution	N	Mean	Std. Error	Median	Variance	Std. Dev.	Skewness	Std. Error	Kurtosis	Std. Error
Government	100	81.720	0.723	83.000	52.305	7.232	-0.419	0.241	-0.669	0.478
Government-aided	40	82.775	0.863	83.000	29.769	5.456	-0.248	0.374	-0.397	0.733
Private	60	79.667	1.185	80.000	84.260	9.179	-0.142	0.309	-0.556	0.608

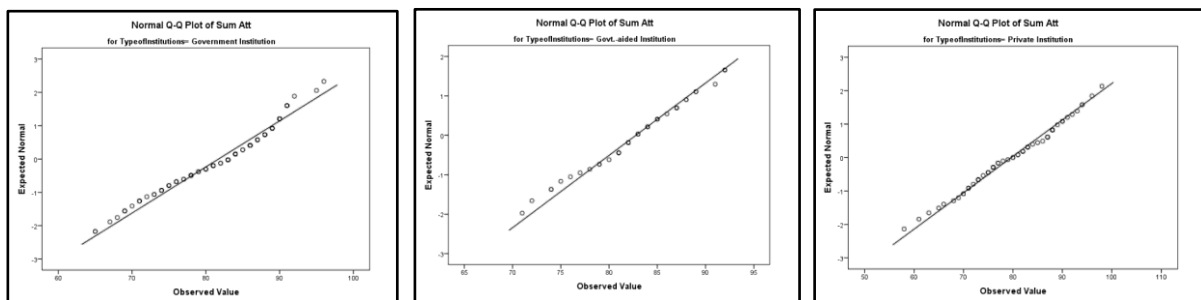


Fig 6-Normal Q-Q Plots Showing Attitude Scores w.r.t. Type of Institution

The descriptive statistics (Table 14) & Q-Q plots (Fig 6) of Attitude scores across institution types showed acceptable normality, satisfying the use of parametric tests like one-way ANOVA.

Testing of H_{05}

Table 15 - ANOVA of Attitude Scores w.r.t. Type of Institution

Sum Att.					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	264.687	2	132.343	2.305	.102
Within Groups	11310.468	197	57.414		
Total	11575.155	199			

- Table 15 reports the ANOVA results, showing $F_{(2,197)} = 2.305$, $p = .102$ ($p > 0.05$). Because the p -value is greater than 0.05, the ANOVA result is not significant. Thus, the study **fails to reject the null hypothesis**, indicating that attitude towards the integration of AI in teaching-learning does not differ significantly across types of institutions.

VI. Normality of Attitudes Towards Integrating AI into Teaching-learning w.r.t. Academic Stream

Table 16: Descriptive Statistics of Attitude Scores w.r.t. Academic Stream

Academic Stream	N	Mean	Std. Error	Median	Variance	Std. Dev.	Skewness	Std. Error	Kurtosis	Std. Error
Arts	128	81.250	0.703	83.000	63.323	7.958	-0.413	0.214	-0.372	0.425
Science	72	81.431	0.831	82.000	49.742	7.053	-0.419	0.283	-0.144	0.559

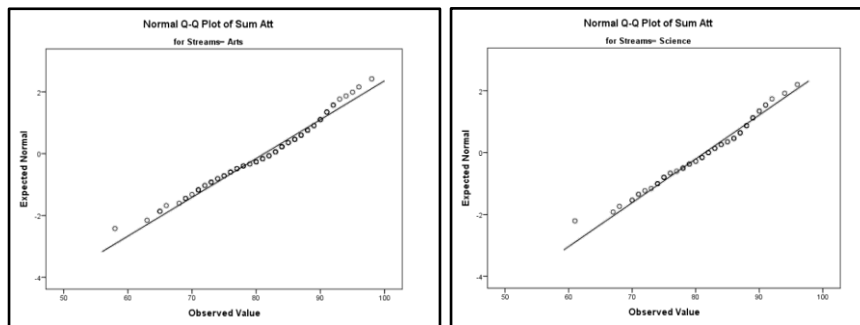


Fig 7 - Normal Q-Q Plots Showing Attitude Scores w.r.t. Academic Stream

The descriptive statistics (Table 16) & Q-Q plots (Fig 7) for Attitudes scores w.r.t. for both streams indicate that the distribution of scores tends toward normality allowing the use of parametric tests.

Testing of H_{06}

Table 17 - Independent Samples Test Between the Groups (Arts & Science)							
		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference
Sum Att.	Equal variances assumed	1.711	.192	-.160	198	.873	-.180556

- Levene's test (Table 17) shows $F = 1.711$, $p = .192$ ($p > 0.05$), so equal variances are assumed.
- The t -test reveals $t_{(198)} = -0.160$, $p = .873$ ($p > 0.05$). Since the t -value is not significant, the study **fails to reject the null hypothesis**. Therefore, there is no significant difference between arts and science stream respondents in their attitudes toward integrating AI into teaching-learning processes.

VII. Normality of Perceptions Regarding the Potentiality of AI to Replace or Support Human Educators w.r.t. Designation

Table 18: Descriptive Statistics of Perception Scores w.r.t. Designation										
Designation	N	Mean	Std. Error	Median	Variance	Std. Dev.	Skewness	Std. Error	Kurtosis	Std. Error
Pupil Teacher	170	76.653	0.549	77.000	51.187	7.154	-0.341	0.186	-0.777	0.370
Teacher Educator	30	79.000	1.340	80.000	53.862	7.339	-0.709	0.427	0.394	0.833

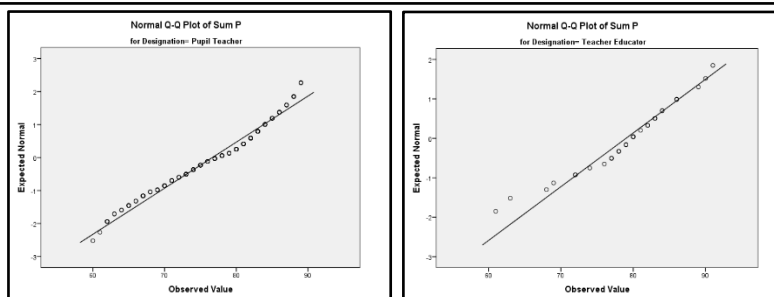


Fig 8 - Normal Q-Q Plots Showing Perception Scores w.r.t. Designation

The descriptive statistics (Table 18) & Q-Q plots (Fig 8) show that perception scores meet normality criteria for both groups.

Overall, both groups show distributions suitable for parametric analysis like a *t*-test, to compare perception scores between the groups.

Testing of H₀₇

Table 19-Independent Samples Test Between the Groups (Pupil Teachers & Teacher Educators)

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference
Sum P	Equal variances assumed	.438	.509	-1.650	198	.100	-2.347059

- Levene's Test for Equality of Variances (Table 19) shows $F = 0.438$, $p = .509$ ($p > 0.05$), indicating that the assumption of equal variances is met and the *t*-value from the "Equal variances assumed" row can be used.
- The *t*-test result, $t_{(198)} = -1.650$ with $p = .100$ ($p > 0.05$), is not significant, and the mean difference is small. Thus, the study **fails to reject the null hypothesis**, indicating there is no significant difference between pupil teachers and teacher educators in their perceptions regarding the potentiality of AI to replace or support human educators.

VIII. Normality of Perceptions Regarding the Potentiality of AI to Replace or Support Human Educators w.r.t. Type of Institution

Table 20: Descriptive Statistics of Perception Scores w.r.t. Type of Institution

Type of Institution	N	Mean	Std. Error	Median	Variance	Std. Dev.	Skewness	Std. Error	Kurtosis	Std. Error
Government	100	77.170	0.729	77.500	53.173	7.292	-0.191	0.241	-0.886	0.478
Government-aided	40	80.000	0.880	81.000	30.974	5.565	-1.291	0.474	1.803	0.733
Private	60	74.733	0.952	75.500	54.402	7.376	-0.196	0.309	-0.683	0.608

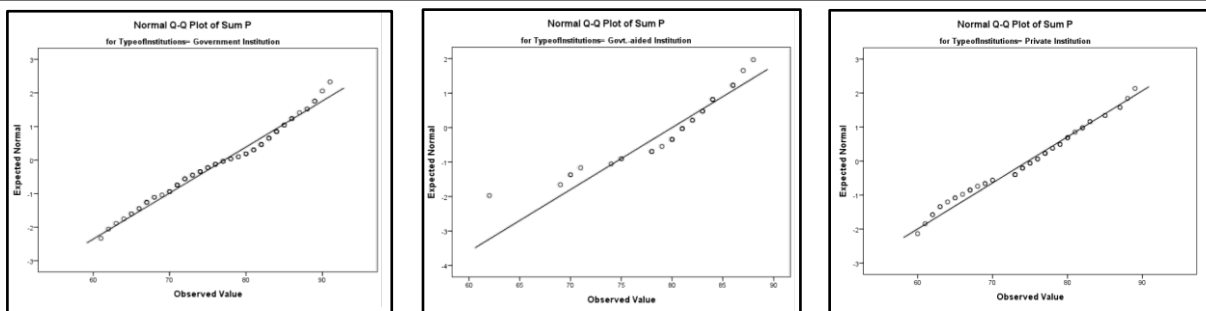


Fig 9-Normal Q-Q Plots Showing Perception Scores w.r.t. Type of Institution

Descriptive statistics of perception scores (Table 20) & Q-Q plots (Fig 9) across institution types show acceptable normality, allowing the use of parametric analyses.

Testing of H₀₈

Table 21 – ANOVA of Perception Scores w.r.t. Type of Institution

Sum P					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	671.152	2	335.576	6.828	.001
Within Groups	9681.843	197	49.146		
Total	10352.995	199			

Table 22 - Multiple Comparisons of Perception Scores w.r.t. Type of Institution

Dependent Variable: Sum P LSD						
(I) Type of Institutions	(J) Type of Institutions	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Government Institution	Govt.-aided Institution	-2.830000*	1.311535	.032	-5.41645	-.24355
	Private Institution	2.436667*	1.144802	.035	.17903	4.69431
Govt.-aided Institution	Government Institution	2.830000*	1.311535	.032	.24355	5.41645
	Private Institution	5.266667*	1.431002	.000	2.44462	8.08872
Private Institution	Government Institution	-2.436667*	1.144802	.035	-4.69431	-.17903
	Govt.-aided Institution	-5.266667*	1.431002	.000	-8.08872	-2.44462

*. The mean difference is significant at the 0.05 level.

- The ANOVA table (Table 21) shows $F_{(2,197)} = 6.828$, $p = .001$ ($p < .05$), indicating a significant difference among the groups. Thus, the study **rejects the null hypothesis**.
- To identify which specific groups differ, a **post-hoc** multiple comparison test was conducted (Table-22). The result reveals all three pairs—Government vs. Government-aided, Government vs. Private, and Government-aided vs. Private—**differ significantly**. This indicates that institution type significantly influences Perception scores.

IX. Normality of Perceptions Regarding the Potentiality of AI to Replace or Support Human Educators w.r.t. Academic Stream

Table 23: Descriptive Statistics of Perception Scores w.r.t. Academic Stream

Academic Stream	N	Mean	Std. Error	Median	Variance	Std. Dev.	Skewness	Std. Error	Kurtosis	Std. Error
Arts	128	76.766	0.620	77.500	49.141	7.010	−0.364	0.214	−0.666	0.425
Science	72	77.431	0.895	79.500	57.629	7.591	−0.432	0.283	−0.649	0.559

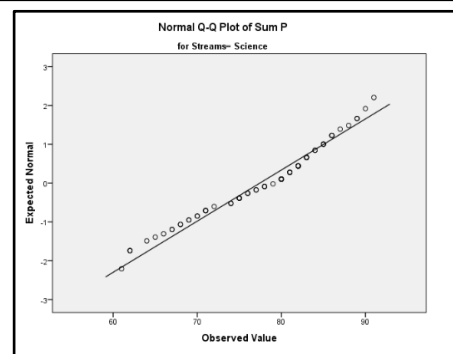
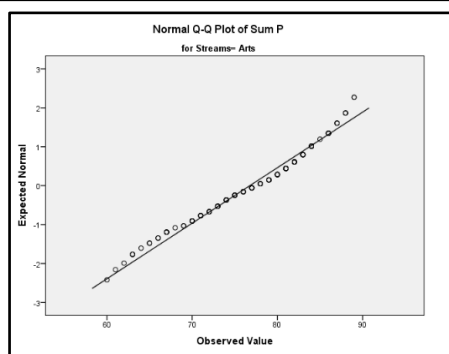


Fig 10 - Normal Q-Q Plots Showing Perception Scores w.r.t. Academic Stream

The descriptive statistics (Table 23) & Q-Q plots (Fig 10) for Perception scores w.r.t. academic stream meet the normality assumption, supporting the use of parametric tests like *t*-test.

Testing of H₀₉

Table 24 - Independent Samples Test Between the Groups (Arts & Science)							
		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference
Sum P	Equal variances assumed	.638	.425	-.625	198	.533	-.664931

- Levene's test ($F = 0.638$, $p = .425$) satisfies the assumption of equal variances, so the "Equal variances assumed" row is used. The t -test result, $t(198) = -0.625$, $p = .533$ ($p > 0.05$), is not significant, indicating very similar mean perception scores for Arts and Science students. Thus, the study **fails to reject the null hypothesis**, indicating no significant difference in perceptions across academic streams.

Testing of H₀₁₀, H₀₁₁ and H₀₁₂

Table 25 - Correlation of H ₀₁₀ , H ₀₁₁ , and H ₀₁₂				
Hypothesis No.	Correlational Variables	Pearson Correlation	Sig. (2-tailed)	Inference
H ₀₁₀	Awareness and Attitudes	.606	.000	Strong (+) correlation
H ₀₁₁	Attitudes and Perceptions	.467	.000	Moderate (+) correlation
H ₀₁₂	Awareness and Perceptions	.355	.000	Weak (+) correlation

A Pearson's Product-Moment Correlation was computed (Table 25) to test the three null hypotheses (H₀₁₀, H₀₁₁, and H₀₁₂). Since all the p -values are less than the significance level ($p < 0.05$ and $p < 0.01$), the **correlation is statistically significant**, leading to **rejection of all three null hypotheses** and acceptance of the alternative hypotheses. Therefore, it can be stated that-

- Higher awareness of AI tools is **strongly** associated with more favourable attitudes toward AI integration in teaching-learning.
- More positive attitudes toward AI integration are **moderately** associated with more supportive perceptions of AI's potential role in education.
- As awareness increases, perceptions regarding AI become somewhat more positive, though the strength of the association is **weak** compared to the other two.

MAJOR FINDINGS

The study revealed substantial awareness of AI tools in teacher education, along with relatively favourable attitudes and balanced perceptions towards AI. No significant differences were found in awareness, attitudes, or perceptions based on designation or academic stream. However, institution type significantly influenced awareness and perceptions. Private institutions recorded relatively lower awareness and perception scores than government and government-aided institutions. Attitudes did not differ significantly across institution types. Significant positive relationships were found between awareness and attitude ($r = .606$), attitude and perception ($r = .467$), and awareness and perception ($r = .355$), indicating that greater AI awareness is associated with more favourable attitudes and perceptions towards AI.

EDUCATIONAL IMPLICATIONS

The findings highlight the need to give greater attention to developing AI literacy and responsible use of AI in teacher education. Regular training, workshops and other opportunities to use AI tools will help teacher educators and pupil teachers develop more confidence and practical skills. Institutional differences also emphasize the need for equitable digital infrastructure and access to AI resources across TEIs. AI will need to be used mainly as a

supportive tool for teaching-learning, while preserving the human qualities of teachers. Therefore, curriculum planners and policymakers will need to give greater importance to AI readiness in teacher education programmes.

RECOMMENDATIONS

- Teacher educators and pupil teachers should be given greater opportunities to become familiar with AI tools through appropriate curricula and practical exposure.
- TEIs should organize training, hands-on workshops & professional development programmes on AI-assisted lesson planning, assessment, content evaluation and teaching practice/internship.
- TEIs should also strengthen digital infrastructure and access to AI tools, particularly in institutions with comparatively lower awareness and perception levels, while promoting ethical and responsible AI use.
- Future researchers may include larger and more diverse samples, along with qualitative and intervention-based approaches, to examine the effectiveness of AI-supported teaching-learning.

CONCLUSION

The study concludes that AI is emerging as a supportive tool in teacher education rather than a substitute for human educators. The absence of significant differences based on designation and academic stream indicates that AI readiness is becoming a general requirement for educators, rather than being linked to their roles or subject backgrounds. On the other hand, differences across Government, Government-aided, and Private institutions suggest that institutional context, particularly access to technology, training opportunities, and infrastructure, continues to influence AI integration in teacher education. Therefore, strengthening AI literacy and opportunities for practical and responsible use of AI will be important for integrating AI into teacher education, while preserving the central role of human educators.

REFERENCES

1. Annuš, N. (2024, February). Education in the Age of Artificial Intelligence. *TEM Journal*, 13 (1), 404-413. <https://doi.org/10.18421/TEM131-42>
2. Borchetia, B., & Hazarika, M. (2024, February). Artificial intelligence in education: An overview. *Journal of Emerging Technologies and Innovative Research (JETIR)*, 11(2). <https://www.jetir.org/papers/JETIR2402146.pdf>
3. Çayak, S. (2024, May). Investigating the relationship between teachers' attitudes toward artificial intelligence and their artificial intelligence literacy. *Journal of Educational Technology and Online Learning*, 7(4 - ICETOL 2024 Special Issue), 367–383. <https://doi.org/10.31681/jetol.1490307>
4. Chan, C. K. Y., & Tsi, L. H. Y. (2023, May). The AI Revolution in Education: Will AI Replace or Assist Teachers in Higher Education? <https://doi.org/10.48550/arXiv.2305.01185>
5. Dorongon, M. A., & Sarmiento, J. R. (2025, May). Teachers' readiness for artificial intelligence integration in teaching and learning. *Global Scientific Journal*, 13(5), 812–819. ISSN 2320-9186.
6. Fitria, T. N. (2023, October). The Use of Artificial Intelligence in Education (AIED): Can AI Replace the Teacher's Role? *Epigram*, 20(2), 165-187. <https://doi.org/10.32722/epi.v20i2.5711>
7. Heung, I., & Wegerif, R. (2024, November). Teachers' perceptions, attitudes, and acceptance of artificial intelligence (AI) educational learning tools: An exploratory study on AI literacy for young students. *Future in Educational Research*, 2(4). <https://doi.org/10.1002/fer3.65>
8. Jamal, A. (2023, March). The Role of Artificial Intelligence (AI) in Teacher Education: Opportunities & Challenges. *International Journal of Research and Analytical Reviews (IJRAR)*, 10 (1), 140-146, E-ISSN: 2348-1269, P-ISSN: 2349-5138. <https://ijrar.org/papers/IJAR23A2629.pdf>
9. Kumar, V. V. & Raman, R. (2022, March). Student Perceptions on Artificial Intelligence (AI) in higher education. *IEEE*. <https://ieeexplore.ieee.org/document/10025165>
10. Mandal, R. & Mete, J. (2023, July). Teachers' and Students' Perception Towards Integration of Artificial Intelligence in School Curriculum: a Survey. *International Journal of Multidisciplinary Educational Research, SSRN*, 12 (7(5)), ISSN:2277-7881. <http://ijmer.in.doi./2023/12.07.93>
11. Mundra, K. G., & Kataria, D. (2024, January). Can Artificial Intelligence Replace Teachers? - An Analysis of Shifting Paradigms in Education. *GAP Bodhi Taru: A Global Journal of Humanities*, VII, 134-138,

ISSN: 2581-5857. [https://www.gapbodhitaru.org/res/articles/\(134-138\)%20CAN%20ARTIFICIAL%20INTELLIGENCE%20REPLACE%20TEACHERS%20%E2%80%93%20AN%20ANALYSIS%20OF%20SHIFTING%20PARADIGMS%20IN%20EDUCATION.pdf](https://www.gapbodhitaru.org/res/articles/(134-138)%20CAN%20ARTIFICIAL%20INTELLIGENCE%20REPLACE%20TEACHERS%20%E2%80%93%20AN%20ANALYSIS%20OF%20SHIFTING%20PARADIGMS%20IN%20EDUCATION.pdf)

12. Slimi, Z. (2023, March 31). The Impact of Artificial Intelligence on Higher Education: An Empirical Study. *European Journal of Educational Sciences*, 10(1), ISSN: 1857-6036. <https://doi.org/10.19044/ejes.v10no1a17>
13. Uygun, D. (2024, March). Teachers' perspectives on artificial intelligence in education. *Advances in Mobile Learning Educational Research*, 4(1), 931-939. <https://doi.org/10.25082/AMLER.2024.01.005>
14. Vazhayil, A., Shetty, R., Bhavani, R.R., & Akshay, N. (2019). Focusing on Teacher Education to Introduce AI in Schools: Perspectives and Illustrative Findings. *2019 IEEE Tenth International Conference on Technology for Education (T4E)*, 71-77. <https://doi.org/10.1109/T4E.2019.00021>
15. Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators? *International Journal of Educational Technology in Higher Education*, 16(1), 1-27. <https://doi.org/10.1186/s41239-019-0171-0>

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