A Study on Impact of Artificial Intelligence on Collegiate Education in Arts & Science Private Colleges in Tamil Nadu

Dr. M. Rajeev Gandhi

Assistant Professor, Department of Commerce, Sri Kaliswari College (A), Sivakasi

Abstract

This paper examines the multifaceted impact of Artificial Intelligence on collegiate education in arts and science private colleges in Tamil Nadu. It synthesizes recent policy drivers NEP 2020 and state-level initiatives, empirical studies from Tamil Nadu and India, and the international literature on Artificial Intelligence in higher education to map current adoption, identify perceived benefits and challenges among stakeholders students, faculty, administrators, and the propose an empirical research design to measure learning, employability, and pedagogical change. The current research findings from the literature show promise for AI-enabled personalised learning, assessment automation, and research support, but persistent barriers include uneven access, faculty readiness, and academic-integrity risks. The paper concludes with recommendations for institutional strategy, curriculum reform, faculty development, and directions for primary research in the Tamil Nadu arts and science private college's context.

Keywords: Artificial Intelligence, higher education, Tamil Nadu, private colleges, arts & science, pedagogy, NEP 2020

Introduction

Artificial Intelligence (AI) from adaptive learning platforms and intelligent tutoring systems to generative AI large language models are composed to reshape higher education internationally. In India, policy frameworks such as the National Education Policy - NEP 2020 encourage curriculum renewal and use of emerging technologies to improve learning outcomes, positioning AI as a strategic enabler for higher education transformation in arts and science private colleges. National Education Policy Recent state-level interest and institutional pilots in Tamil Nadu indicate growing traction, but systematic evidence on how AI is affecting collegiate education particularly in private arts and science colleges remains limited. Empirical work from Chennai and other districts in Tamil Nadu points to experimental use of AI tools in teacher training, student evaluations, and efforts to enhance learning outcomes; however, many studies report uneven awareness and limited infrastructure in smaller private colleges. Local descriptive studies (e.g., Erode, Chennai-based investigations) indicate positive attitudes among students but challenges in faculty readiness and resource access. NEP 2020 encourages technology integration, multidisciplinary learning, and continuous teacher development frameworks which implicitly support AI adoption when accompanied by state and institutional initiatives. State-level education policies and UGC guidelines are evolving to address

digital transformation, quality assurance, and skill alignment, which affect private college adoption strategies.

Literature Review

Global and Indian trends in AI in higher education

Kumar, S. & Meenakshi, R. (2021) – *Integration of AI in Indian Higher Education* – The study found that AI-based learning tools improved personalized learning experiences, but adoption in arts & science colleges was slower compared to technical institutions due to infrastructural gaps.

Narayanan, P. & Devi, M. (2022) – *Role of AI in Enhancing Teaching Efficiency in Tamil Nadu Colleges* – Research revealed that AI reduced administrative workload for faculty, allowing more focus on student mentoring, though training needs remain high.

Prasad, V., & George, J. (2021) – *AI-Driven Student Assessment in Higher Education* – AI-based evaluation systems enhanced accuracy and feedback speed but raised concerns about transparency and bias in grading.

Rajesh, K. & Anitha, S. (2023) – *AI Tools and Student Engagement in Arts and Science Colleges* – The study concluded that AI-enabled gamification significantly improved engagement in humanities and commerce streams.

Lakshmi, T. & Ram, A. (2022) – *Barriers to AI Adoption in Private Colleges in South India* – Key barriers included lack of technical expertise, cost constraints, and skepticism from senior faculty members.

Sivakumar, G. & Banu, R. (2021) – *AI and Curriculum Transformation in Tamil Nadu* – Integration of AI in curricula led to multidisciplinary projects, particularly benefiting commerce and management students through data analytics exposure.

Mohan, S. & Priya, K. (2023) – *Perception of College Students towards AI in Education* – The majority perceived AI as a career-enhancing tool but expressed fear of reduced human interaction in learning.

Suresh, R. & Manimegalai, P. (2020) – *Impact of AI on Faculty Development* – Faculty using AI tools reported improved teaching efficiency, but the lack of institutional support limited wider application.

Thomas, A. & Geetha, V. (2022) – *AI in Virtual Learning Environments for Arts & Science Students* – The study found AI-driven platforms increased accessibility for rural students, though internet connectivity remained a bottleneck.

Venkatesan, L. & Karthika, M. (2023) – *AI and Student Performance Analytics in Higher Education* – Predictive analytics helped identify at-risk students early, improving retention rates in private institutions.

Research Objectives

1. To assess the current level of AI awareness among students in arts & science private colleges in Tamil Nadu.
2. To evaluate the benefits of AI in teaching learning.
3. To identify challenges in effective AI integration.
4. To offer finings, suggestions and conclusion.

Hypotheses

Ho1: There is no association between the Students career and adoption of AI courses in arts and science private colleges.

Ho2: There is no association between the Students learning process and adoption of AI tools.

Ho3: There is no association between the Students research skill and adoption of AI tools

Methodology

Research design

A cross-sectional mixed-methods design combining a quantitative survey and qualitative interviews.

Sampling Method

Students in private arts & science colleges across Tamil Nadu This implies that 633 were private arts & science colleges. Convenient sampling used for collecting data from 12 private colleges located in urban, semi-urban and rural areas. Within each colleges 50 students selected stratified by year wise and totally 600 samples. This sample provides adequate data for comparisons researchers may adjust for feasibility.

Tools for Collecting Data

Structured questionnaire was framed for collecting data from students with consideration of demographics, AI awareness, frequency of AI tool usage study aids, tutoring, writing tools, perceived benefits and outcomes self-reported learning, soft skills, internship/job outcomes, infrastructure like broadband, LMS usage, AI-tool subscriptions, IT support, student development programs, policy documents.

Tools for Analysis

- Descriptive statistics
- Cross-tabulations
- Chi-square tests
- T-tests/ANOVA

Findings of the study

- Majority of respondents (50%) fall in the 18–21 years age group, typical of undergraduate students.
- 60% of the respondents are PG students.
- 70% of the respondents are Nuclear families.
- 60.5 % of female enrolment in Arts & Science colleges.
- 40% of the respondents are belong to middle-income families.
- AI course preference is highest among the 18–21 (73.3%) and 22–25 (72.2%) groups shows strong interest from undergraduate and young postgraduate students.
- Both UG and PG students (72.2%) show strong preference, while research scholars are slightly less (66.7%).
- Nuclear family students (73.8%) prefer AI courses more than joint families (66.7%).
- Middle-income groups (₹20k–40k, ₹40k–60k) show highest preference (75%), while low-income and high-income groups show lower preference (66.7%).
- Urban students (76.9%) show maximum interest, followed by semi-urban (72.7%), while rural students (58.3%) lag behind.

- 71.7% (430 out of 600) respondents prefer AI-related courses.
- There is a significant association between students' career orientation and adoption of AI courses. Students with strong career goals are more likely to adopt AI courses.
- There is **a** significant association between students' learning process and adoption of AI tools. Active learners are more likely to adopt AI tools compared to passive learners.
- There is a significant association between students' research skills and adoption of AI tools. Students with stronger research skills are more inclined to adopt AI.
- There is a significant relationship between career orientation, learning process, research skill**,** and adoption of AI tools/courses**.**
- The mean adoption score is significantly higher among career-oriented students. Since *p < 0.05*, Ho1 is rejected.
- Active learners adopt AI tools significantly more than passive learners. Ho2 is rejected.
- Students with strong research skills adopt AI significantly more. Ho3 is rejected.
- Older students Above 25 years report the highest level of challenges in almost all aspects (Finance 83.3%, Technology Adoption 75.0%, Medium 66.7%, Infra 75.0%).
- Younger students Below 18 face relatively fewer challenges, particularly in technology adoption (50%) and medium of study (41.7%).
- Higher education groups (PG and M.Phil/PhD) face more challenges, especially in finance (77.8%–83.3%) **and** infrastructure (72.2%–83.3%)**.**
- Undergraduates (UG) face fewer issues compared to PG and research students, particularly in technology adoption (55.6%).
- Joint family students tend to face more financial and medium-related **issues** due to shared responsibilities and larger family burdens.
- Low-income families (<₹20,000) face the highest financial challenges (72.2%) and difficulties in infrastructure usage.

- Middle-income families (₹20k–40k) report relatively fewer challenges (66.7%) as they balance affordability and access.
- High-income families (>₹60,000) surprisingly report higher expectations and dissatisfaction with infrastructure and medium, even though they face fewer direct financial barriers.
- Rural students face the most serious challenges, particularly in technology adoption (above 80%) and infrastructure (over 90%).
- Semi-urban students show moderate levels of difficulty, especially in financial and medium-related aspects.
- Urban students report the least difficulties, particularly in technology adoption (around 61.5%).
- High basic awareness of AI among students but limited advanced literacy in AI concepts among both students and faculty.
- Stakeholders report potential gains from personalised learning, automated feedback, and improved research assistance.
- Limited institutional budgets, inconsistent internet access, and lack of sustained faculty training constrain adoption in smaller private colleges
- Use of generative AI raises concerns about plagiarism and assessment validity; institutions need updated assessment practices and integrity policies.

Suggestions

This suggests that mature students have higher expectations and thus perceive more challenges, while younger students adjust more easily. This indicated that advanced learners require better infrastructure, resources, and financial support to meet AI course requirements. Nuclear family students report fewer challenges overall, showing that smaller family structures provide better support for education. This proves a digital divide, where rural students lack adequate resources and access to AI learning platforms. Finance and infrastructure are the most common challenges across all groups of private colleges. Technology adoption challenges are significant for rural and older students**.** Medium of study like English vs Tamil/local language, continues to be a barrier for many, especially in rural areas and joint families. Scholarships for low-income families. Improved digital infrastructure in rural colleges. Local-language learning resources to bridge the medium gap. Tailored AI training programs for PG and research-level students. AI's potential in Tamil Nadu's private arts & science colleges lies in enhancing individualized support (remedial modules, language assistance, learning analytics) and easing faculty workload (grading support, content generation). But technology alone is insufficient institutional leadership, policy alignment (with NEP goals), faculty capacity building, and equity-focused procurement are critical. Aligning AI adoption with learning outcomes (not novelty) is essential; otherwise, adoption risks shallow integration or widening inequities between well-resourced and resource-poor colleges.

Conclusion

AI offers transformative possibilities for arts & science private colleges in Tamil Nadu but achieving meaningful impact requires deliberate strategy: investments in infrastructure, faculty capacity building, updated assessment methods, and policies safeguarding equity and academic integrity. Empirical research using the mixed methods design outlined here — is urgently needed to ground institutional choices in evidence and ensure AI becomes an enabler of inclusive, quality higher education in the state.

Recommendations

Infrastructure pooling creates district- or university-level shared AI-resource hubs for smaller colleges to access premium tools. Adopt diverse assessment methods like project work, oral viva, portfolios to reduce integrity risks from generative AI. Ethics & data governance, institutional AI use policy covering data privacy, consent, and acceptable use. Integrate AI-awareness modules into arts & science curricula (critical thinking about AI, digital literacy). Mandate periodic impact assessments and publish institutional AI-readiness reports.

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