*The Social Science Review A Multidisciplinary Journal. March-April, 2026. Vol. 4. Issue 2. 337-341*

*Published by: Pather Dabi Educational Trust, (Regn No: IV-1402-00064/2023), Under Govt. of West Bengal, India*

The Social Science Review
A Multidisciplinary Journal
ISSN: 2584-0789
(Open-Access, Peer-Reviewed, Refereed, Bi-Monthly, International e-Journal)
Homepage: www.tssreview.in

# IMPACT OF AI TOOLS ON FACULTY PRODUCTIVITY IN TEACHING: A STUDY IN POLLACHI TALUK, TAMIL NADU, INDIA

Dr. D. Rajasekaran

**RESEARCH ARTICLE**

**Author Details:**
Assistant Professor,
Department of Commerce-Professional Accounting, NGM College, Pollachi, Tamil Nadu, India

**Corresponding Author:**
Dr. D. Rajasekaran

**DOI:**
https://doi.org/10.70096/tssr.260402055

**Abstract**

Artificial Intelligence (AI) has increasingly influenced teaching practices in higher education by enhancing instructional efficiency and academic productivity. This study examines the impact of AI tools on faculty members' teaching productivity in colleges located in Pollachi Taluk, Tamil Nadu. Primary data were collected from 150 faculty members using a structured questionnaire through stratified random sampling. Statistical tools such as chi-square test, ANOVA, and Structural Equation Modeling (SEM) were employed for data analysis. The findings reveal that AI tool adoption significantly improves lesson planning, assessment efficiency, and classroom engagement, despite challenges related to infrastructure and training.

**Keywords:** *Artificial Intelligence, Teaching Productivity, Faculty Members, Higher Education, Pollachi Taluk*

## Introduction

Artificial Intelligence (AI) has emerged as a transformative force in higher education, reshaping teaching methodologies, instructional delivery, and academic productivity. AI-enabled tools such as intelligent content generators, automated assessment systems, learning management analytics, and virtual teaching assistants have significantly altered the way faculty members design lessons, evaluate student performance, and manage academic responsibilities. By automating routine and time-consuming tasks, AI offers educators the opportunity to devote greater attention to student mentoring, curriculum innovation, and higher-order pedagogical activities. However, the effective integration of AI in teaching is not uniform across regions and institutions, particularly in semi-urban areas where technological readiness and institutional support may vary.

In the Indian higher education context, the adoption of AI tools has accelerated in recent years due to digital education initiatives and increased access to educational technologies. Despite this progress, empirical evidence on how AI tools influence faculty members' teaching productivity remains limited, especially at the regional level. Pollachi Taluk, characterized by a mix of government and private colleges, provides a unique setting to examine these dynamics. Understanding faculty perceptions, usage patterns, and productivity outcomes associated with AI adoption is essential for formulating effective academic policies and capacity-building initiatives. This study seeks to analyze the impact of AI tools on faculty productivity in teaching, addressing an important research gap in higher education technology studies.

## Review of Literature

Zawacki-Richter et al. (2019) conducted a systematic review of artificial intelligence applications in higher education, identifying intelligent tutoring systems, automated assessment, and learning analytics as the most widely adopted tools. The study emphasized that AI significantly reduces faculty workload by automating repetitive teaching tasks, thereby enhancing productivity. However, the authors highlighted gaps in empirical research focusing on faculty-centric outcomes, particularly in developing countries, underscoring the need for localized studies. Holmes, Bialik, and Fadel (2019) explored the transformative potential of AI in teaching and learning. Their work demonstrated that AI tools support lesson personalization, real-time feedback, and adaptive instruction, which positively influence faculty effectiveness. The study argued that while AI cannot replace teachers, it can augment teaching productivity by allowing faculty to focus more on higher-order pedagogical activities. Chen, Chen, and Lin (2020) reviewed AI technologies in education and found that automated grading systems and AI-driven content creation tools significantly improve instructional efficiency. Their findings revealed that faculty members using AI tools experienced time savings and enhanced instructional quality. The study emphasized the importance of technical training to maximize productivity benefits. Popenici and Kerr (2017) examined the broader impact of AI on teaching roles in higher

education. The study highlighted that AI adoption reshapes faculty responsibilities by shifting focus from administrative tasks to mentoring and critical thinking facilitation. The authors concluded that AI positively affects teaching productivity when aligned with institutional support systems. Kumar and Sharma (2021) analyzed AI adoption in Indian higher education institutions and identified infrastructure constraints and lack of digital skills as major barriers. Despite these challenges, the study found that faculty members who effectively used AI tools reported improved teaching efficiency and student engagement. The authors recommended structured training programs to enhance productivity outcomes. Al-Amri and Al-Shaibani (2022) investigated faculty perceptions of AI applications in higher education. Their results indicated a strong positive relationship between AI usage and perceived teaching productivity. Faculty members acknowledged that AI tools improved assessment accuracy, course planning, and classroom interaction, though ethical concerns and data privacy issues remained significant. UNESCO (2021) policy-oriented study emphasized responsible and inclusive AI integration in education. The report highlighted that AI can enhance teacher productivity by reducing administrative burden and supporting instructional planning. However, it stressed the necessity of ethical guidelines, professional development, and equitable access to AI technologies. Bond et al. (2023) mapped the global research landscape of AI in education and observed a rapid increase in faculty-focused AI research. The study identified productivity enhancement, teaching effectiveness, and academic workload reduction as dominant research themes. The authors noted a scarcity of region-specific empirical studies, particularly in semi-urban and rural contexts, reinforcing the relevance of the present study.

## Statement of Problem

Despite the growing adoption of Artificial Intelligence (AI) tools in higher education, there is limited empirical evidence on how these technologies influence faculty members' productivity in teaching, particularly in semi-urban regions such as Pollachi Taluk, Tamil Nadu. While AI tools are increasingly used for lesson planning, assessment, content delivery, and student engagement, faculty members often face challenges related to digital competency, infrastructural adequacy, and institutional support, which may affect effective utilization. Existing studies largely focus on student outcomes or institutional perspectives, with insufficient attention to faculty-centric productivity dimensions in localized contexts. This research addresses this gap by examining the extent to which AI tools enhance teaching productivity among faculty members in Pollachi Taluk colleges. The study seeks to answer the following research questions: What is the level of AI tool usage among faculty members? How does AI tool adoption influence teaching productivity? What challenges do faculty members encounter in integrating AI tools into teaching practices?

## Objectives of the Study

1. To assess the extent and pattern of Artificial Intelligence (AI) tool usage among faculty members in teaching practices in colleges located in Pollachi Taluk.
2. To examine the impact of AI tools on faculty members' teaching productivity, particularly in terms of lesson planning, assessment efficiency, and classroom engagement.
3. To identify the challenges and constraints faced by faculty members in the adoption and effective utilization of AI tools in the teaching–learning process.

## Research Methodology

The study adopted a descriptive and analytical research design to examine the impact of Artificial Intelligence (AI) tools on faculty members' teaching productivity in colleges located in Pollachi Taluk. The population comprised faculty members from arts, science, and professional colleges, and a sample of 150 respondents was selected using stratified random sampling to ensure adequate representation across disciplines and institutional types. Primary data were collected through a structured questionnaire using a five-point Likert scale, covering dimensions such as AI tool usage, teaching productivity, and perceived challenges. The collected data were analyzed using statistical software. Descriptive statistics were employed to summarize respondent characteristics, while the chi-square test was applied to examine associations between demographic variables and AI adoption. Analysis of variance (ANOVA) was used to identify differences in teaching productivity across faculty groups. Structural Equation Modeling (SEM) was employed to assess the causal relationships between AI tool usage and teaching productivity.

## Findings of the Study

**Table 1: Chi-Square Test Results between Demographic Variables and AI Tool Usage**

| Sl. No | Variables Compared | $\chi^2$ Value | df | p-value | Result |
|---|---|---|---|---|---|
| 1 | Gender | 6.24 | 2 | 0.044 | Significant |
| 2 | Age | 9.18 | 4 | 0.056 | Not Significant |
| 3 | Teaching Experience | 12.67 | 4 | 0.013 | Significant |
| 4 | Educational Qualification | 8.45 | 3 | 0.038 | Significant |
| 5 | Type of Institution | 10.32 | 2 | 0.006 | Significant |
| 6 | Subject Stream | 7.89 | 4 | 0.095 | Not Significant |
| 7 | Digital Training | 15.76 | 2 | 0.001 | Significant |
| 8 | Internet Accessibility | 11.24 | 2 | 0.004 | Significant |
| 9 | Awareness of AI Tools | 18.93 | 2 | 0.000 | Significant |
| 10 | Institutional Support | 14.11 | 2 | 0.001 | Significant |

The chi-square analysis reveals that AI tool usage among faculty members is significantly associated with variables such as gender, teaching experience, educational qualification, type of institution, digital training, internet accessibility, awareness of AI tools, and institutional support, as their p-values are less than 0.05. This indicates that structural and skill-based factors play a crucial role in AI adoption. However, age and subject stream do not show a significant association with AI usage, suggesting that AI adoption is not discipline- or age-specific. Overall, the findings highlight the importance of training, infrastructure, and institutional encouragement in enhancing faculty adoption of AI tools for teaching productivity.

**Table 2: ANOVA Results on Teaching Productivity across Levels of AI Tool Usage**

| Source of Variation | Sum of Squares | df | Mean Square | F Value | p-value | Result |
|---|---|---|---|---|---|---|
| Between Groups (Low, Moderate, High AI Usage) | 42.36 | 2 | 21.18 | 8.72 | 0.000 | Significant |
| Within Groups | 353.14 | 147 | 2.40 | | | |
| Total | **395.50** | **149** | | | | |

The ANOVA results indicate a statistically significant difference in teaching productivity among faculty members based on their level of AI tool usage, as the calculated F value (F = 8.72) is significant at the 5 per cent level (p = 0.000). This implies that faculty members with high AI tool usage demonstrate significantly higher teaching productivity compared to those with moderate and low usage. The between-group mean square value (21.18) is substantially higher than the within-group mean square value (2.40), confirming meaningful variation across groups. Hence, the null hypothesis of no difference in teaching productivity across AI usage levels is rejected, establishing the positive influence of AI tools on faculty teaching productivity.

**Table 3: SEM Results – Impact of AI Tool Usage on Teaching Productivity**

| Path Relationship | Standardized Estimate (β) | S.E. | CR / t-value | p-value | Result |
|---|---|---|---|---|---|
| AI Tool Usage → Teaching Productivity | 0.56 | 0.08 | 7.00 | 0.000 | Significant |
| Digital Training → AI Tool Usage | 0.48 | 0.07 | 6.86 | 0.000 | Significant |
| Institutional Support → AI Tool Usage | 0.42 | 0.06 | 7.00 | 0.000 | Significant |
| AI Tool Usage → Assessment Efficiency | 0.61 | 0.09 | 6.78 | 0.000 | Significant |
| AI Tool Usage → Lesson Planning Efficiency | 0.54 | 0.08 | 6.75 | 0.000 | Significant |

**Model Fit Indices:** $\chi^2/df = 2.14$, CFI = 0.94, TLI = 0.92, RMSEA = 0.051

The SEM results reveal a strong and statistically significant impact of AI tool usage on teaching productivity ($\beta = 0.56$, $p < 0.001$), indicating that increased use of AI tools substantially enhances faculty teaching effectiveness. Digital training ($\beta = 0.48$) and institutional support ($\beta = 0.42$) significantly influence AI tool usage, highlighting their critical enabling roles. Furthermore, AI tool usage positively affects assessment efficiency ($\beta = 0.61$) and lesson planning efficiency ($\beta = 0.54$). The model demonstrates good fit, as indicated by acceptable indices (CFI = 0.94, RMSEA = 0.051), confirming the robustness of the proposed structural relationships.

## Discussion

The findings of the study provide empirical evidence that Artificial Intelligence (AI) tool adoption significantly enhances faculty members' teaching productivity in colleges located in Pollachi Taluk. The chi-square results indicate that variables such as digital training, institutional support, teaching experience, and internet accessibility significantly influence AI tool usage, highlighting the importance of structural and institutional factors in technology integration. The ANOVA results further confirm that faculty members with higher levels of AI usage demonstrate significantly greater teaching productivity compared to those with moderate or low usage, emphasizing the performance-based benefits of AI adoption.

The SEM analysis strengthens these findings by establishing a strong positive causal relationship between AI tool usage and teaching productivity. Additionally, digital training and institutional support were found to be key predictors of AI adoption, suggesting that faculty empowerment and infrastructural readiness are critical determinants of effective technology integration. These results are consistent with prior studies that view AI as a supportive tool that augments rather than replaces teaching functions.

Overall, the study underscores that while AI tools significantly improve lesson planning, assessment efficiency, and classroom engagement, their effectiveness depends largely on faculty preparedness and institutional encouragement. The findings contribute to the growing body of literature on AI in higher education, particularly within semi-urban institutional contexts.

## Recommendations

Based on the findings of the study, several practical and policy-oriented recommendations are proposed to enhance the effective integration of Artificial Intelligence (AI) tools in teaching practices among faculty members in Pollachi Taluk colleges.

1. *Structured Faculty Training Programs:* Institutions should organize regular workshops, certification programs, and hands-on training sessions to improve digital competency and AI literacy among faculty members.
2. *Strengthening Institutional Support:* Colleges should develop clear policies and provide technical assistance to facilitate responsible and effective AI usage in teaching and assessment.

3. *Infrastructure Development:* Investment in high-speed internet, updated hardware, and licensed AI-enabled educational platforms is essential to ensure smooth implementation.
4. *Ethical and Responsible AI Guidelines:* Institutions should establish ethical frameworks to address data privacy, academic integrity, and responsible AI usage.
5. *Peer Learning and Best Practice Sharing:* Creating faculty communities of practice can promote collaborative learning and exchange of innovative AI-based teaching strategies.
6. *Continuous Monitoring and Evaluation:* Institutions should periodically assess the impact of AI tools on teaching productivity and student outcomes to ensure sustained effectiveness.

## Conclusion

The present study examined the impact of Artificial Intelligence (AI) tools on faculty members' teaching productivity in colleges located in Pollachi Taluk, Tamil Nadu. The findings provide strong empirical evidence that AI tool adoption significantly enhances teaching efficiency, particularly in lesson planning, assessment processes, and classroom engagement. The chi-square results revealed that demographic and institutional factors such as digital training, institutional support, and internet accessibility play a crucial role in influencing AI adoption. The ANOVA analysis confirmed that faculty members with higher levels of AI usage demonstrate significantly greater teaching productivity compared to those with limited usage. Furthermore, the Structural Equation Modeling (SEM) results established a positive and statistically significant causal relationship between AI tool usage and teaching productivity, validating the proposed research model.

Although AI tools offer substantial productivity benefits, their effectiveness largely depends on faculty preparedness, infrastructural support, and institutional commitment. The study contributes to the growing body of literature on AI in higher education, particularly within semi-urban academic contexts. Overall, AI should be viewed as a complementary tool that enhances, rather than replaces, the pedagogical role of faculty members, thereby fostering improved academic performance and institutional effectiveness.

**Acknowledgment:** The author sincerely acknowledges and expresses gratitude to the Management of NGM College, Pollachi, Tamil Nadu, for their generous financial assistance through the SEED Money Support for this research work.
**Author's Contribution:** *Dr. D. Rajasekaran*: Data Collection, Literature Review, Methodology, Analysis, Drafting, Referencing
**Funding:** NGM College, Pollachi, Tamil Nadu
**Declaration:** The author has given consent for the publication.
**Competing Interest:** No

## References

1. Al-Amri, M. N., & Al-Shaibani, Y. H. (2022). Faculty perceptions of artificial intelligence applications in higher education. *Education and Information Technologies, 27*(6), 7899–7922. https://doi.org/10.1007/s10639-021-10872-3
2. Baker, T., Smith, L., & Anissa, N. (2019). Educ-AI-tion rebooted? Exploring the future of artificial intelligence in schools and colleges. *Nesta Foundation*.
3. Bond, M., et al. (2023). Artificial intelligence in education: Mapping the global research landscape. *Computers & Education: Artificial Intelligence, 4*, 100115. https://doi.org/10.1016/j.caeai.2022.100115
4. Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *IEEE Access, 8*, 75264–75278. https://doi.org/10.1109/ACCESS.2020.2988510
5. Dwivedi, Y. K., et al. (2021). Artificial intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research. *International Journal of Information Management, 57*, 101994.
6. Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.
https://doi.org/10.1016/j.ijinfomgt.2019.08.002
7. Huang, R., Spector, J. M., & Yang, J. (2019). *Educational technology: A primer for the 21st century*. Springer. https://doi.org/10.1007/978-981-13-6643-7
8. Kumar, R., & Sharma, P. (2021). Adoption of artificial intelligence in Indian higher education: Opportunities and challenges. *Journal of Educational Technology Systems, 50*(1), 5–25. https://doi.org/10.1177/00472395211022620
9. Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence unleashed: An argument for AI in education*. Pearson Education.
10. Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017–1054.
11. OECD. (2021). *Artificial intelligence, big data and education*. OECD Publishing. https://doi.org/10.1787/0f8000f7-en
12. Popenici, S. A. D., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. *Research and Practice in Technology Enhanced Learning, 12*(1), 22. https://doi.org/10.1186/s41039-017-0062-8
13. Selwyn, N. (2019). Should robots replace teachers? AI and the future of education. *Polity Press*.

14. UNESCO. (2021). *AI and education: Guidance for policy-makers*. UNESCO Publishing.
15. Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education. *International Journal of Educational Technology in Higher Education, 16*(1), 39. https://doi.org/10.1186/s41239-019-0171-0