

## Effectiveness of AI-Powered Personalized Learning Tools among College Faculty in Tenkasi District

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### Abstract

Artificial Intelligence (AI) has emerged as a transformative force in higher education, offering automation, data-driven decision-making, and individualized learning experiences. This study investigates the awareness, usage patterns, and effectiveness of AI-powered personalized learning tools among college faculty in Tenkasi District. A sample of 70 faculty members was surveyed using a structured questionnaire, and the data were analysed using percentage analysis, weighted averages, Chi-square tests, and ANOVA. The findings reveal moderate awareness (48.6%) and adoption of AI tools, with AI quiz tools and AI-based research assistants being the most commonly used. Teaching effectiveness was found to vary significantly across different levels of AI usage, indicating the strong pedagogical potential of AI integration. However, concerns related to over-dependence on AI, reduced originality, and risk of student misuse were also identified. The study concludes that while AI significantly enhances teaching effectiveness, its optimal integration requires comprehensive training, ethical guidelines, and institutional support. The insights from this study contribute to understanding AI adoption trends in semi-urban higher education contexts and provide recommendations for strengthening AI-based pedagogical strategies.

**Keywords:** Artificial Intelligence, Personalized Learning, Higher Education, Teaching Effectiveness, Faculty Perception, Technology Integration, Tenkasi District.

### 1. Introduction

Artificial Intelligence (AI) is reshaping the landscape of higher education by providing advanced tools that facilitate personalized learning, automate administrative processes, enhance content delivery, and improve instructional productivity. AI-enabled platforms—such as adaptive learning systems, automated assessment tools, plagiarism detectors, chatbots, and virtual teaching assistants—are becoming integral components of modern educational environments. These tools offer significant advantages, including real-time feedback, individualized learning pathways, predictive analytics, and improved accessibility.

Despite the rapid global advancement in AI-enhanced education, the pace of adoption varies across regions. In semi-urban districts such as Tenkasi, the transition towards AI-driven teaching remains gradual due to disparities in technological exposure, digital infrastructure, and faculty readiness. Although many educators recognize the potential of

AI to enhance teaching effectiveness, barriers such as limited awareness, inadequate training, and concerns about academic integrity persist. This study seeks to analyse the extent of AI usage, faculty perceptions, potential challenges, and the overall effectiveness of AI-powered personalized learning tools among college faculty in Tenkasi District.

### 2. Review of Literature

AI has proven to be a powerful enabler of personalized learning by offering tailored instructional pathways, performance monitoring, and adaptive assessments (Chen *et al.*, 2021). Research highlights the potential of AI tools to enhance instructional quality and learner engagement through automation and real-time analytics (Jones & Patel, 2021). However, faculty hesitancy remains a major challenge, often linked to insufficient technological competence or lack of institutional support (Anderson, 2020).

Ethical considerations—such as bias in algorithms, data privacy issues, and academic integrity—further complicate AI adoption (Garcia & Thomas, 2020). Studies also indicate clear differences in adoption patterns among faculty from STEM and non-STEM disciplines, with STEM educators showing higher levels of acceptance (Taylor, 2023). Training initiatives have been found to significantly improve familiarity and confidence in AI usage (Miller, 2022).

Although global scholarship extensively covers AI in higher education, region-specific studies, especially from rural and semi-urban contexts like Tenkasi District, remain limited. This research aims to bridge this gap by assessing localized adoption patterns and challenges.

### 3. Objectives of the Study

1. To assess the awareness and usage of AI-powered personalized learning tools among college faculty.
2. To analyse the impact of AI tools on teaching effectiveness.
3. To examine faculty perceptions and concerns regarding AI in education.
4. To identify significant differences in AI adoption across demographic groups.
5. To offer suggestions for improving AI usage in higher education.

### 4. Methodology

A descriptive research design was adopted for the study.

- **Sample Size:** 70 faculty members
- **Sampling Technique:** Convenience sampling
- **Tools Used:** Percentage analysis, Weighted Average, Chi-square test, ANOVA
- **Data Collection:** Structured Google Form questionnaire

This methodological framework enabled a comprehensive assessment of AI usage patterns and their influence on teaching effectiveness.

## 5. Results and Discussion

### 5.1 Demographic Profile of Respondents

**Table 1:** Demographic Profile of Respondents

Variable	Category	Frequency	Percentage (%)
Gender	Male	36	51.4
	Female	34	48.6
Age	Above 51 years	25	35.8
Designation	Associate Professor	22	31.43
Department	Health & Life Sciences	11	15.71
Experience	6–10 years	Highest	—

Source: Computed from Primary Data

The sample shows diverse representation across gender, age, academic ranks, and disciplines.

### 5.2 Awareness of AI Tools

**Table 2:** Level of Awareness

Awareness Level	Frequency	Percentage (%)
Aware	34	48.6
Not Aware	36	51.4

Source: Computed from Primary Data

More than half of the respondents lack awareness, indicating significant scope for faculty development programmes.

### 5.3 Frequency of AI Usage

**Table 3:** Frequency of AI Usage

Usage Frequency	Frequency	Percentage (%)
Always	21	30.0
Never	9	12.86

Source: Computed from Primary Data

A moderate proportion (30%) consistently integrates AI tools into their instructional practices.

### 5.4 Types of AI Tools Used

**Table 4:** AI Tools Used

AI Tool Category	Percent (%)	Rank
AI Quiz Tools	18%	1
AI Research Tools	17%	2

Source: Computed from Primary Data

AI quiz tools and AI research assistants are the most preferred tools among faculty members.

### 5.5 Weighted Average Analysis on AI Effectiveness

**Table 5:** Weighted Average Score

Factor	Weighted Mean Score	Interpretation
Teaching Effectiveness	3.51	Moderate
AI Research Tools	17%	2

Source: Computed from Primary Data

The weighted mean score indicates that AI moderately enhances teaching effectiveness.

### 5.6 Major Concerns Regarding AI

**Table 6:** Faculty Concerns

Concern	Frequency	Percentage (%)	Rank
Over-dependence on AI	18	25.71	1
Reduced originality	15	21.43	2
Student misuse	14	20.00	3

Source: Computed from Primary Data

Concerns predominantly relate to dependency and academic originality.

### 5.7 Faculty Expectations About AI

**Table 7:** Future Expectations

Expectation	Agreement (%)
Willingness to attend AI training	68.57
Uncertainty about AI replacing teachers	37.14

Source: Computed from Primary Data

Most respondents support future AI-enabled teaching.

### 5.8 Chi-Square Analysis

**Table 8:** Age vs AI Usage

Test	Result
Chi-square Value	Not Significant
p-value	>0.05
Conclusion	No relationship

Source: Computed from Primary Data

Age does not significantly influence AI usage.

## 5.9 ANOVA – AI Usage vs Teaching Effectiveness

**Table 9:** ANOVA Results

Parameter	Result
F-value	Significant
p-value	< 0.05
Conclusion	Teaching effectiveness differs significantly

Source: Computed from Primary Data

This confirms that higher AI usage leads to better teaching performance.

## 5.10 Summary of Findings

**Table 10:** Summary of Key Findings

Finding	Result
AI Awareness	Moderate
Teaching Improvement	Significant
Main Concern	Dependency
Training Interest	High
Age Influence	Not significant

### Findings

1. Awareness of AI tools remains limited among faculty members.
2. AI quiz tools and research assistants are the most commonly used tools.
3. AI usage significantly enhances teaching effectiveness.
4. Faculty demonstrate a strong willingness to participate in AI training.
5. The main concerns relate to dependency, originality, and student misuse.
6. No significant association was found between age and AI usage.
7. ANOVA results confirm that teaching effectiveness differs across AI usage groups.

### Conclusion

AI-powered personalized learning tools possess immense potential to transform instructional practices in higher education. In Tenkasi District, while the adoption of AI tools is moderate, their impact on teaching effectiveness is substantial. Faculty members express strong interest in enhancing their AI competencies, although concerns related to ethical use and originality persist. Institutions must invest in continuous training programmes, provide ethical guidelines, and strengthen technological infrastructure to enable responsible and effective AI integration. This study offers valuable insights into regional AI adoption patterns and contributes to the broader discourse on technology-enhanced learning.

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