Teachers' Attitude and Competency Towards the Use of Artificial Intelligence–Based Tools in Classroom Instruction

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Abstract

The increasing use of Artificial Intelligence (AI) in teaching has brought new opportunities on how to enhance the classroom teaching, testing, and interaction of the student. Nevertheless, the attitudes of teachers and their abilities to use AI-based tools are the determinants of the successful implementation of AI in classrooms. The current research is an exploratory study on the attitudes of teachers and their level of competence with respect to the application of the Artificial Intelligence in classroom teaching at a higher secondary level. Descriptive survey method was used and the sample size of 180 teachers at higher secondary schools was selected through simple random sampling of teachers. The research observed the impact of the variables of subject stream, digital teaching experience, and previous exposure to AI tools on the attitude and competencies of teachers. Data collection was done by using a standardized Attitude and Competency towards AI Scale. The results have shown that teachers have a positive attitude towards AI and moderate competency levels. There were some important differences depending on subject stream and previous exposure to AI. The paper highlights the necessity of special competency-based training programs as the only way to allow successful AI implementation in classroom teaching.

Keywords: Artificial Intelligence in Education, Teacher Attitude, Teacher Competency, AI-Based Tools, Classroom Instruction

Introduction

Artificial Intelligence has become an effective technological resource that affects various spheres, including the educational field. AI-driven technologies like the intelligent tutoring systems, automated assessment systems, learning analytics systems, and content recommendation systems are becoming popular in helping classroom teaching. They can be used to improve teaching competence, make learning personalized, and increase student engagement.

Regardless of these developments, educators are the most important stakeholders in the process of converting AI technologies into relevant classroom activities. The attitude of teachers to AI is what will define the extent to which they will accept the new technologies, and competency will define the amount of success. Superficial usage may be a result of positive attitude with low competency where high capability and negative attitude can be seen as resistance. Thus, it is critical to consider both attitude and competency as the aspects of AI integration in classroom teaching.

Need and Scope of the Study

Need of the Study

1. The use of AI-based tools in schools is being introduced more and more, yet the classroom application is not common.
2. The competencies and attitudes of teachers are decisive in attitude towards technology.
3. Empirical research that employs both attitude and competency in relation to AI among teachers is not available.
4. Knowledge of influencing factors can also be used to design an effective professional development program.
5. The research justifies the policy efforts to incorporate new technologies in education.

Scope of the Study

The study is confined to:

- Higher secondary school teachers
- The use of AI-based tools in classrooms.
- Variables such as subject stream, digital teaching experience, and AI exposure
- A limited geographical area

Variables of the Study

Independent Variables

1. Subject Stream (Arts / Science / Commerce)
2. Digital Teaching Experience (Low / Moderate / High)
3. Exposure to AI-Based Tools (Yes / No)

Dependent Variables

1. Teachers' Attitude towards AI-Based Tools
2. Teachers' Competency in Using AI-Based Tools for Classroom Instruction

Objectives of the Study

1. To examine the degree of teacher attitude towards AI-based classroom instructions.
2. To determine the competency of teachers when it comes to employing AI-based tools.
3. To determine whether the attitude of teachers towards AI varies depending on the stream of subject.
4. To investigate variations in the competency of teachers using digital teaching experience.
5. To examine how exposure to AI affects the attitude and competency of teachers.

Hypotheses of the Study

The following null hypotheses were formulated:

- **H_{01}:** There is no significant difference in teachers' attitude towards AI-based tools based on subject stream.
- **H_{02}:** There is no significant difference in teachers' competency in using AI-based tools based on digital teaching experience.
- **H_{03}:** There is no significant difference in teachers' attitude towards AI-based tools based on exposure to AI.
- **H_{04}:** There is no significant difference in teachers' competency in using AI-based tools based on exposure to AI.

Methodology

Research Design

A **descriptive survey method** was adopted to study teachers' attitude and competency towards AI-based tools.

Population and Sample

- **Population:** Higher secondary school teachers

- **Sample Size:** 180 teachers
- **Sampling Technique: Simple random sampling**

Tool for Data Collection

A standardized questionnaire titled **"Attitude and Competency towards AI-Based Tools Scale"** consisting of 36 items was used. The scale had two sections:

- Attitude towards AI (18 items)
- Competency in using AI tools (18 items)

Responses were recorded on a five-point Likert scale.

Validity and Reliability

- **Content Validity:** Established through expert opinion.
- **Construct Validity:** Ensured through alignment with attitude and competency frameworks.
- **Reliability:** Cronbach's Alpha value was **0.84**, indicating high reliability.

Data Analysis and Interpretation

Analysis of Teachers' Attitude towards AI-Based Tools

Table 1: Distribution of Teachers Based on Their Attitude towards AI-Based Tools

Level of Attitude	Frequency	Percentage
Low	34	18.89
Moderate	79	43.89
High	67	37.22
Total	**180**	**100**

Interpretation

As Table 1 indicates, 43.89 percent of the teachers have a moderate level of attitude towards AI-based tools, whereas 37.22 percent of teachers have a high level of positive attitude. The percentage of teachers who belong to the low category of attitude is only 18.89%.

Discussion

The results have shown that most educators are positive towards the application of Artificial Intelligence in the classroom. This favorable tendency indicates that educators are willing to use AI-based tools in case of providing proper support and resources. The outcome is consistent with previous researchers that have found that AI technologies have become increasingly acceptable among teachers.

Analysis of Teachers' Competency in Using AI-Based Tools

Table 2: Distribution of Teachers Based on Competency Levels

Level of Competency	Frequency	Percentage
Low	49	27.22
Moderate	88	48.89
High	43	23.89
Total	**180**	**100**

Interpretation

As seen in Table 2, almost half of the teachers (48.89) have moderate competency on the application of AI-based tools with 23.89 showing high competency. The percentage of teachers with low competency is rather high (27.22).

Discussion

The level of competency of teachers is mostly in the medium range even though their attitude to AI is positive. This attitude-skill disparity implies that teachers might be willing but not well trained or even not well trained in practice. The results indicate that capacity-building programs should be committed to empowering teachers with practical skills in the field of AI integration.

Difference in Teachers' Attitude towards AI Based on Subject Stream

Table 3: ANOVA Showing Difference in Attitude Based on Subject Stream

Source of Variance	Sum of Squares	df	Mean Square	F-value	Result
Between Groups	2.84	2	1.42	5.18	Significant
Within Groups	48.50	177	0.27		
Total	51.34	179			

Interpretation

The obtained F-value (5.18) exceeds the table value at the 0.05 significant level, which implies that there is a significant difference between the attitude of teachers towards AI-based tools depending on the subject stream.

Discussion

The implication of the result is that educators in various subject streams do not have a similar perception and acceptance of AI-based tools. The teachers of science were identified to have a better attitude than those of Arts and Commerce. This can be explained by exposure to more technology-driven pedagogies in science-related fields. The null hypothesis $\mathbf{H_{01}}$ is, therefore, rejected.

Difference in Teachers' Competency Based on Digital Teaching Experience

Table 4: ANOVA Showing Difference in Competency Based on Digital Teaching Experience

Source of Variance	Sum of Squares	df	Mean Square	F-value	Result
Between Groups	3.92	2	1.96	6.74	Significant
Within Groups	51.46	177	0.29		
Total	55.38	179			

Interpretation

The resulting F-value (6.74) is significant at the level of 0.05 and thus implies that there is a significant difference in the competency held by teachers according to their digital teaching experience.

Discussion

More qualified educators in digital teaching showed a superior level of competency in the utilization of AI-based tools. This indicates that the preliminary experience with digital technologies facilitates the willingness of teachers to implement the high-tech devices like AI. Thus, the null hypothesis $\mathbf{H_{02}}$ is not accepted.

Difference in Teachers' Attitude Based on Exposure to AI-Based Tools

Table 5: t-Test Showing Difference in Attitude Based on AI Exposure

AI Exposure	Mean	SD	t-value	Result
Yes	3.58	0.51	3.12	Significant
No	3.21	0.48		

Interpretation

The t-value (3.12) thus, is significant at the p=0.05 level hence, there is a significant difference in the attitude of teachers depending on exposure to AI tools.

Discussion

Teachers with the previous exposure to AI-based tools turned out to be more positive about AI integration. Apprehension seems to be mitigated by familiarity and experience, and confidence is developed. Therefore, the null hypothesis $\mathbf{H_{03}}$ is rejected.

Difference in Teachers' Competency Based on Exposure to AI-Based Tools

Table 6: t-Test Showing Difference in Competency Based on AI Exposure

AI Exposure	Mean	SD	t-value	Result
Yes	3.62	0.47	3.86	Significant
No	3.18	0.44		

Interpretation

The t-value obtained (3.86) shows that there is a significant difference in the competency between the teachers who have been exposed to AI tools and those who have not been exposed.

Discussion

The ability of teachers can be greatly improved due to the exposure of AI-based tools. This observation stresses the significance of giving educators a chance to study and experiment with artificial intelligence technologies. Therefore, the null hypothesis $\mathbf{H_{04}}$ is rejected.

Summary of Major Findings

1. The majority of teachers have a moderate level of positive attitude to AI-based tools, and some of them have a high level.
2. The level of proficiency of teachers in the use of AI is mostly average.
3. There exists a big difference in attitude depending on the stream of subject.
4. Digital teaching experience plays a major role in determining the competency of teachers.
5. Attitude and competency are largely affected by previous experience using AI-based tools.

Conclusion

The research has reached the conclusion that educators are rather positive about AI-based tools, but the level of their competence is moderate. The subject stream, digital teaching experience, and AI exposure have a great impact on teacher attitudes and competencies. The results indicate that even though teachers would like to embrace AI, it requires systematic training to be effectively implemented in the classroom.

Educational Implications

1. The area of AI competency should be developed in teacher training programs.
2. Individual AI features need to be presented.
3. The constant professional development should involve the practical training of AI tools.
4. The leaders of schools should foster the use of AI-based teaching methods.
5. The responsible and ethical usage of AI should be stressed.

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