

Artificial Intelligence in Higher Education: Opportunities, Challenges, and Policy Implications for Teaching and Learning in Mumbai University Affiliated Colleges

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Abstract—Artificial Intelligence (AI) is becoming embedded in higher education through generative AI, automated assistance, language technologies and data-driven learning. This study examines awareness, use, perceived benefits, risks and institutional expectations concerning AI among students and faculty using an expanded survey workbook. The empirical dataset contains 297 original survey responses from the uploaded survey workbook. In the 297-record dataset, 296 respondents (99.7%) had heard of AI and 283 (95.3%) reported current use. Daily use was reported by 129 respondents, while weekly use was reported by 83. Assignments, research, presentation preparation, examination preparation and coding were prominent applications. Mean agreement was high for understanding difficult concepts (3.94/5), learning more effectively (3.92), assignment support (3.90) and willingness to learn more about AI (3.91). At the same time, respondents reported concerns about dependency, privacy, bias, inaccurate information and academic integrity. The Indian policy context is especially relevant because NEP 2020 supports evaluated technology integration, while the IndiaAI Mission, AIKosh, IndiaAI FutureSkills and BHASHINI create opportunities for infrastructure, datasets, skilling and multilingual access. The study argues that institutional adoption should combine AI-enabled innovation with human oversight, faculty development, academic-integrity safeguards, data protection, inclusive access and assessment redesign.

Index Terms—Artificial Intelligence, Higher Education, Educational Policy, Teaching and Learning, IndiaAI Mission, Digital Transformation, Social Policy

I. INTRODUCTION

Artificial Intelligence has moved from a specialist computing topic to a practical component of everyday academic work. Generative AI systems can explain concepts, draft and revise text, support programming, summarize information, generate examples and assist research. For higher education, these capabilities create opportunities for personalized support and productivity, but they also change assumptions about authorship, assessment, information verification and the role of the teacher. Research on generative AI in education therefore emphasizes both educational potential and risks relating to reliability, bias, privacy, over-dependence and academic integrity (Kasneci et al., 2023; Tlili et al., 2023).

The Indian context adds an important policy dimension. NEP 2020 identifies technology as a means of improving educational processes and outcomes and calls for rigorous evaluation before technology interventions are scaled. It also recognizes the digital divide, the need for teacher preparation and the potential of emerging technologies such as artificial intelligence and machine learning in higher education. These principles are increasingly connected with national AI initiatives. The IndiaAI Mission, approved in 2024, is organized around compute, datasets, foundation models, applications, future skills, startup financing and safe and trusted AI. AIKosh provides a national platform for datasets, models, toolkits and use cases, while IndiaAI FutureSkills supports advanced AI education and research pathways. BHASHINI addresses the language dimension of

digital inclusion by developing multilingual AI services for Indian languages.

Against this background, the present study connects an institution-level survey with the changing Indian AI policy environment. The research asks not only whether students and faculty use AI, but also what they use it for, which educational benefits they perceive, what risks concern them and what institutional measures they expect. The title and cover-page information of the original research paper are retained unchanged. The empirical analysis below uses the full 297-record workbook while clearly identifying the composition of the expanded dataset.

II. REVIEW OF LITERATURE

Kasneji et al. (2023) identify opportunities for large language models in education while emphasizing limitations associated with accuracy, bias and appropriate use. Tili et al. (2023) similarly describe ChatGPT as an educational opportunity that requires careful attention to ethics and assessment. Chan (2023) proposes an institutional AI policy framework connecting pedagogy, governance, privacy, infrastructure and professional development. Cotton et al. (2023) highlight the implications of generative AI for academic integrity and the need to clarify acceptable assistance.

UNESCO's guidance on generative AI emphasizes human-centred use, privacy, equity and institutional preparedness. Its competency frameworks for teachers and students also stress AI literacy, ethical awareness, critical evaluation and human agency. Together, this literature suggests that successful AI integration is not simply a question of providing access to tools. It requires curriculum alignment, assessment redesign, faculty development, student literacy, privacy safeguards and mechanisms for verifying AI-generated outputs.

III. RESEARCH GAP

Much discussion of educational AI is global or technology-centred, while institutional evidence from Indian higher education can reveal how actual users perceive benefits, risks and support requirements. There is particular value in connecting user-level survey evidence with India's evolving policy infrastructure. This study addresses that gap by

combining survey results with an Indian policy analysis focused on NEP 2020, the IndiaAI Mission, AIKosh, FutureSkills, multilingual AI and data protection.

IV. OBJECTIVES OF THE STUDY

- To examine the level of AI awareness and usage among students and faculty.
- To identify commonly used AI tools and their major educational purposes.
- To examine perceptions regarding the benefits of AI in teaching and learning.
- To identify academic, ethical and institutional concerns associated with AI.
- To examine perceptions of institutional preparedness, training and policy requirements.
- To connect the survey findings with current Indian AI and higher-education policy developments.
- To suggest measures for responsible and inclusive integration of AI in higher education.

V. RESEARCH QUESTIONS

- What is the level of AI awareness and usage in the 297-record survey dataset?
- Which AI tools and educational applications are most commonly reported?
- What benefits and risks do respondents associate with AI-assisted education?
- What institutional measures are considered necessary for responsible AI adoption?
- How can Indian AI initiatives and education policy respond to the needs identified by the survey?

VI. RESEARCH METHODOLOGY

6.1 Research Design

The study follows a descriptive survey design. The questionnaire covers respondent characteristics, AI awareness, tool familiarity, current use, frequency, purposes of use, daily usage, perceived educational benefits, teaching applications, accessibility and future skills, risks, institutional readiness and future expectations. Likert-scale statements were coded from 1 (Strongly Disagree) to 5 (Strongly Agree). Multiple-response questions were analysed by

counting mentions, so totals can exceed the number of respondents.

6.2 Dataset and Sampling

The uploaded survey workbook contains 297 original survey responses used as the full empirical survey dataset. The workbook's Data Source field marks all 297 records as 'Original response'. The composition is 249 students (83.8%) and 48 faculty (16.2%), enabling analysis of both student and faculty perspectives within the same survey dataset.

Dataset component	Records	Treatment
Original survey responses	297	Original survey responses

6.3 Data Analysis

Descriptive frequencies and percentages were calculated for categorical variables. Likert means and

combined Agree/Strongly Agree percentages were calculated for perception statements. Open-ended responses were reviewed using simple thematic keyword grouping. The workbook identifies all 297 records as 'Original response', and this source status is retained in the present analysis.

VII. RESULTS AND ANALYSIS

7.1 Respondent Profile and AI Awareness

In the 297-record survey dataset, 163 respondents were male and 134 female. AI awareness was almost universal: 296 of 297 respondents (99.7%) reported that they had heard about AI. Current AI use was reported by 283 respondents (95.3%), leaving 14 non-users. The respondent profile includes 249 students and 48 faculty members.

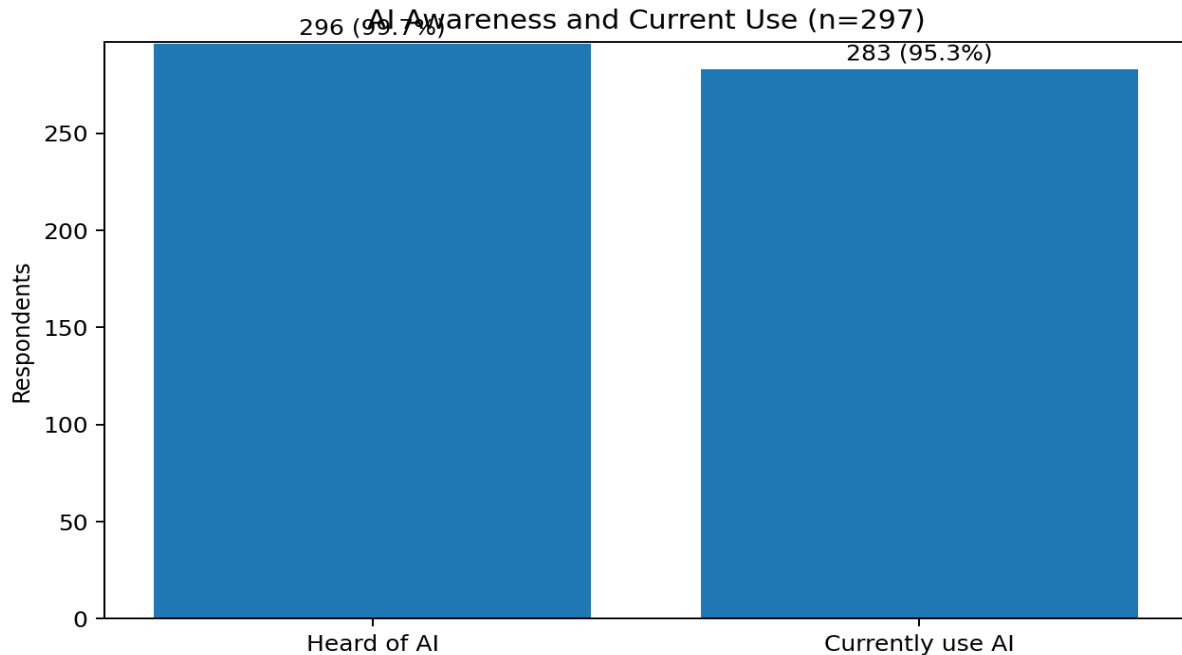


Figure 1. AI awareness and current use in the 297-record survey dataset.

7.2 Frequency, Tools and Purposes of Use

Daily AI use was reported by 129 respondents (43.4%), weekly use by 83 (27.9%), several times a week by 25 (8.4%) and occasional use by 34 (11.4%). ChatGPT was the most frequently identified tool after normalizing capitalization and spelling variants, with 175 records (58.9%); Microsoft

Copilot appeared in 47 (15.8%) and Gemini in 46 (15.5%). Familiarity was also broad: ChatGPT appeared in 239 responses, Gemini in 206 and Microsoft Copilot in 110. Because some questions permit multiple selections, these figures are mention counts rather than mutually exclusive user shares.

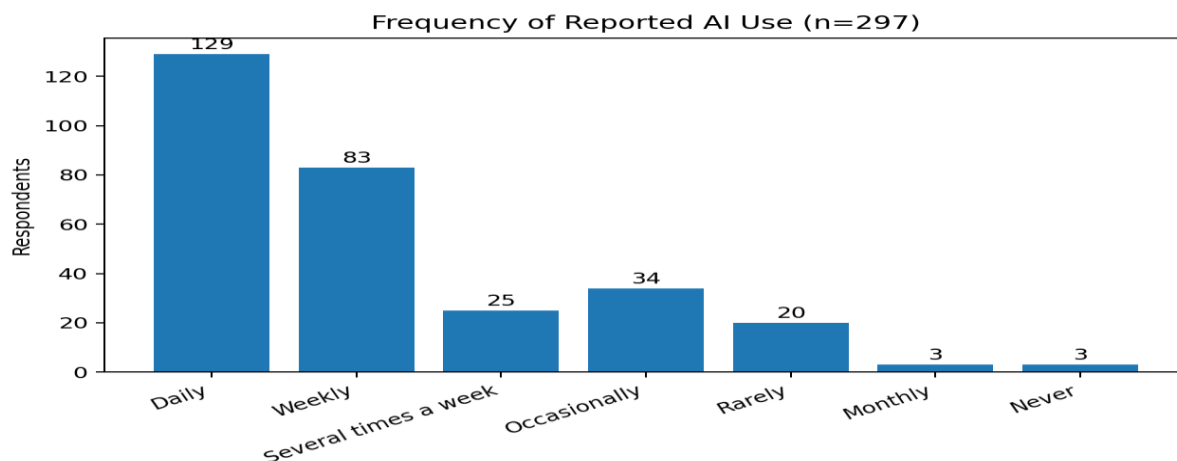


Figure 2. Frequency of reported AI use (n=297).

The main purposes of AI use were assignments (226 mentions), research (178), presentation preparation (157), examination preparation (144), content writing (132), coding (121) and lesson planning (108). This

pattern indicates that AI is not confined to a single subject or task; it is being used across learning, assessment preparation, research and teaching-related activities.

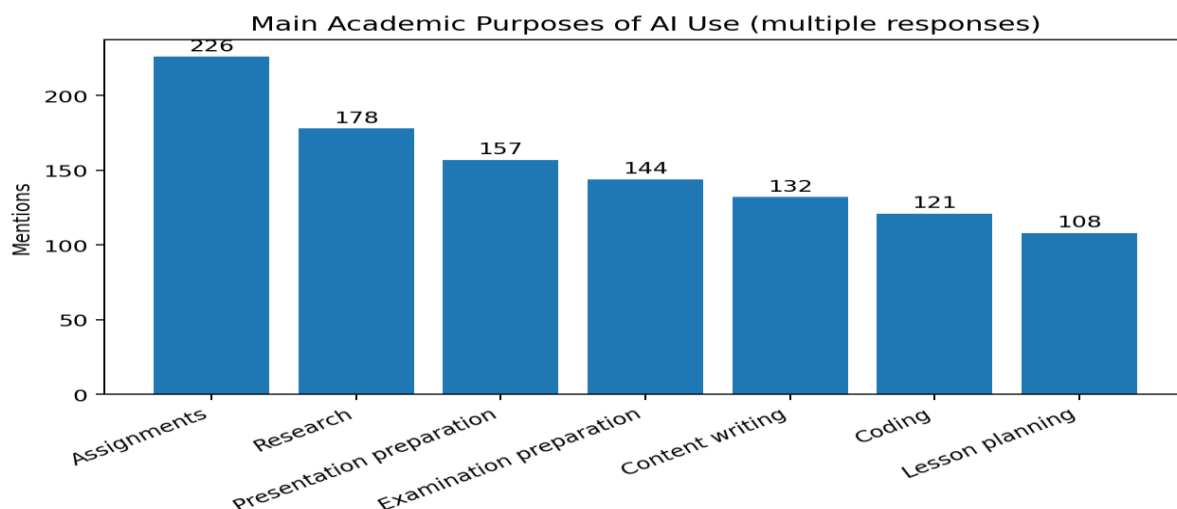


Figure 3. Main academic purposes of AI use; multiple responses permitted.

7.3 Perceived Educational Benefits

Statement	Mean	Agree/Strongly Agree
Understanding difficult concepts	3.94	74.4%
Learning more effectively	3.92	72.7%
Assignment/project preparation	3.90	72.7%
Access to educational	3.90	70.7%

resources		
Saving study/teaching time	3.89	71.7%
Research capabilities	3.81	70.7%
Innovation and creativity	3.82	70.7%
Educational accessibility	3.79	68.7%
Problem-solving skills	3.75	69.0%

The strongest benefit rating concerned understanding difficult concepts (mean 3.94), followed by learning more effectively (3.92), assignment support (3.90) and resource access (3.90). These results support a view of AI as a supplementary learning aid, especially for explanation, drafting, exploration and access to information. They do not establish that AI independently improves measured academic achievement.

7.4 Risks and Ethical Concerns

Concern	Mean	Agree/Strongly Agree
AI can increase dependency on technology	3.84	66.3%
AI-generated content may contain bias	3.74	63.6%
AI can reduce human interaction	3.68	62.6%
AI raises concerns about data privacy	3.65	60.9%
AI may	3.61	57.6%

provide inaccurate information		
AI reduces independent thinking	3.58	60.3%
AI encourages plagiarism	3.58	54.9%
AI may negatively impact academic integrity	3.57	55.6%

Dependency was the highest-rated concern, followed by bias, reduced human interaction and privacy. Open-ended responses also repeatedly referred to overdependence, plagiarism, data security, inaccurate information and the need for verification. These findings reinforce the need for assessment designs that require explanation, reflection, application and authentic performance rather than relying only on easily generated written answers.

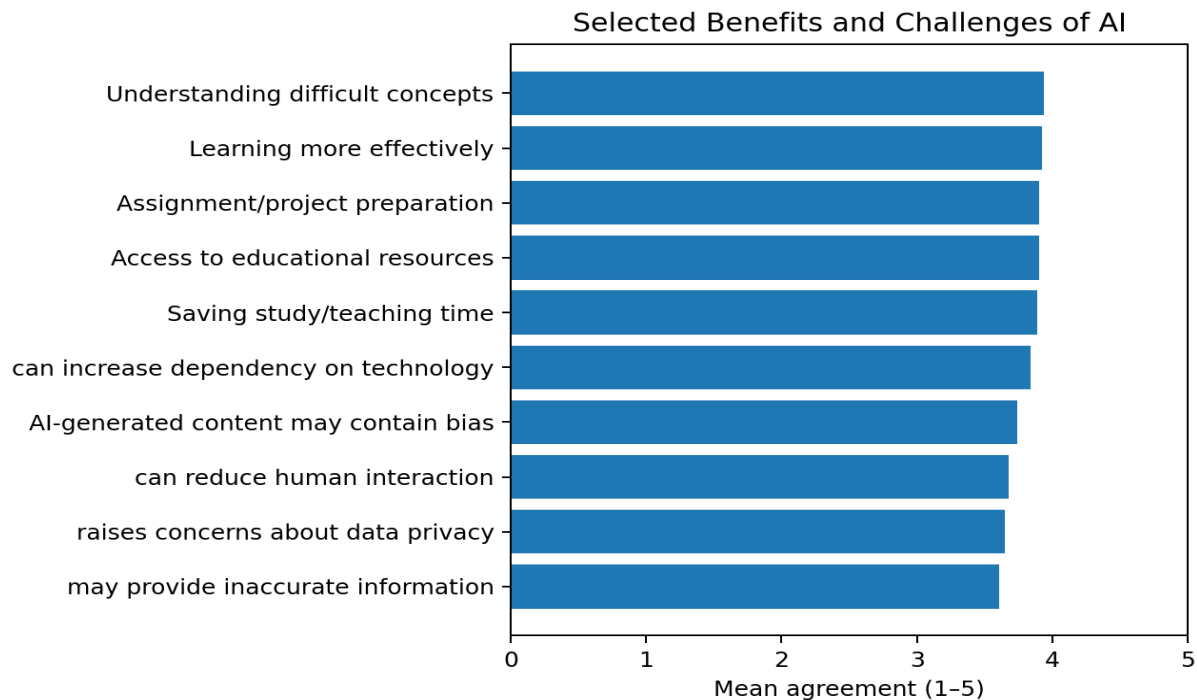


Figure 4. Selected perceived benefits and challenges of AI.

7.5 Institutional Readiness and Expectations

Institutional/future statement	Mean	Agree/Strongly Agree
AI-related workshops should be conducted regularly	3.75	67.3%
AI training should be compulsory for faculty	3.78	68.0%
AI should be used ethically and responsibly	3.81	69.7%
AI should be	3.72	62.0%

integrated into the curriculum		
Institution should formulate AI usage policies	3.69	61.6%
Institution provides adequate digital infrastructure	3.53	55.6%
AI can support implementation of NEP 2020	3.74	64.3%
Willingness to learn more about AI	3.91	72.1%

Institutional AI Readiness and Policy Indicators

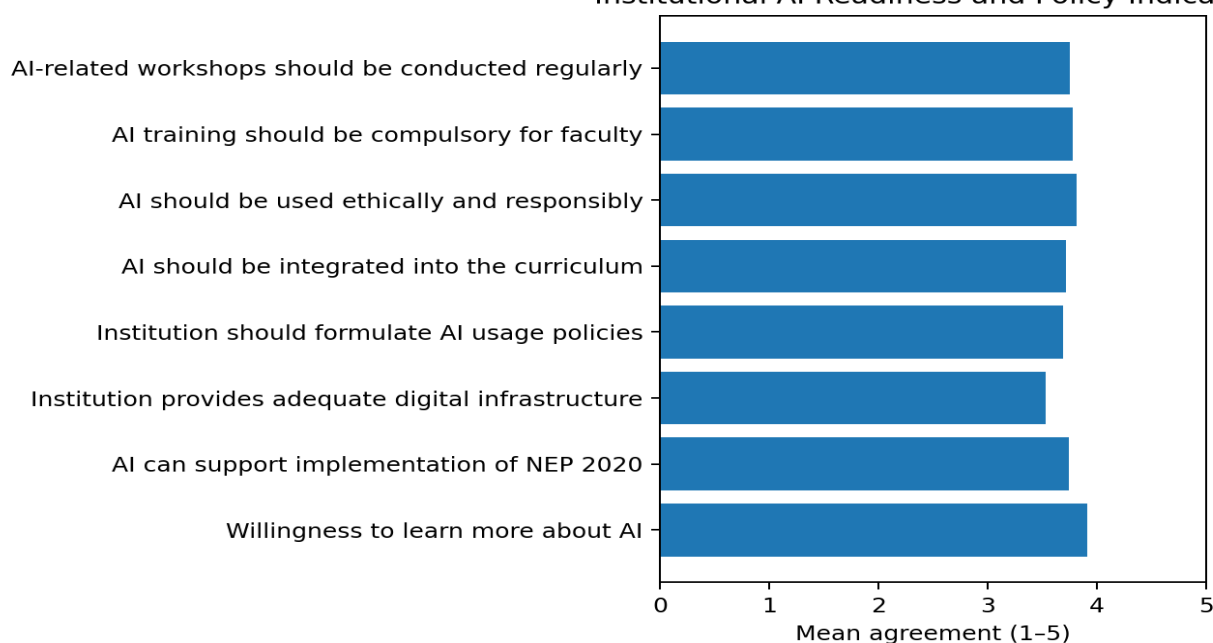


Figure 5. Selected institutional AI readiness and policy indicators.

VIII. DISCUSSION

The 297-record survey indicates that AI has already become part of academic routines for a large proportion of respondents. The combination of near-universal awareness and 95.3% current use suggests that institutions are no longer deciding whether students will encounter AI; the more immediate policy question is how that use can be connected to learning outcomes and academic responsibility. Assignments, research, presentations, examinations

and coding are especially important because they overlap with conventional forms of assessment.

The positive ratings for concept understanding, learning effectiveness and resource access are consistent with the literature on AI-supported learning. However, the risks identified in the same dataset show why access alone is insufficient. A student who receives an accurate explanation from an AI system may benefit, while a student who copies an unverified answer may weaken learning. Thus, educational value depends on the task design, the

student's verification behaviour and the teacher's expectations.

The institutional findings are particularly relevant. Respondents support workshops, faculty training, ethical use and curriculum integration, while infrastructure receives a comparatively lower mean. This pattern suggests that policy should address both human capability and technical access. Faculty members need practical training in prompt design, verification, assessment redesign and responsible data handling, while students need AI literacy that emphasizes critical evaluation rather than passive dependence.

IX. INDIAN AI OPPORTUNITIES, CHALLENGES, AND POLICY IMPLICATIONS

9.1 Opportunities in Indian Higher Education

India's policy environment creates several opportunities for colleges and universities. The IndiaAI Mission is designed around seven connected pillars: compute, datasets, foundation models, application development, FutureSkills, startup financing, and safe and trusted AI. For higher education, this creates a pathway from classroom experimentation to research, skilling and innovation. IndiaAI's compute initiatives explicitly include academia, researchers and students, potentially reducing some barriers created by the cost of advanced computing.

AIKosh is relevant because it provides a national platform for datasets, models, toolkits and use cases. Its university engagement programme is designed to bring students from different disciplines into the national AI ecosystem. For commerce, management, economics and social-science students, this is significant because AI learning can move beyond programming to data interpretation, business analytics, policy analysis and domain-specific applications.

IndiaAI FutureSkills and fellowship pathways can support the development of advanced talent, while institutional AI literacy can extend those benefits to students who are not specializing in computer science. The survey's high willingness to learn more about AI (mean 3.91) provides an institution-level indication that there is demand for such learning opportunities.

Multilingual AI is another major opportunity. BHASHINI aims to reduce language, literacy and digital barriers through AI-powered translation, speech and language services. For Indian higher education, multilingual AI can support learning resources, translation, accessibility and interaction for students who are more comfortable using Indian languages. This opportunity is closely aligned with the inclusion and language objectives of NEP 2020.

9.2 Indian Higher-Education Challenges

The survey identifies challenges that are directly relevant to Indian institutions: dependency on technology, privacy, bias, inaccurate information, academic integrity and infrastructure. These should be considered alongside the structural issues identified in NEP 2020, including the digital divide and the need for teacher preparation. Unequal access to devices, reliable connectivity, paid AI services and advanced computing can produce unequal educational benefits even when a technology is nominally available to everyone.

Faculty preparedness is another challenge. The survey shows strong support for compulsory faculty AI training (mean 3.78). Training should not be limited to software demonstrations. It should include verification of outputs, bias awareness, copyright and attribution, privacy, assessment design, disciplinary applications and methods for preserving meaningful teacher-student interaction.

Academic integrity requires particular attention because generative AI can produce plausible text and code quickly. Rather than relying only on detection, institutions can combine disclosure rules with assessment redesign, oral questioning, process evidence, drafts, practical demonstrations and reflective components. Such approaches assess learning directly and reduce dependence on whether a particular detection system can identify AI-generated material.

9.3 Policy and Data-Protection Implications

The Digital Personal Data Protection Act, 2023 and the Digital Personal Data Protection Rules, 2025 create an increasingly important data-governance context for educational AI. Colleges using AI systems should therefore develop clear practices for collecting, sharing, retaining and protecting personal information. Student records, assessment data,

identity information and confidential institutional documents should not be entered into AI services without appropriate authorization and safeguards.

At institutional level, an AI policy should specify acceptable and unacceptable uses, disclosure expectations, privacy requirements, verification responsibilities and procedures for addressing misuse. Policies should distinguish low-risk uses such as brainstorming or language improvement from higher-risk uses involving personal data, high-stakes assessment or automated decisions about students.

The Indian policy environment therefore points toward a layered model: national infrastructure and AI initiatives create opportunities; higher-education institutions translate them into curriculum and training; and institutional governance protects privacy, fairness, academic integrity and human oversight. This layered approach is consistent with the survey evidence, where respondents simultaneously report substantial benefits and substantial concerns.

X. POLICY IMPLICATIONS FOR MUMBAI UNIVERSITY-AFFILIATED HIGHER EDUCATION

- Create a transparent institutional AI-use policy covering teaching, learning, assessment, research, privacy, disclosure and responsible use.
- Establish compulsory AI-literacy modules for students that emphasize verification, source evaluation, prompting, bias, privacy and ethical use.
- Provide continuous, practice-oriented faculty development focused on pedagogy, assessment redesign and discipline-specific AI applications.
- Use AI to support learning outcomes rather than simply generate answers; require explanation, reflection and application in appropriate assessments.
- Develop equitable access measures for students who lack suitable devices, connectivity or paid AI subscriptions.
- Explore Indian-language and accessibility applications, including multilingual resources and voice-enabled learning support.
- Use IndiaAI and AIKosh opportunities for interdisciplinary projects, datasets, research and

student innovation where institutionally appropriate.

- Create a data-governance protocol aligned with applicable Indian data-protection requirements before integrating AI systems with student or staff information.
- Review AI policy periodically because models, risks, institutional experience and regulatory requirements continue to evolve.

XI. RECOMMENDATIONS

- Conduct regular AI workshops for students and faculty.
- Introduce an AI-use disclosure framework for substantial assistance in academic work.
- Redesign selected assessments toward oral, practical, reflective and process-based evaluation.
- Establish verification practices for AI-generated factual, statistical and research content.
- Develop discipline-specific guidance for Commerce, Computer Science, IT, Economics, Management and other programmes.
- Strengthen digital infrastructure and provide equitable access to learning resources.
- Pilot multilingual AI resources for students who benefit from Indian-language support.
- Encourage faculty-led research and evaluation of AI-supported teaching rather than adopting tools without evidence.
- Create a periodic institutional review committee or working group to monitor AI, privacy and academic-integrity issues.

XII. LIMITATIONS OF THE STUDY

The study has important limitations. First, the 297 responses are drawn from the uploaded survey workbook and are not statistically representative of all Mumbai University-affiliated colleges. Second, college-name entries contain substantial variation in spelling and naming. Third, the sample includes a large student component and strong representation from Computer Science, Commerce and Information Technology. Fourth, responses are self-reported and do not measure objective learning gains. Fifth, multiple-response and open-ended questions are not mutually exclusive. Future studies should collect

independently verified multi-college samples, document sampling procedures and examine longitudinal learning outcomes.

XIII. CONCLUSION

AI is already part of the academic experience represented in the expanded survey workbook. Awareness is almost universal, current use is high and respondents identify practical value in concept explanation, learning support, assignments, research and access to educational resources. At the same time, dependency, privacy, bias, accuracy and academic integrity remain important concerns. The results therefore support a balanced institutional approach in which AI complements rather than replaces human teaching, student reasoning and academic responsibility.

For India, the policy environment provides a significant opportunity to connect institutional practice with national initiatives. NEP 2020 provides a broad framework for technology-enabled and equitable education; the IndiaAI Mission and AIKosh can support infrastructure, datasets and innovation; FutureSkills can strengthen advanced talent; and BHASHINI can contribute to language-inclusive access. These opportunities will be meaningful in higher education only when they are accompanied by faculty development, student AI literacy, assessment reform, data protection and equitable access. The survey's findings provide a practical institution-level basis for that agenda while also showing why future research should rely on independently collected and verified multi-institutional evidence.

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