

Original Research Article

Study on AI Education and Skill Development: NEP 2020 and AI Integration

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Abstract

Artificial Intelligence (AI) is becoming an important technology in transforming education and skill development. The National Education Policy (NEP) 2020 emphasizes technology-enabled learning, multidisciplinary education, vocational education, critical thinking, creativity, and the development of future-ready skills. The integration of AI into education can support these objectives by providing personalized learning, intelligent assessment, automated feedback, digital learning resources, and improved teaching and learning processes. AI can help students learn according to their individual needs, improve academic performance, and access educational resources more effectively. It can also contribute to the development of digital literacy, problem-solving, creativity, communication, and other skills required in the changing world of work. For teachers, AI can assist in lesson planning, assessment, feedback, and identifying students' learning needs, thereby improving the overall efficiency of the education system. However, the successful integration of AI also presents several challenges. These include the digital divide, unequal access to technology, inadequate digital infrastructure, data privacy and security concerns, ethical issues, limited awareness, and insufficient training among teachers and educators. Addressing these challenges is essential to ensure that AI benefits all learners equally and is used responsibly. This study examines the role of AI in education

and skill development and explores its alignment with the objectives of NEP 2020. It focuses on the opportunities offered by AI, as well as the challenges involved in its implementation. The study also suggests measures such as improving digital infrastructure, providing teacher training, promoting AI awareness, ensuring data privacy, and establishing ethical guidelines for responsible AI use. Overall, the study highlights that the effective and responsible integration of AI can strengthen the objectives of NEP 2020. By combining technological innovation with inclusive and learner-centred approaches, AI can contribute to a more personalized, accessible, innovative, and future-ready education system in India.

Keywords: AI Personalized learning, intelligent assessment, digital learning resources, language support, and improved teaching methods.

Introduction

The National Education Policy (NEP) 2020 is a major reform in India's education system that focuses on making education more flexible, inclusive, multidisciplinary, skill-oriented, and technology-driven. The policy emphasizes critical thinking, creativity, problem-solving, vocational education, digital learning, and the development of future-ready skills. The integration of Artificial Intelligence (AI) into education can further support the objectives of NEP 2020. AI can help provide personalized learning, intelligent assessment, digital learning resources, language support, and improved teaching methods. It can also help students develop new skills required for an increasingly technology-driven workplace. However, AI integration also brings challenges such as data privacy, unequal access to technology, AI-related bias, academic integrity, and the need for teacher training. Therefore, the effective integration of AI under NEP 2020 requires a balance between technological innovation and human-centered education. Overall, AI integration with NEP 2020 has the potential to transform teaching, learning, assessment, and skill development in India while supporting the goal of creating a future-ready education system.

What is AI education and skill development?

Using artificial intelligence tools to improve teaching and learning, while also teaching people how to build, use, and understand AI. It covers two main areas: **learning with AI** (using smart tools to study better) and **learning about AI** (gaining technical and literacy skills for the modern workforce).

Benefits of AI in Education & Skill Development (under NEP 2020)

- **Personalized Learning Pacing:** Adapts lesson difficulty, content recommendations, and pacing dynamically to fit individual learning curves instead of a one-size-fits-all model.
- **Instant Doubt Clarification:** Provides students with on-demand, step-by-step problem-solving and immediate feedback outside traditional classroom hours.
- **Shift Away from Rote Memorization:** Facilitates interactive scenario-based assessments and critical problem-solving that directly align with NEP 2020's competency-based vision.
- **Multilingual Content Accessibility:** Translates textbooks, technical terms, and lectures into various regional languages in real-time to bridge language barriers.
- **Support for Differently-Abled Learners:** Delivers automated text-to-speech, audio descriptions, and visual recognition tools to make learning accessible for special-needs students.
- **Teacher Workload Reduction:** Automates routine grading, administrative record-keeping, and initial lesson drafting, allowing educators to dedicate more time to active mentoring.

- Interactive Teaching Aids: Assists faculty in instantly creating visual explanations, lecture presentations, and contextual examples that improve classroom engagement.
- 21st-Century Employability Skills: Builds hands-on fluency in prompt engineering, analytical research, and digital workplace tools from an early academic stage.

Challenges of AI in Education & Skill Development (under NEP 2020)

- Ethical & Data Privacy Risks: Unclear data harvesting practices and potential leaks of sensitive student records create major compliance and ethical concerns.
- High Cost of Premium Tools: Paywalled software tiers, advanced API subscriptions, and licensed platforms create financial barriers for students and institutions.
- Digital & Infrastructure Disparity: Inconsistent campus Wi-Fi, power disruptions, and a lack of dedicated computing labs prevent equitable AI access across colleges.
- Teacher & Student Technical Skill Gap: A lack of structured training on prompt generation, tool selection, and data verification limits effective classroom adoption.
- Over-Reliance & Plagiarism: Students' excessive dependence on automated chatbot solutions can diminish independent cognitive effort, original writing, and critical thinking.
- Algorithmic Bias & Hallucinations: AI outputs often generate inaccurate facts or culturally unrepresentative responses that mislead learners if unverified.
- Regional Language Accuracy Limits: Current NLP models struggle with complex dialects, regional idioms, and technical terms across Indian languages.
- Institutional Resistance to Change: Reluctance among educators and administrators to restructure traditional syllabi and pedagogical methods slows policy integration.

Objectives of the study

- To examine the level of awareness and adoption of Artificial Intelligence (AI) among students and teachers in higher education institutions.
- To assess the role of AI in enhancing teaching-learning processes, personalized education, and academic performance in higher education.
- To identify the major challenges faced by teachers and students in adopting AI, including technological, ethical, privacy, and infrastructural barriers.
- To study the availability of AI-related infrastructure and digital resources in higher education institutions.
- To evaluate the impact of AI on students' creativity, critical thinking, problem-solving, and employability skills

Significant of the study

- NEP 2020 Policy Alignment: Provides empirical data on how AI adoption supports the shift toward personalized, competency-based education and critical thinking.
- Student Workflow Insights: Highlights the primary academic uses of AI, particularly for real-time doubt solving, personalized pacing, and research skill-building.
- Addressing Key Adoption Barriers: Identifies crucial operational obstacles—such as tool costs, data privacy concerns, and digital skill gaps—that require structured interventions.

- Guidance for Institutional Readiness: Points out campus infrastructure deficits (Wi-Fi, dedicated labs) and emphasizes the need for subsidized access and faculty training.
- Focus on Employability & Ethics: Outlines the necessity for structured curricula to foster responsible AI use and enhance student career readiness.

Review of Literature:

Aithal & Aithal (2020) examined the conceptual framework of AI integration in Indian higher education under NEP 2020. The authors highlighted that while AI-driven personalized instruction can dramatically improve student comprehension, Indian institutions face moderate-to-severe digital capacity and infrastructure bottlenecks.

Luckin et al. (2016) explored intelligence unleashed in educational systems, demonstrating that AI tools act primarily as cognitive catalysts. They established that AI is most effective when functioning as an intelligent collaborative partner for learners rather than an autonomous instructional replacement.

Holmes, Bialik, and Fadel (2019) evaluated the pedagogical promises of AI in education (AIED). Their synthesis underscored the divide between learning with AI (adaptive tutoring), learning about AI (curricula updates), and learning for AI (preparing the workforce for an automated economy).

Research Methodology:

1. Research Design

This study adopts a descriptive and exploratory mixed-method design focusing primarily on quantitative survey analysis supported by descriptive interpretation. It aims to evaluate the awareness, perception, and practical integration of Artificial Intelligence (AI) in education and vocational skill development as outlined under the National Education Policy (NEP) 2020.

2. Data Collection Methods

Primary Data: Collected via a structured, online Google Forms questionnaire distributed among key stakeholders (students, educators, and academic administrators). The questionnaire includes Likert-scale questions, multiple-choice items, and category-based queries.

Secondary Data: Sourced from official policy documents published by the Ministry of Education (NEP 2020 framework), peer-reviewed academic journals, reports by NCERT/UGC, and edtech whitepapers.

3. Sampling Technique & Sample Size

Sampling Method: A convenience and stratified sampling method was utilized to ensure balanced representation across undergraduate/postgraduate students and teaching faculty.

Target Population: College students and educators involved in higher education and vocational skill courses.

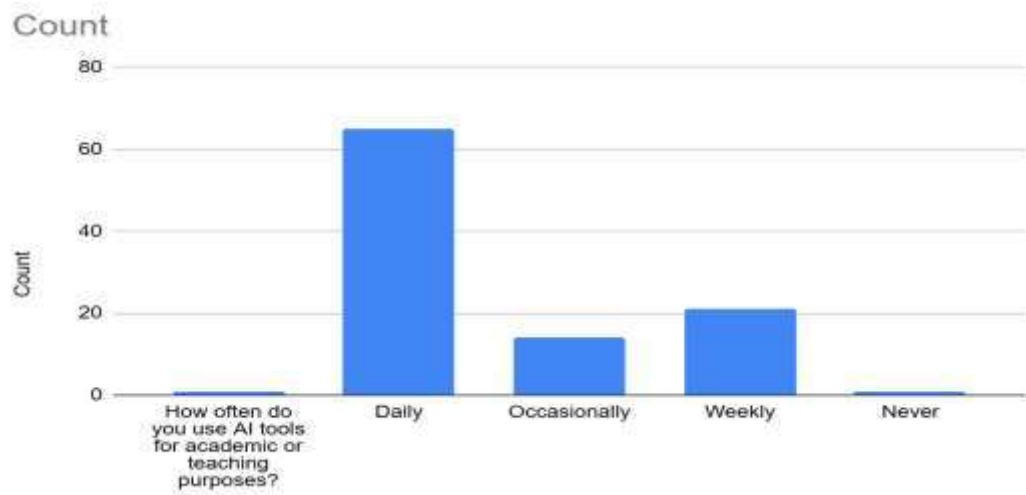
Sample Size: 50–100 respondents

4. Data Analysis Tools

Primary data collected through Google Forms is compiled and analyzed systematically

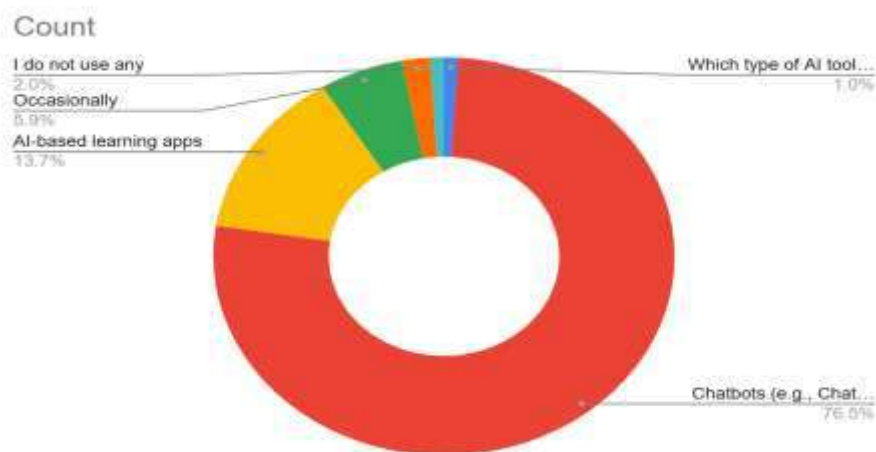
Data Analysis & Interpretation

How often do you use AI tools for academic or teaching purposes?



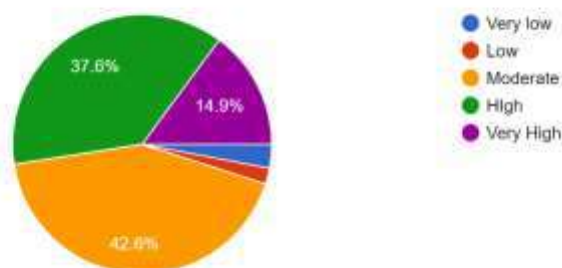
Interpretation: The above result shows **84.2%** reported being **fully aware**, **14.9%** are **somewhat aware**, and negligible respondents are not aware. Basic awareness and recognition of educational AI tools is nearly universal across the group.

Which type of AI tool do you use most often?



Interpretation: The above chart shows **77.2%** predominantly use **Chatbots (e.g., ChatGPT)**, followed by **13.9%** using **AI-based learning apps**, with tiny shares using other models or not using any. Conversational LLM chatbots are by far the preferred format for academic AI assistance.

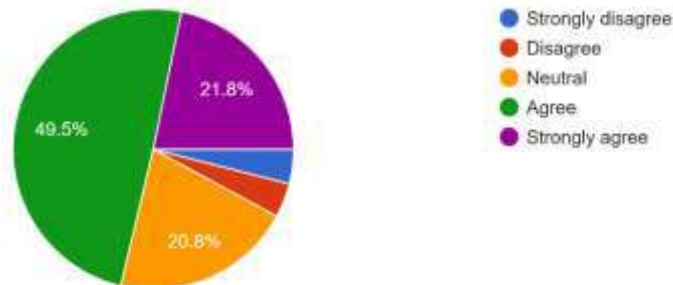
How would you rate your overall awareness of AI applications in education?
101 responses



Interpretation: The above chart shows **42.6%** rated awareness as **Moderate**, **37.6%** as **High**, **14.9%** as **Very High**, and less than 5% as Low/Very Low. While almost everyone uses tools, most classify their depth of understanding as moderate-to-high rather than expert level.

AI has improved the quality of teaching-learning processes in my institution.

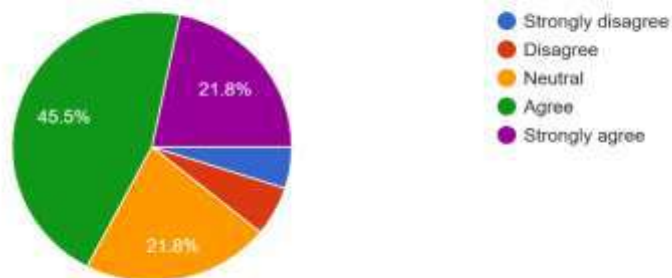
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Interpretation: The above chart shows **71.3%** cumulative agreement (**49.5% Agree**, **21.8% Strongly Agree**), **20.8% Neutral**, and small disagreement. A strong majority perceives a clear positive institutional impact on educational workflows

AI tools have made learning more personalized for me/my students.

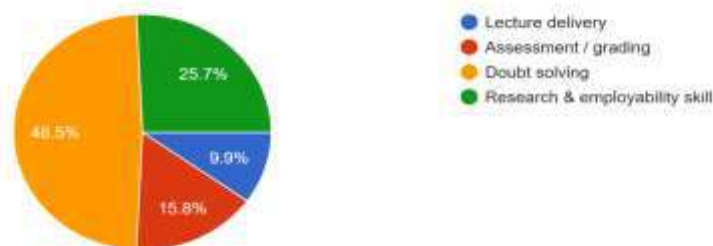
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Interpretation: The above chart shows **67.3%** positive consensus (**45.5% Agree**, **21.8% Strongly Agree**), **21.8% Neutral**, and **10.9%** negative. Two-thirds believe AI provides effective self-paced or individualized learning assistance.

Which area benefits most from AI, in your opinion

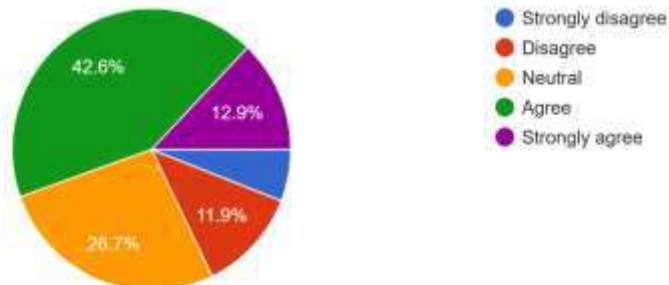
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Interpretation: The above chart shows **Doubt solving** is the top benefit (48.5%), followed by **Research & employability skills** (25.7%), **Assessment / grading** (15.8%), and **Lecture delivery** (9.9%). Learners find the greatest value in on-demand conceptual clarity and research synthesis over automated evaluation or lectures.

Lack of technical knowledge is a barrier to using AI tools.

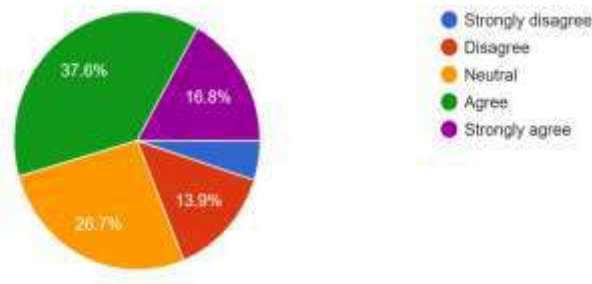
101 responses



Interpretation: The above chart shows 55.5% agree to some extent (42.6% Agree, 12.9% Strongly Agree), 26.7% Neutral, and 17.8% disagree. Over half the respondents identify skill and prompt-literacy gaps as a hurdle to effective adoption.

I have concerns about data privacy and ethical use of AI.

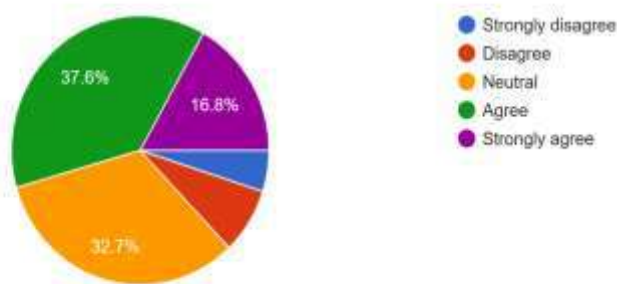
101 responses



Interpretation: The above chart shows 54.4% express concern (37.6% Agree, 16.8% Strongly Agree), 25.7% Neutral, and 19.9% unconcerned. A majority acknowledges potential risks around academic integrity, data safety, and ethical usage.

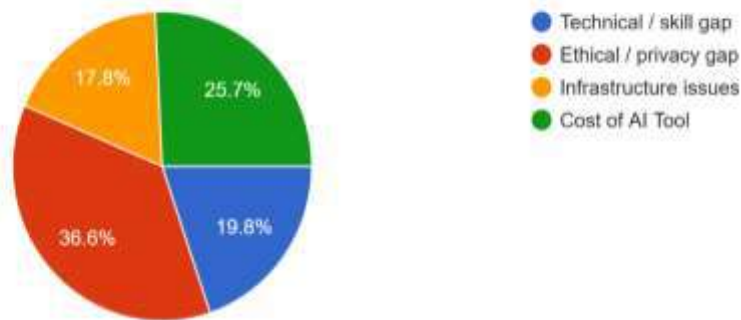
Poor infrastructure (internet, devices) limits AI adoption in my institution.

101 responses



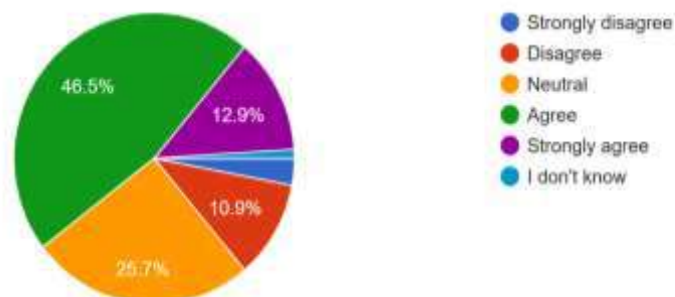
Interpretation: The above chart shows **54.4%** agreement (**37.6% Agree, 16.8% Strongly Agree**), **32.7% Neutral**, and **12.9%** disagreement. Over half highlight hardware and connectivity constraints as meaningful bottlenecks at their institutions

What is the biggest challenge you face in using AI tools?
101 responses



Interpretation: The above chart shows **Ethical / privacy gap** leads at **36.6%**, followed by **Cost of AI Tools (25.7%)**, **Technical / skill gap (19.8%)**, and **Infrastructure issues (17.8%)**. Ethical ambiguity and paywalls/pricing models represent the primary perceived obstacles.

AI-related resources (labs, licensed software, smart classrooms) are easily accessible.
101 responses



Interpretation: The above chat shows **59.4%** agree (**46.5% Agree, 12.9% Strongly Agree**), **25.7% Neutral**, and **14.9%** disagree. While core software access is relatively available, a notable minority remains underserved

Research Findings

- **High AI Awareness:** Over 84.2% of participants indicated they are fully aware of educational AI tools like ChatGPT and Grammarly
- **Chatbot Popularity:** Conversational LLM chatbots (e.g., ChatGPT) are the most preferred format, used by 76.5% of respondents.
- **Teaching-Learning Improvement:** 71.3% of respondents agreed or strongly agreed that AI has improved teaching and learning quality in their institution
- **Technical Knowledge Gap:** 55.5% of respondents agreed that a lack of technical knowledge and prompt skills is a barrier to using AI.

Suggestion

1. Academic Integrity & "Process-Based" Evaluation

- Transition from Product to Process Evaluation: Shift grading criteria from evaluating static final submissions to assessing the research journey, prompt iteration history, and source verification notes.
- Implement "AI Citizenship" Core Modules: Make a 1-credit mandatory course on algorithmic bias, generative copyright, synthetic data ethics, and intellectual property obligatory for all undergraduate degree streams.
- Normalize Controlled AI Usage in Classrooms: Replace total AI bans with clear course-level syllabi disclosures specifying allowed tools (e.g., green-lighted for literature searching, restricted during preliminary hypothesis drafting).

2. Vernacular Translation & Multimodal Inclusion

- Scale Translation APIs on Public Portals: Integrate national natural language processing (NLP) models into platforms like SWAYAM and DIKSHA to translate STEM and commerce course materials into 22 scheduled Indian languages in real time.
- Deploy Assistive Diagnostic Tools for Learning Disabilities: Implement AI-enabled screening and training platforms to assist students with dyslexia, dyscalculia, and visual/hearing impairments across colleges.

3. Faculty Upskilling & Institutional Governance

- Institute Campus AI Ethics & Audit Committees: Form institutional oversight bodies to audit AI tool procurement, monitor algorithmic fairness, and handle data leak or plagiarism disputes.
- Incentivize Faculty Tech Integration: Provide workload credits, institutional grants, and research recognition for educators who design interactive AI-assisted courseware and open-access visual learning modules.

Conclusion

The integration of Artificial Intelligence within higher education presents a transformative opportunity to realize the core objectives of the National Education Policy (NEP) 2020. The empirical interpretations of this study demonstrate that AI tools—particularly conversational generative assistants—have shifted from novel technologies to everyday academic necessities for students. Primarily utilized for instant doubt resolution, personalized pacing, and research enhancement, AI is actively driving the policy-mandated transition away from rote memorization toward competency-based, student-centric learning. However, realizing the full potential of AI under the NEP 2020 framework requires addressing critical systemic bottlenecks.

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