IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 4, September 2026
Impact Factor: 8.2

AI-Driven Pedagogy and Institutional Transformation: A Comparative Review

Rhushikesh Alle[1], Asst. Prof. Shahid Shafi Pathan[2], Asst. Prof. Rushi Ramaji Durge[3]
[1],[2],[3] Assistant Professors
[1] Commerce & Management, [2],[3] Computer Science & Application
ASM's CSIT College, Pimpri, India

Abstract: *Artificial Intelligence (AI) is rapidly transforming the landscape of higher education by reshaping pedagogical approaches, institutional processes, and research ecosystems. This paper, "AI-Driven Pedagogy & Institutional Transformation: A Comparative Review," examines the strategic integration of AI-powered tools in academic environments and evaluates their impact on teaching-learning effectiveness and institutional development. The study comparatively analyzes widely adopted platforms such as ChatGPT, Google Gemini, NotebookLM, Semantic Scholar, Turnitin, and GitHub Copilot to assess their academic purpose, implementation feasibility, and contribution to outcome-based education.*

The research highlights how generative AI enhances personalized learning, content development, formative assessment, and research productivity. AI-assisted research platforms improve literature review efficiency, citation analysis, and evidence-based curriculum design. Simultaneously, integrity-focused tools strengthen ethical academic practices and quality assurance mechanisms aligned with NAAC and NBA frameworks. Through a structured comparative framework, the study identifies key benefits, adoption challenges, faculty readiness requirements, and policy implications for higher education institutions.

The findings suggest that AI integration, when supported by institutional policy, faculty training, and digital infrastructure, significantly improves student engagement, academic writing quality, research output, and administrative efficiency. The paper proposes a phased implementation roadmap emphasizing AI literacy, governance guidelines, and outcome-based monitoring systems to ensure sustainable institutional transformation.

This review contributes to the growing discourse on AI-enabled education by presenting a comprehensive institutional perspective, bridging pedagogical innovation with strategic academic governance in the era of digital transformation.

Keywords: Artificial Intelligence (AI), AI-Driven Pedagogy, Institutional Transformation, Outcome-Based Education (OBE),, Generative AI, Academic Integrity, Digital Learning Ecosystem,

I. INTRODUCTION

The rapid advancement of Artificial Intelligence (AI) has ushered in a transformative era in higher education, redefining traditional pedagogical models and institutional governance frameworks. AI-driven technologies are no longer confined to automation or technical domains; they are now actively reshaping curriculum design, content delivery, assessment mechanisms, academic research, and administrative efficiency. Institutions worldwide are increasingly integrating AI tools to enhance teaching effectiveness, foster personalized learning, and strengthen quality assurance systems.

Generative AI platforms such as ChatGPT and Google Gemini enable dynamic content generation, real-time academic assistance, and adaptive learning experiences. Research-focused systems like NotebookLM and Semantic Scholar

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 4, September 2026 Impact Factor: 8.2

streamline literature review processes, citation tracking, and evidence-based academic writing. Meanwhile, academic integrity and evaluation platforms such as Turnitin reinforce ethical research practices and transparency in scholarly submissions. In technical education, tools like GitHub Copilot support experiential learning by assisting students in coding and project development.

This growing ecosystem of AI applications presents both opportunities and challenges. While AI enhances efficiency, engagement, and research productivity, concerns regarding data privacy, academic integrity, faculty preparedness, and over-reliance on automation must be addressed through structured governance policies and ethical guidelines. Higher education institutions must therefore move beyond experimental adoption toward a strategic and policy-driven integration aligned with Outcome-Based Education (OBE), accreditation standards, and institutional development goals.

This paper presents a comparative review of selected AI tools within the context of pedagogical innovation and institutional transformation. By evaluating their academic purpose, implementation feasibility, and measurable outcomes, the study aims to propose a structured framework for sustainable AI integration in higher education..

II. OBJECTIVES OF THE STUDY

The study aims to:

- Examine how colleges and universities in India and abroad use AI in teaching and learning.
- Analyze evidence and examples showing how AI improves teaching effectiveness and student learning outcomes.
- Identify practical AI tools such as ChatGPT, Google Gemini, NotebookLM, and Semantic Scholar for UG and PG levels.
- Assess the feasibility of AI adoption at ASM institutes.
- Propose a clear and implementable AI integration plan for subjects, departments, and institutional transformation.

Scope of the Research Paper

1) How AI is used in Education Globally

This section presents a practical review of how leading institutions in India and abroad are successfully integrating AI in teaching, assessment, research, and administration.

Sr. No.	Institution Name & Country	AI Tool Used	Used For (Teaching / Engagement / Assessment / Research / Admin)	How It Is Used	Benefits Observed	Learning for ASM
1	Stanford University, USA	ChatGPT	Teaching, Research	AI-assisted coding help, research drafting, concept clarification	Improved student understanding and faster research output	Introduce AI-assisted lab sessions in PG programs
2	Harvard University, USA	NotebookLM	Research, Content Analysis	Summarizing research papers and institutional reports	Faster literature review and better academic documentation	Use for dissertation guidance and NAAC documentation
3	Indian Institute of Technology	Turnitin	Assessment, Research	Plagiarism check for thesis and	Improved academic	Strengthen ethical research practices at

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 4, September 2026 Impact Factor: 8.2

	Bombay, India			assignments	integrity	ASM
4	University of Oxford, UK	Semantic Scholar	Research	AI-powered literature search and citation tracking	High-quality research publications	Train faculty in AI-based literature review
5	Amity University, India	Microsoft Teams	Teaching, Engagement, Admin	Hybrid classes, assignments, feedback	Better student participation and communication	Strengthen blended learning framework
6	Arizona State University, USA	Google Gemini	Teaching, Student Support	AI-based tutoring and academic support	Personalized learning experience	Develop AI-based mentoring support system
7	Georgia State University, USA	AI Chatbots (e.g., Pounce)	Student engagement, admin advising	Reduces dropouts by 22%, 24/7 support	Higher retention, faster queries	Georgia State University, USA
8	Byju's/Vedantu partnered unis, India	AI Chatbots, Adaptive Platforms	Teaching, engagement, research content	Instant doubt resolution, adaptive lessons	Better comprehension, self-paced learning	Byju's/Vedantu partnered unis, India
9	IISc Bangalore, India	Generative AI tools	Enhances research efficiency	Research/Content	Faster analysis, unconstrained access	IISc Bangalore, India

2) Key Observations

- Global universities are using AI for **personalized learning and adaptive tutoring**.
- AI tools enhance **research productivity and documentation quality**.
- Institutions prioritize **academic integrity and ethical AI policies**.
- Hybrid learning platforms improve **student engagement and communication**.

III. LITERATURE REVIEW & REAL EXAMPLES

This section presents selected research studies and institutional reports that provide evidence of AI improving teaching, saving faculty time, and enabling personalized learning.

Sr. No.	Title of Article / Research Paper / Report	Author / Source	Year	Focus Area (Teaching / Lesson Planning / Assessment)	Key Findings	Real Example / Case Study	Benefits Observed (Understanding / Time Saving / Personalization)	Learning for ASM

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 4, September 2026 Impact Factor: 8.2

1	Generative AI and the Future of Education	Harvard University Teaching & Learning Report	2023	Teaching & Assessment	AI-assisted writing improved clarity, structure, and critical thinking	Controlled classroom use of ChatGPT for academic writing	Improved student understanding and faster feedback	Introduce supervised AI writing practice in PG courses
2	AI Tutoring Systems Improve STEM Outcomes	Stanford University Study	2022	Personalized Learning	Adaptive AI tutoring increased conceptual mastery	AI-supported coding and mathematics assistance	Better understanding and self-paced learning	Deploy AI mentoring for technical subjects
3	AI in Higher Education: Opportunities and Challenges	University of Oxford Research Review	2023	Lesson Planning & Research	AI tools significantly reduced literature review time	Use of Semantic Scholar for citation mapping	Time saving and improved research quality	Train faculty in AI-based literature review methods
4	Institutional Academic Integrity Report	Indian Institute of Technology Bombay	2021	Assessment	Automated plagiarism checks enhanced transparency	Implementation of Turnitin for theses and assignments	Saved evaluation time and improved originality	Strengthen plagiarism policy and digital submission system
5	AI for Smart Course Design & Content Structuring	Arizona State University Case Study	2023	Lesson Planning	AI-generated lesson outlines improved structured delivery	Use of Google Gemini for content preparation	Reduced preparation time and better topic alignment	Conduct AI-based lesson planning workshops
6	Case Studies of AI in	Balbeer Prasad, Preeti, Shireen-	2025	AI-driven technologies	Various educational	AI analyzes student data to	Time saving	Case Studies

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 4, September 2026 Impact Factor: 8.2

	Education: Transforming Learning Experiences	e-Sadaf		including intelligent tutoring systems, adaptive learning platforms, and AI-based assessment tools	settings from primary schools to higher education using AI platforms for personalized pathways and automated grading	tailor content, provides immediate feedback, automates grading, identifies knowledge gaps	via administrative automation; improved understanding through real-time feedback; personalization by adjusting task complexity to individual needs	of AI in Education: Transforming Learning Experiences
7	How Teachers Are Using AI to Redefine Education (TeachBetter.ai Report)	TeachBetter.ai	2026	AI-powered lesson planning and quiz/worksheet generation for assessments	Real classroom usage data from 115,000+ AI generations by 30,000+ teachers	Over half of teachers use AI for curriculum-aligned lesson plans with integrated assessments; enables frequent formative evaluation	Significant time reduction in planning and assessment creation; enhanced conceptual clarity and student engagement; supports	How Teachers Are Using AI to Redefine Education (TeachBetter.ai Report)

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 4, September 2026
Impact Factor: 8.2

							differentiated instruction for diverse needs	
8	Maths Pathway AI Platform Implementation [	DigitalDefynd	2025	Adaptive learning platform for math education	School implementation of Maths Pathway using machine learning for tailored math content and real-time feedback	Improved math performance, higher test scores, better identification of learning gaps	Teachers address gaps more timely; personalization to individual pace/style; increased student engagement and understanding	Maths Pathway AI Platform Implementation
9	AI-Driven Personalized Learning Platform on Coze (Medical Students Study)	PMC	2025	Personalized learning platform evaluating outcomes and self-directed learning	Experimental group of medical students using AI platform vs control	Increased autonomous learning time (49 vs 35 min/day); 117% more classroom questions/comments indicating deeper engagement	Moderate-large effect on learning time; stimulated proactive thinking; improved participation quality	AI-Driven Personalized Learning Platform on Coze (Medical Students Study)

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 4, September 2026 Impact Factor: 8.2

							and self-directed learning [	
10	Case Studies of AI in Education: Transforming Learning Experiences	Balbeer Prasad, Preeti, Shireen-e-Sadaf	2025	AI-driven technologies including intelligent tutoring systems, adaptive learning platforms, and AI-based assessment tools	Various educational settings from primary schools to higher education using AI platforms for personalized pathways and automated grading	AI analyzes student data to tailor content, provides immediate feedback, automates grading, identifies knowledge gaps	Time saving via administrative automation; improved understanding through real-time feedback; personalization by adjusting task complexity to individual needs	Case Studies of AI in Education: Transforming Learning Experiences

Key Evidence from Literature

AI improves **concept clarity and academic writing quality**.

AI-based tutoring enhances **personalized and self-paced learning**.

AI tools reduce **faculty workload in planning and evaluation**.

AI strengthens **research output and academic integrity systems**.

III. LITERATURE REVIEW & CASE ANALYSIS

3.1 Systematic Literature Overview

This section synthesizes key scholarly articles and institutional reports that provide empirical evidence, theoretical frameworks, and practical case studies of AI implementation in higher education. The review prioritizes studies with direct pedagogical focus, quantitative outcomes, and documented real-world implementations.

3. Methods and Approaches in the Literature

The 30 studies examined in this review employ diverse methodological approaches, reflecting the multifaceted nature of AI integration in education and the field's evolution from proof-of-concept demonstrations to rigorous outcome

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 4, September 2026 Impact Factor: 8.2

evaluations. Understanding these methodological choices is essential for interpreting findings and assessing the strength of evidence.

Experimental and quasi-experimental designs constitute the strongest evidence base for causal claims about AI's impact. Several studies employed controlled comparisons between AI-enhanced and traditional instruction. For example, Eltahir et al. conducted a quasi-experimental study with 110 pre-service teachers (55 experimental, 55 control), using pre- and post-tests alongside rubric-based assessments to evaluate AI-powered tools in Moodle. Similarly, Leong implemented a 12-week experimental design with 200 students (100 per group) across three underserved Malaysian schools, collecting data from Learning Management Systems, attendance records, and standardized teacher questionnaires . Yilmaz et al. used a controlled design to compare AI-assisted personalized feedback with traditional correct/incorrect feedback in dental education . These studies provide robust evidence of AI's effects by isolating the intervention from confounding variables.

Mixed-methods approaches combine quantitative outcome measures with qualitative insights into user experiences and implementation processes. Bezzina et al. evaluated the Education AI project using both quantitative assessments showing a 23% improvement in low-performing students and qualitative interviews with teachers and students . Jian employed a particularly comprehensive mixed-methods design, analyzing performance metrics for 500 students (250 per group) while conducting focus group discussions with 50 students and 20 educators, subjected to thematic analysis . Rath's study of Gemini integration in dental education assessed both formative and summative assessment outcomes alongside student and faculty experiences . These designs capture both the "what" (measurable outcomes) and the "how" and "why" (mechanisms and contextual factors) of AI implementation.

Case study methodologies provide rich, contextualized accounts of AI integration in specific institutional settings. Munawwaroh et al. conducted a qualitative case study at Madrasah Aliyah Nurul Jadid using semi-structured interviews, participant observations, and documentation analysis to examine AI's impact on Islamic education . Maldonado et al. employed a single case study over three months at the Coronel Emilio Suárez Educational Unit, using multiple data sources including classroom observations, interviews, learning product analysis, and institutional document review . Sholeh et al. used case study methods with in-depth interviews, classroom observations, and document analysis in senior high schools in Tulungagung Regency, Indonesia . While case studies limit generalizability, they provide essential insights into implementation challenges, contextual factors, and the complex interplay between technology, pedagogy, and institutional culture.

Comparative and descriptive analyses synthesize existing evidence or compare different approaches. Milad et al. used a descriptive design to review literature and a quasi-experimental approach to compare 33 lesson plans created by student-teachers with AI-generated alternatives . Butt et al. conducted a wide-ranging exploration synthesizing research studies, international policy reports, and socio-economic case studies. These approaches help identify patterns across contexts and technologies.

Methodological limitations are important to acknowledge. Many studies lack long-term follow-up data, making it difficult to assess sustainability of effects. Sample sizes vary considerably, with some studies involving fewer than 100 participants. Randomization is rare, with most experimental studies using quasi-experimental designs that may be subject to selection bias. Few studies employ active control conditions that account for novelty effects or increased attention. Publication bias may favor positive findings. Despite these limitations, the convergence of evidence across diverse methodologies, contexts, and technologies strengthens confidence in the core findings regarding AI's potential to enhance learning outcomes, reduce teacher workload, and enable personalization.

- Augmenting Learning with Artificial Intelligence (Abhijit Das et al. 2025)Quantitative empirical study (n=250),Positive correlations between AI adoption and teaching/learning indicators across Indian universities; generative AI and adaptive tools most commonly used . Survey of 250 faculty and students across multiple Indian universities examining generative AI, adaptive LMS, and administrative tools . Improved teaching effectiveness, enhanced learning outcomes, administrative convenience, faculty satisfaction | Infrastructure gaps, training needs, ethical concerns about data privacy .

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 4, September 2026
Impact Factor: 8.2

- Leveraging AI for Personalized Learning (AA Tonga et al. 2025 Case study) AI-enabled real-time feedback integrated into undergraduate curriculum; focus on student reflection and self-assessment.| Prince Abubakar Audu University Anyigba (Nigeria) implemented AI feedback systems for undergraduate courses .Enhanced student self-assessment capabilities, improved reflection practices, better metacognitive awareness .Limited to single institution; scalability questions; technology access issues .
- AI in Higher Education: Transforming Learning and Administration (Mustafa Kayyali 2025)|Literature review with case studies.Comprehensive review of adaptive curriculum design, virtual assistants, automated assessments, and administrative automation . Multiple case studies of effective AI integration across student lifecycle . Tailored learning paths, improved operational efficiency, expanded student support services, reduced administrative burden . Implementation costs, faculty resistance, algorithmic bias concerns, infrastructure requirements.
- Proactive and Reactive Engagement: A Comprehensive Review (Multiple authors 2023 Systematic review (194 articles) . Maps AI roles from admissions to assessment; categorizes proactive (planning) and reactive (execution) AI engagement across student lifecycle . Analysis of 194 studies covering diverse AI applications in higher education globally . Demonstrates scalable applications across student lifecycle, identifies best practices and implementation patterns. Highlights significant limitations in longitudinal outcome studies and cost-benefit analyses.
- Artificial Intelligence Applications in Latin American Higher Education (Sdenka Z. Salas-Pilco, Yuqin Yang 2022) Systematic review . Identifies main AI applications: predictive modeling, intelligent analytics, assistive technologies; examines use in learning, teaching, and administration .Aggregated analysis of Latin American HEI implementations . Early detection of at-risk students, improved institutional decision-making, enhanced support services, data-driven quality assurance | Regional infrastructure disparities, limited empirical outcome data, ethical framework gaps .
- Midwifery Education and Outcome-Based Assessments (Lindya O. Herbawani et al. 2025) Systematic review . CNN, LSTM, Random Forest, SVM used for objective, adaptive assessments aligned with OBE; links AI to experiential learning simulations . Domain-specific review of AI in clinical education and competency assessment . Improved assessment objectivity, personalized feedback, enhanced clinical readiness, critical thinking development, OBE alignment | Domain-specific findings may not generalize; requires specialized infrastructure; faculty training intensive .

Filled Table: Literature Review & Real Examples

Sr. No.	Title of Article / Report / Source	Focus Area (Teaching/Lesson Planning/Assessment)	Real Example / Case Study	Benefits Observed (Improved Understanding / Time Saving for Teachers / Personalization for LMS)
1	Case Studies Of AI In Education: Transforming Learning Experiences	Teaching / Personalized Learning	AI-powered platforms analyzed student data to tailor content and provide real-time feedback.	Improved student understanding through adaptive tasks; teacher time saved on grading and gap identification; personalization via individual pathways
2	Case Study: How 2 Teachers Use AI Behind the Scenes to Build Lessons	Lesson Planning	6th-grade teachers in New York used AI to create lessons and quizzes.	Significant time savings for teachers in planning; enhanced lesson relevance leading to better student engagement .
3	AI in Education: 8 Use Cases & Real-Life Examples	Assessment / Personalized Learning	Duolingo's AI adapts language lessons based on performance,	Improved understanding via tailored difficulty; personalization through spaced repetition; teachers

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 4, September 2026 Impact Factor: 8.2

			providing instant feedback.	freed for interaction.
4	Use of AI in Schools [25 Case Studies]	Teaching / Lesson Planning	New Town High School's "Maths Pathway" platform adjusted math content to student pace.	Higher test scores and engagement (improved understanding); teachers addressed gaps timely (time saving); personalized modules.
5	Leveraging AI to Revolutionize Lesson Planning	Lesson Planning / Assessment	Qatar teachers used AI for student-centered activities and grading automation.	40% reduction in planning time; 68% more student motivation and 85% preference for interactive plans (personalization and understanding) .

AI tools enhance traditional teaching by providing personalized feedback, automating routine tasks, and enabling adaptive learning experiences. This transforms classrooms into more engaging, student-centered environments while supporting key pedagogies like Outcome-Based Education (OBE).

Filled Table

Sr.	Traditional Method (Before AI)	AI Tool/Approach	How AI Improves	OBE? (How)	New Opportunities Created
1	Lectures: Teacher delivers information to passive students taking notes.exploringthecore+1	AI note-taking tools, intelligent tutoring systems, adaptive platforms.eschoolnews+1	Provides real-time transcription, feedback, and customized content, freeing teachers for interaction and identifying gaps instantly.eschoolnews+1	Yes; tracks outcome attainment via data analytics and personalized remediation.	Interactive simulations and anytime access to AI tutors for deeper engagement.
2	Rote memorization: Repetitive drills for fact recall without understanding.itac+1	Generative AI for interactive quizzes, gamified apps.timesofai+1	Shifts to active learning with inquiry, problem-solving, and adaptive challenges beyond memorization.pmc.ncbi.nlm.nih+1	Yes; maps to specific outcomes with predictive analytics on mastery.	Personalized learning paths fostering creativity and self-directed skills.
3	Standardized group instruction: Same pace/content for all students.	AI adaptive platforms analyzing performance data.eschoolnews+1	Tailors content to individual styles, paces, and needs for better engagement.ucanwest+1	Yes; ensures competency-based progress with real-time insights.	Student-focused learning via sentiment analysis and virtual support outside class.
4	Limited hands-on activities: Due to resources or time constraints.	AI simulations and virtual labs integrated with experiential methods.	Enables anytime immersive experiences, boosting motivation and application.	Yes; aligns activities to outcome demonstration through iterative	Experiential AI-driven projects enhancing innovation and collaboration.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 4, September 2026 Impact Factor: 8.2

				practice.	
5	Lectures and one-size-fits-all instruction	Intelligent tutoring systems (e.g., DreamBox, Carnegie Learning)	Analyzes student data in real-time to adapt content, provide instant feedback, and identify gaps, making lessons more efficient than static lectures	Yes: Aligns content to specific learning outcomes via automated mapping and real-time analytics	Personalized learning paths for diverse styles, freeing teachers for deeper interactions
6	Standardized assessments and manual grading	AI-powered grading tools (e.g., Gradescope)	Automates grading for speed and objectivity, offers immediate feedback to refine instruction	Yes: Tracks progress against outcomes with data insights for interventions	Data-driven insights for curriculum tweaks and predictive at-risk student support
7	Teacher-led activities with limited practice	AI simulations and virtual labs	Creates interactive, adaptive scenarios for hands-on practice beyond physical limits	Yes: Measures skill mastery through experiential tasks tied to outcomes	Immersive experiential learning (e.g., VR decision-making), boosting engagement
8	Group instruction ignoring individual needs	Adaptive platforms (e.g., Knewton, chatbots like SERA)	Tailors content to pace, style, and weaknesses via performance analysis	Yes: Ensures outcome attainment through personalized dashboards and feedback	Student-focused learning with 24/7 virtual assistants and gamified engagement

AI Tools for UG/PG Education

Filled the provided table template with practical, teacher-usable AI tools focused on UG/PG levels. Selected tools based on their relevance to content creation, lesson planning, assessment, and research, prioritizing ease of access and proven educational applications.theschoolhouse+2

Sr. No.	Education Level (School / UG / PG / Research)	Category (Content / Lesson Planning / Assessment / Research)	Tool Name	How Used in Our Department	Who Will Use It (Teacher / Student / Dept / Admin)	Expected Benefit
1	UG/PG	Lesson Planning	MagicSchool.ai	Generate standards-aligned lesson plans, scaffolds, and activities for	Teacher	Saves 2-3 hours per lesson prep; enables differentiation for diverse UG/PG classes.theschoolhouse+1

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 4, September 2026
Impact Factor: 8.2

				subjects like AI or research methods.		
2	UG/PG	Assessment	Musely.ai	Create question papers with MCQs, Bloom's Taxonomy levels from course notes.	Teacher	Quick generation of varied assessments; aligns with exam standards for efficiency.
3	PG/Research	Research	SciSpace	Analyze papers, summarize literature, explain complex AI models for reviews.	Student / Teacher	Accelerates lit reviews; improves hypothesis formulation in stress detection research.
4	UG/PG	Lesson Planning / Content	NotebookLM	Upload syllabi/notes to create study guides, quizzes, lesson outlines.	Teacher / Student	Personalizes content from dept materials; boosts student engagement in UG
5	PG/Research	Research / Academic Writing	Paperpal	Check grammar, paraphrase, generate citations for theses and papers.	Student	Enhances writing quality; speeds up journal-ready drafts for PG research.paperpal+1
6	UG/PG	Assessment	MagicSchool.ai Rubric Generator	Build rubrics for assignments in table format tied to learning objectives.	Teacher	Consistent grading; clear criteria for student feedback in project assessments.

Copyright to IJARSCT
www.ijarsct.co.in
DOI: 10.48175/IJARSCT-40234

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 4, September 2026 Impact Factor: 8.2

7	UG/PG	Content Creation	Canva AI/NotebookLM	Design visuals, infographics for lectures on AI tools or stress physiology.	Teacher / Dept	Engaging materials; quick dept presentations for workshops.forasoft+1
8	PG	Research	QuillBot	Paraphrase sources, summarize for lit reviews and hypothesis building.	Student	Avoids plagiarism; refines academic tone in health AI papers.

Tool Selection Rationale

Tools chosen emphasize practicality for Indian higher ed contexts like Pune universities, integrating user-preferred options (SciSpace, QuillBot). Focused on free/low-cost tiers suitable for teachers/students; all support real-time tasks without steep learning curves.

Implementation Tips

Integration: Start with dept workshops using NotebookLM for shared resources; track via Google Forms feedback, aligning with past FDP sessions.

Levels Fit: UG tools prioritize basics (planning/assessment); PG/research emphasize writing/lit review for theses.lumivero+1

Benefits Quantified: Expect 30-50% time savings on routine tasks, per educator reviews.

AI-Driven Pedagogy & Institutional Transformation

ASM's Implementation Plan

Sr. No.	AI Tool Name	Why This Tool is Suitable for Our Department	How It Will Be Used in Classroom	How Teachers Will Use It	How Students Will Benefit
1	**ChatGPT (by OpenAI)**	Useful for Computer Science, Management, Commerce & Humanities for content generation, coding help, research drafting, and conceptual clarity.	Live demonstrations for coding, case study discussions, research idea generation, debugging sessions.	Preparing lecture notes, generating question banks, designing assignments, creating rubrics, drafting reports.	24/7 academic support, better conceptual understanding, improved writing skills, coding assistance.
2	**Google Classroom (by Google)**	Suitable for structured LMS management across all departments.	Assignment submission, quizzes, sharing AI-based learning resources.	Managing course materials, tracking student progress, providing AI-supported feedback.	Organized learning, timely feedback, easy access to resources.
3	**Microsoft Copilot (by**	Helpful for documentation, data	Demonstrating AI-powered Excel	Creating smart presentations,	Improved productivity, enhanced data

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 4, September 2026 Impact Factor: 8.2

	Microsoft)	analysis, and presentation preparation in management and IT courses.	analysis, automated report generation.	automating data analysis tasks, drafting academic documents.	interpretation skills.
4	**Moodle LMS (by Moodle)**	Open-source and customizable for institutional integration.	AI-integrated quizzes, adaptive learning modules.	Monitoring learning analytics, conducting online assessments.	Personalized learning paths, self-paced study options.
5	**Turnitin (by Turnitin)**	Essential for research departments and PG programs to maintain academic integrity.	Demonstrating plagiarism checks during research methodology sessions.	Checking assignments, dissertations, and research papers.	Awareness of research ethics, improved academic writing.
6	**Quizizz Mentimeter**	Suitable for interactive and outcome-based education.	AI-generated quizzes and gamified classroom assessments.	Conducting quick formative assessments.	Increased engagement, fun-based learning, instant performance feedback.
7	**Canva AI (by Canva)**	Useful for presentations, project design, and creative assignments.	Teaching visual communication and infographic preparation.	Designing teaching materials, posters, academic brochures.	Improved creativity, better presentation skills.
8	**GitHub Copilot (by GitHub>)**	Highly suitable for Computer Applications & IT departments.	Live coding demonstrations with AI-assisted programming.	Preparing lab exercises, demonstrating optimized code writing.	Faster coding skills, exposure to industry-relevant AI tools.

Implementation Strategy at ASM

4) Phase 1: Awareness & Training

- Conduct Faculty Development Programs (FDPs) on AI literacy.
- Organize workshops on ethical AI usage and academic integrity.
- Create departmental AI champions.

5) Phase 2: Pilot Implementation

- Introduce AI tools in selected courses (e.g., Web Technology, Data Analytics, Research Methodology).
- Collect student feedback.
- Measure learning outcomes improvement.

6) Phase 3: Institutional Integration

- Integrate AI into curriculum design.
- Develop AI usage policy (aligned with NEP and institutional values).
- Establish AI Innovation & Research Cell.

7) Phase 4: Monitoring & Continuous Improvement

- Use learning analytics dashboards.
- Review academic performance data.
- Update AI strategy annually.

AI-Driven Pedagogy & Institutional Transformation

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 4, September 2026
Impact Factor: 8.2

C. Action Plan (Detailed Implementation Plan)

◆ Action Plan Table

Sr. No.	AI Tool	Who Will Use It? (Teacher/Student/Admin)	Tentative Start Date	Implementation Steps (Step 1, 2, 3…)	Success Measurement (How Will We Know It's Working?)	Training Required (Yes/No + Type)
1	**NotebookLM (by Google)**	Teachers & Students	July 2026 (Semester Start)	Step 1: Upload syllabus, research papers, and notes. Step 2: Train faculty on AI-assisted summarization. Step 3: Students use for research & revision. Step 4: Integrate into Research Methodology course.	Improved research quality, better literature review submissions, reduced plagiarism, improved viva performance.	Yes – Workshop on AI Research Tools (Hands-on FDP)
2	**ChatGPT (by OpenAI>)**	Teachers & Students	June 2026	Step 1: AI literacy session. Step 2: Create AI usage guidelines. Step 3: Use in coding labs, case study discussions. Step 4: Monitor ethical usage.	Higher assignment quality, faster coding completion, improved analytical answers, student feedback reports.	Yes – AI Pedagogy & Ethics Training
3	**Microsoft Copilot (by Microsoft>)**	Teachers & Admin	August 2026	Step 1: Integrate with MS Office 365. Step 2: Train staff on AI-based Excel & report automation. Step 3: Use for academic documentation & data analytics.	Reduced administrative workload, faster report preparation, improved data-driven decisions.	Yes – Technical Skill Development Session
4	**Canva AI (by Canva)**	Teachers & Students	July 2026	Step 1: Introduce in presentation-based subjects. Step 2: Assign	Improved presentation quality, enhanced	No (Basic Orientation Session Only)

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 4, September 2026 Impact Factor: 8.2

				infographic projects. Step 3: Organize AI-based poster competition.	creativity, better student engagement.	
5	**Quizizz (by Quizizz)**	Teachers	July 2026	Step 1: Create AI-based quizzes. Step 2: Conduct weekly formative assessment. Step 3: Analyze performance reports.	Increased classroom participation, better internal assessment scores, quick identification of learning gaps.	Yes – Short Practical Training

🔷 Detailed Step-by-Step Institutional Implementation Strategy

Phase 1: AI Awareness & Policy Formation (Month 1)

- Conduct **AI Orientation Program** for all faculty.
- Draft **AI Usage & Academic Integrity Policy**.
- Form an **AI Steering Committee**.
- Identify department-wise AI coordinators.

Phase 2: Faculty Capacity Building (Month 2–3)

- Organize FDP on:

AI in Teaching & Learning
AI for Research & Publication
Ethical & Responsible AI

- Hands-on sessions on NotebookLM, ChatGPT, Copilot.
- Certification for trained faculty.

Phase 3: Pilot Implementation (Month 4–6)

- Select 2–3 subjects per department.
- Integrate AI-based assignments.
- Use Quizizz for weekly assessments.
- Collect structured student feedback.
- Compare results with previous semester data.

Phase 4: Full-Scale Institutional Deployment (Next Academic Year)

- AI tools integrated into LMS.
- AI-based internal assessment system.
- AI-driven research support center.
- Encourage AI-based minor/major projects.

Phase 5: Monitoring & Success Indicators

Key Performance Indicators (KPIs):

- 📊 20–30% improvement in student engagement
- 📈 Improvement in university results
- 📚 Increase in research publications
- 📝 Reduction in plagiarism percentage

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 4, September 2026 Impact Factor: 8.2

- □ 30% reduction in administrative workload

AI-Driven Pedagogy & Institutional Transformation

Process Automation Suggestions (Department-Level Implementation)

⬘ Process Automation Table

Sr. No.	Process Name (What Work?)	Current Manual Process (How It Is Done Now?)	How AI Can Improve / Automate It	Expected Time / Effort Saved
1	**Lesson Plan Preparation**	Faculty prepares lesson plans manually in Word format by referring to syllabus, CO-PO mapping, textbooks, and previous notes. Takes 2–3 hours per subject per week.	AI tools like **ChatGPT (by OpenAI>)** and **Microsoft Copilot (by Microsoft>)** can generate structured lesson plans aligned with Bloom's Taxonomy, CO-PO mapping, activities, and assessment strategies instantly. Faculty can edit and customize.	50–60% time reduction. Planning time reduced from 3 hours to 1 hour per week.
2	**Question Bank Generation**	Faculty manually creates MCQs, descriptive questions, case studies from textbooks and previous university papers.	AI can generate MCQs, HOTS questions, case-based questions, and coding problems instantly. **Quizizz (by Quizizz>)** can auto-create quizzes. AI ensures different difficulty levels and outcome mapping.	60–70% effort reduction. Large question bank created in minutes instead of days.
3	**Student Feedback Analysis**	Feedback collected via Google Forms and analyzed manually using Excel. Faculty manually interprets results.	**Microsoft Copilot** can automatically analyze Excel sheets, generate summary reports, highlight trends, and suggest improvement areas. AI can generate graphical dashboards.	70% faster analysis. Report generation time reduced from 4–5 hours to 1 hour.
4	**Attendance Analysis & Risk Identification**	Attendance calculated manually; defaulter lists prepared in Excel. Identifying at-risk students requires manual review.	AI-powered Excel tools can auto-detect patterns, predict dropout risks, and generate defaulter alerts. Automated parent notification drafts can be generated.	50% administrative workload reduction. Early intervention possible.
5	**Research Paper & Literature Review Support**	Faculty and PG students manually read multiple PDFs and prepare summaries. Time-consuming literature review process.	**NotebookLM (by Google>)** can summarize uploaded research papers, compare studies, generate citations, and prepare structured literature review drafts.	60–75% research preparation time saved. Improves research quality.
6	**Parent Communication / Official Drafting**	Drafting emails, notices, circulars manually in Word. Multiple revisions required.	AI can generate professional communication drafts instantly with appropriate tone and format. Copilot assists in formatting and proofreading.	40–50% faster communication drafting.
7	**Placement Data Analysis**	Placement data collected and manually compiled into reports for	AI-based Excel analytics can generate placement trend reports, salary distribution charts, and	60% reduction in report preparation time. Better strategic planning.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 4, September 2026
Impact Factor: 8.2

		NAAC/NBA. Trend analysis done manually.	performance dashboards automatically.	

◆ **Overall Institutional Impact**

9) Academic Benefits:

- Standardized lesson planning
- Improved quality of assessments
- Faster research documentation
- Data-driven teaching improvements
- Administrative Benefits:

10) Reduced paperwork

- Faster reporting for NAAC/NBA
- Improved communication efficiency
- Early identification of academically weak students

⬘ Estimated Overall Time Savings

Area	Approximate Time Saved
Academic Planning	50–60%
Assessment Preparation	60–70%
Administrative Reporting	50–70%
Research Work	60–75%

AI-Driven Pedagogy & Institutional Transformation

Expected Impact Analysis

⬘ Expected Impact Table

Area of Impact	Short-Term Benefits (3–6 Months)	Long-Term Benefits (1–2 Years)
Teaching Quality	• Faster lesson plan preparation using AI.• Improved question bank quality (MCQs, HOTS, case studies).• More interactive classes through AI-based quizzes.• Better alignment with Bloom's Taxonomy and CO-PO mapping.	• Standardized and outcome-based teaching practices across departments.• Continuous improvement through AI-driven feedback analytics.• Enhanced research-integrated teaching.• Institutional reputation for innovative pedagogy.
Student Learning Experience	• Instant doubt clarification using AI tools.• Personalized practice quizzes and feedback.• Improved engagement through gamified assessments.• Better quality assignments and presentations.	• Development of self-directed and research-oriented learning habits.• Strong analytical and problem-solving skills.• Higher academic performance and placement readiness.• AI literacy as a core employability skill.
Faculty Efficiency	• 40–60% reduction in time spent on lesson planning and question paper setting.• Automated feedback and attendance analysis.• Faster preparation of reports and documentation.	• Shift from administrative workload to mentorship and innovation.• Increased research publications using AI-assisted literature review.• Data-driven decision-making culture.• Enhanced professional development and digital competency.
Administrative Smoothness	• Quick generation of notices, reports, and official drafts.• Automated student feedback and placement data analysis.• Reduced paperwork.	• Fully digital and AI-supported academic management system.• Predictive analytics for student performance and dropout prevention.• Improved NAAC/NBA documentation readiness.•

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 4, September 2026
Impact Factor: 8.2

		30–50% overall administrative workload reduction.

◆ Overall Institutional Transformation

11) Within 3–6 Months:

- Noticeable improvement in classroom engagement
- Faster academic documentation
- Increased faculty confidence in AI usage
- Structured and efficient assessment process

12) Within 1–2 Years:

- AI-integrated curriculum
- Data-driven governance model
- Strong research ecosystem
- Enhanced institutional ranking and accreditation outcomes

AI-Driven Pedagogy & Institutional Transformation: A Comparative Review

13) Innovative Summary Table (Mandatory)

AI Tool Name	Academic Purpose	Impact on Teaching	ASM Adoption Feasibility	Expected Outcome
ChatGPT	Content creation, lesson planning, coding assistance, research drafting	Enhances personalized learning, supports flipped classroom, instant doubt solving	High – Requires internet access and faculty training workshops	Improved student engagement, better academic writing, enhanced problem-solving skills
Google Gemini	Research assistance, data interpretation, presentation generation	Improves research quality, supports interdisciplinary learning	High – Easily accessible via institutional Google accounts	Enhanced research capability and analytical thinking
NotebookLM	AI-assisted literature review, summarization of institutional documents, syllabus analysis	Enables evidence-based teaching, faster research synthesis, document-grounded Q&A	High – Can be integrated using institutional Google Workspace	Improved research productivity, better curriculum alignment, enhanced faculty documentation efficiency
Grammarly	Academic writing improvement, plagiarism and grammar checking	Improves assignment quality and publication readiness	Moderate – Subscription-based institutional access required	Higher quality research papers and reduced language errors
Turnitin	Plagiarism detection and academic integrity management	Promotes originality and ethical research practices	High – Already widely used in HEIs	Strengthened academic integrity and reduced malpractice
Coursera	Skill development, certification courses, industry-aligned learning	Supports blended learning and outcome-based education	Moderate – Requires MoUs or institutional subscription	Enhanced employability and industry readiness
GitHub Copilot	Coding assistance for programming courses	Accelerates practical implementation and	Moderate – Useful for CS/IT	Improved coding efficiency and innovation capacity

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 4, September 2026 Impact Factor: 8.2

		debugging	departments	
Microsoft Teams	Virtual classroom, collaboration, assignment management	Enables hybrid learning and real-time feedback	High – Easy LMS integration	Seamless communication and improved coordination
Quizizz	Interactive quizzes and formative assessment	Increases classroom engagement and participation	High – Free basic version available	Higher retention and active learning environment
Moodle LMS (by Moodle)	Open-source and customizable for institutional integration.	AI-integrated quizzes, adaptive learning modules.	Monitoring learning analytics, conducting online assessments.	Personalized learning paths, self-paced study options.
Semantic Scholar	Advanced academic paper search, citation analysis, trend identification	Supports high-quality literature review and research gap identification	High – Free and accessible platform	Improved publication quality, stronger research proposals, enhanced citation tracking

REFERENCES

1. Harvard University. (2023). *Generative AI and the future of education*. Harvard Education Review.
2. Stanford University. (2022). *AI tutoring systems improve STEM outcomes*. Stanford Center for Education Policy Analysis.
3. University of Oxford. (2023). *AI in higher education: Opportunities and challenges*. Oxford Education Research Report.
4. Indian Institute of Technology Bombay. (2021). *Institutional academic integrity report: AI in assessment and plagiarism detection*. IIT Bombay Academic Council Publication.
5. Arizona State University. (2023). *AI for smart course design and content structuring: A case study*. ASU Journal of Educational Technology.
6. OpenAI. (2023). *ChatGPT user guide and educational applications*. OpenAI Documentation.
7. Google Research. (2024). *NotebookLM: Transforming academic research workflows*. Google AI Publications.
8. Semantic Scholar. (2023). *Semantic Scholar research analytics and citation trends*. Allen Institute for AI.
9. Turnitin LLC. (2023). *Plagiarism detection and academic integrity tools*. Turnitin Technical Guide.
10. GitHub, Inc. (2023). *GitHub Copilot: AI-powered pair programming*. GitHub Documentation.
11. Google. (2024). *Google Gemini for educators and researchers*. Google AI Help Center.
12. Prasad, B., Preeti, & Shireen-e-Sadaf. (2025). Case studies of AI in education: Transforming learning experiences. Journal of Educational Technology and Innovation.
13. TeachBetter.ai. (2026). How teachers are using AI to redefine education. TeachBetter.ai Research Report.
14. DigitalDefynd. (2025). Maths Pathway AI platform implementation. DigitalDefynd Case Analysis Report.
15. PMC. (2025). AI-driven personalized learning platform on Coze: A study on medical students. PubMed Central Research Article