ISSUE BRIEF

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AI in Education:

How India's Students Are Studying and What Policy Has Missed

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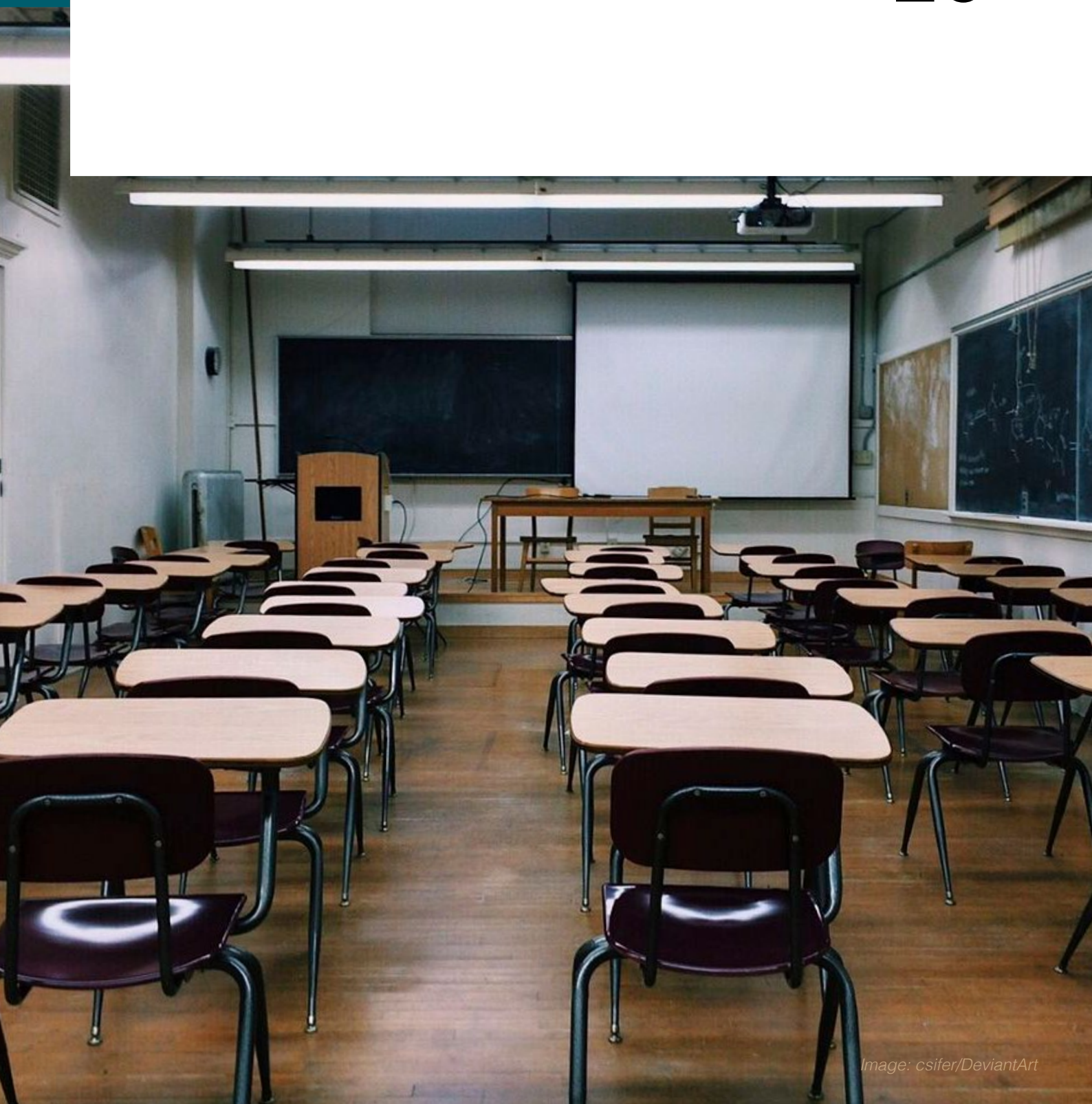
Inmozhi Mangai



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Author Bio

Inmozhi Mangai is an AI and Machine Learning researcher and a student in the Department of Data Science and Artificial Intelligence, IIT Guwahati. Her research spans large language model evaluation, retrieval-augmented generation (RAG) systems, explainability, and the sociotechnical dimensions of AI deployment. She has authored multiple peer-reviewed papers accepted at IEEE conferences and Scopus-indexed publications, including empirical work on LLM performance in STEM fact verification, AI frameworks for public safety, and explainable, responsible, trustworthy AI. She is an IEEE Student Member and an independent researcher working at the intersection of AI systems and their societal implications.

ABSTRACT

The rapid integration of Artificial Intelligence (AI) and Large Language Models (LLMs) into India's educational landscape is significantly ahead of the development of corresponding policy and governance frameworks. This paper provides findings from an original primary survey of 125 students across three age groups (below 12, 13–19, and 20 and above) in Bangalore, India, examining the frequency, nature, and student perceptions of LLM use for Science, Technology, Engineering, and Mathematics (STEM) learning. The results show us an alarming rate of AI usage that demands immediate attention: 48% of respondents use AI for academic purposes everyday, 38.4% use it multiple times per week, and only 3.2% reported no AI use.

Survey findings also reveal that students rate AI's teaching effectiveness highest in computer science (3.82/5) and mathematics (3.65/5), that freedom from fear of judgment, rather than just convenience, is the strongest motivator for AI use, that 92.8% of respondents expect AI to become a permanent tutoring presence or support in schools and colleges, and that there is significant student resistance to AI-based assessment. These findings collectively reveal a governance gap in which student-led AI usage for learning purposes has grown suddenly without any regulatory frameworks, accuracy standards, age-specific safeguards, or academic integrity guidelines.

This paper uses these empirical findings to identify where regulatory action is most urgently needed in India's existing policy landscape including the National Education Policy 2020 and the Digital Personal Data Protection Act 2023, and to make relevant, targeted policy recommendations addressed to the Ministry of Education, UGC, and relevant regulatory bodies.

Keywords: *Large Language Models, Artificial Intelligence, STEM Education, AI Governance, Educational Policy, Student Survey, EdTech, NEP 2020, Digital Personal Data Protection Act, AI in Education*

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1. INTRODUCTION

The deployment of Artificial Intelligence in education represents one of the most noteworthy and least governed technological shifts happening in India. Large Language Models (LLMs), i.e. AI systems capable of generating responses across a wide range of subjects and complexity levels, have made sophisticated, personalised academic tutoring accessible to any student with a smartphone and an Internet connection. Tools such as OpenAI's ChatGPT, Google's Gemini, Google's NotebookLM, Microsoft's Copilot, Anthropic's Claude, and DeepSeek are available at low or no cost, require no institutional approval or even parental approval for children, and operate without any age restrictions or quality certifications in the Indian educational realm.

The National Education Policy 2020 shares a vision of technology-enhanced, accessible learning that prioritises personalisation, inclusion, and multilingual instruction. Since the proverbial "AI boom" [1], ChatGPT has been one of the top five most-frequented websites across the world and in India as well [2]. However, NEP 2020 was built and authorized prior to the widespread commercial availability of generative AI and LLMs. As a result, the mass adoption of AI tools by students for learning purposes across age groups and institutions has been growing without any official policy in place. No Indian regulatory body currently defines accuracy standards for educational AI tools, specifies age-appropriate access requirements for minors, or provides guidance on AI use in academic assessment.

This paper addresses that gap directly by presenting original primary survey data documenting the scale and nature of student AI adoption for STEM learning, analysing the implications of those findings for policy and governance, and offering targeted recommendations for specific regulatory actions.

2. LITERATURE REVIEW: AI IN EDUCATION AND THE INDIAN POLICY CONTEXT

Research on Intelligent Tutoring Systems (ITS) has established, over decades, that adaptive, AI-driven instruction can meaningfully improve learning outcomes, particularly for students whose needs are not met by the pace and format of conventional classroom teaching. Anderson et al.'s [3] early work on cognitive tutoring demonstrated that computer-based instruction aligned with models of human cognition could achieve significant learning gains. More recently, Wei et al. demonstrated that chain-of-thought prompting substantially improves LLM performance on mathematical and scientific reasoning tasks, suggesting that LLMs are approaching the kind of structured, step-by-step pedagogical approach that effective STEM tutoring requires [4]. Addressing the well-documented limitation of general-purpose LLMs generating inaccurate responses, Modran et al. (2025) proposed an intelligent tutoring system integrating Retrieval-Augmented Generation (RAG), a technique that grounds LLM responses in curated, verified academic sources instead of relying solely on the model's training data, informing us that subject-specific accuracy in AI tutoring can be meaningfully improved through architectural design and high-quality resources [5].

India has both contributed to and benefited from these developments. Prutor, developed at IIT Kanpur by Prof. Amey Karkare and his team and published in 2016, is an ITS for programming now on course for adoption by over 600 Indian institutions [6, 7]. Nova, an AI teacher deployed at a government school in Kollam, Kerala, delivers instruction from uploaded curriculum materials to lower primary students [8]. The humanoid robot Shalu, a low-cost robot built entirely from recycled materials, communicates in nine Indian regional languages and 38 foreign languages, directly addressing India's linguistic diversity being a barrier to accessible education for all [9]. These domestic developments convey that AI-based tutoring is not foreign anymore but an active area of Indian innovation and this growth calls for an updated educational policy in the country.

The existing policy landscape notably has not kept pace. NEP 2020 envisioned technology as a tool deployed under institutional supervision, with teacher oversight and within approved frameworks. The reality, as evidenced by survey data presented in this paper, is categorically different: students are adopting AI tools autonomously, from ages as young as 12 and below. Edwards et al. (2018) identified teacher shortages as a structural driver of AI tutoring adoption in the United States [10]; the same structural dynamic applies to India, where teacher shortages in rural and semi-urban areas are well documented. The Digital Personal Data Protection Act 2023 (DPDPA) establishes a framework for the protection of children's personal data, but sector-specific guidance for EdTech platforms and frameworks for AI tools in educational settings have not been issued. UNICEF (2024) has noted both the growing international deployment of humanoid robots in education and the significant cost barriers to hardware-based approaches, reinforcing immediate policy priority around technology-enhanced learning and the use of robots in Indian schools [11].

The literature also identifies significant risks associated with unregulated AI adoption in education. Gerlich (2025) found that higher levels of cognitive offloading, which refers to the tendency to bypass active reasoning in favour of AI-generated answers, were associated with measurably lower critical thinking skills [12]. Ahmad et al. (2023) identified over-dependence on AI as a risk to both student reasoning and teacher professional capacity [13]. Research on LLM hallucination, i.e., the generation of factually incorrect responses presented confidently, is particularly important in STEM subjects, where incorrect information can result in major learning deficits, or in applied contexts, safety risks [14]. These documented risks, in the absence of regulations, are currently managed individually by students, which should concern all professionals in the education domain and parents as well.

3. POLICY RELEVANCE

This research is directly relevant to the following areas of active policy concern in India.

3.1. IMPLEMENTATION OF NEP 2020

The National Education Policy 2020 mandates the integration of technology in education and commits to personalised, flexible, and multilingual learning. The findings of this survey demonstrate that students have moved significantly ahead of what was envisioned by NEP 2020 by using AI tools independently, at scale, and with positive perceptions overall. This brings to light both an opportunity and a governance obligation: the policy framework exists to support technology-enhanced learning, but it needs to be updated to account for the specific capabilities, risks, and equity implications of generative AI and LLMs. Similarly, NEP 2020's provisions on teacher training, digital infrastructure, and assessment reform also need to be updated to keep up with students' active use of AI for learning purposes.

3.2. IMPLEMENTATION OF THE DIGITAL PERSONAL DATA PROTECTION ACT 2023

The DPDPA 2023 establishes significant protections for children's personal data, including requirements for verifiable parental consent and restrictions on processing children's data for commercial purposes. Survey findings confirm that children below 12 are actively using general-purpose AI platforms that collect interaction data without age-specific safeguards or parental notification. The gap between the DPDPA's intent and its current application in educational AI contexts reveals a specific, identifiable enforcement deficit that the Ministry of Electronics and Information Technology and the Ministry of Education must address through sector-specific guidance.

3.3. IMPLEMENTATION OF THE DIGITAL PERSONAL DATA PROTECTION ACT 2023

Survey respondents cited availability and accessibility as the primary benefits of AI-based tutoring. These benefits, however, are contingent on device access and internet connectivity, resources which are not equally distributed across India's student population owing to the class barriers and economic diversity. According to the report "Household Social Consumption on Education in India (2017 -2018)", which was published prior to the Covid-19 event [15], nearly 4% of rural households and 23% of urban households possessed a computer, nearly 24%of the households in the country had internet access in the survey year, 2017-18; the proportions were 15% among rural households and 42% among urban households. And according to this report [16] by Arora R and Sapre N (2025), access to computers is over fourfold higher in the urban households than in rural households and on average, 65% of the rural population (15+ years) had used mobile phones in the last three months, which is roughly 15% lower than the urban average.

The risk that AI-enhanced learning reinforces existing educational inequalities between urban and rural, connected and unconnected, and economically advantaged and disadvantaged students is a direct concern for the Ministry of Education's equity goals and for the implementation of NEP 2020's commitment to reducing learning outcome disparities.

3.4. ACADEMIC INTEGRITY AND ASSESSMENT

As LLMs are now highly capable of completing assignments, solving examination problems, and generating essays, institutional assessment frameworks that do not account for AI use are ignoring a massive integrity problem, which can put years of students', parents', and teachers' investments in education at risk. The survey finding that students are deeply uncomfortable with AI grading their work, while simultaneously using AI extensively as a learning tool, indicates a student-side preference for human judgment in assessment. This preference has not been translated into formal guidance by any Indian regulatory or accreditation body. The absence of a national standard for AI disclosure in academic work creates inconsistency, unfairness, and reputational risk for Indian higher education.

4. METHODOLOGY

This study employs a primary survey methodology to generate empirical data on student AI adoption for STEM learning, data that does not currently exist at the policy level and is essential for evidence-based regulation. The survey was designed specifically to capture variables of policy relevance: the age profile of users, subject-specific effectiveness ratings, motivations for use including non-judgmental interaction (to identify institutional disadvantages that lead to AI adoption), attitudes toward AI-based assessment, and students' expectations for future education in Indian classrooms (to assess the urgency of governance action).

A total of 125 students from schools, colleges, and universities in Bangalore were surveyed. Respondents were distributed across three age groups: below 12 years (28%), 13–19 years (27.2%), and 20 years and above (44.8%). The survey was strictly anonymous; no personally identifying information was collected beyond age group. The questionnaire covered AI usage frequency, subjects of use, reasons for use (drawn from a structured list of 13 options), subject-specific effectiveness ratings, preferences for theoretical versus practical subject instruction, comfort with AI-based grading (on a three-point scale), and views on the future of AI in educational institutions. The questionnaire was created using Google Forms; data was downloaded and analysed using Python, applying descriptive statistical methods. Given the sample size and geographic scope, findings are reported strictly as indicative rather than nationally representative, and the paper explicitly calls for a larger national study as a policy action.

It should be noted that none of the respondents had experienced live instruction from a physical humanoid robot tutor, and these findings represent only the perceptions from participants' LLM experience.

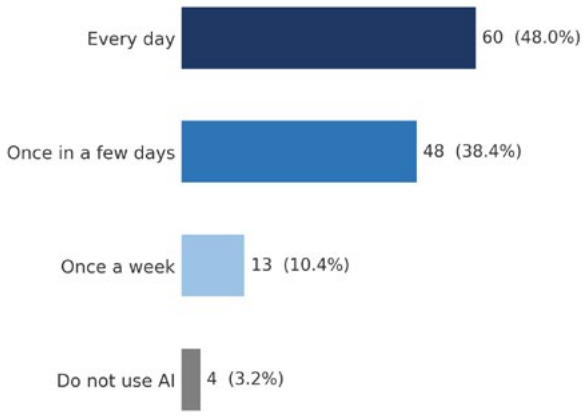
5. KEY FINDINGS

The following five findings from the survey reveal direct policy implications regarding the use of AI for learning purposes.

5.1. ACADEMIC INTEGRITY AND ASSESSMENT

Of 125 respondents, 48% reported daily AI use for academic purposes, and 38.4% reported use several times per week as seen in Fig. 1. Fewer than 3.2% reported no AI use whatsoever. This pattern held across all three age groups, including respondents aged 12 and below, a cohort that is accessing general-purpose AI platforms without age-specific safeguards, parental consent or supervision for conversational AI use by minors, or institutional oversight. This finding establishes the policy baseline: AI adoption in Indian student populations is not an emerging or anticipated development. The present state reveals extensive use by Indian students, even minors.

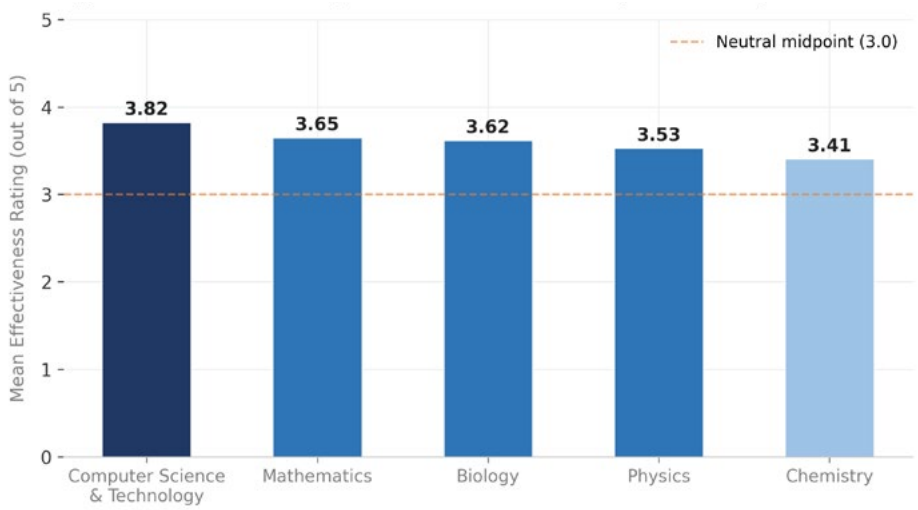
Figure 1: AI Usage Frequency by Age Group (n=125)



5.2. ACADEMIC INTEGRITY AND ASSESSMENT

Among STEM subjects, AI's teaching effectiveness was rated highest in computer science and technology (3.82/5) and mathematics (3.65/5), with more variable and generally lower ratings in chemistry and biology, as seen in Fig. 2. This pattern is empirically consistent with known LLM capabilities and limitations: these models perform most reliably in formal, verifiable domains and are more prone to hallucination in areas requiring current scientific knowledge or nuanced reasoning [17]. Most users might not be aware of this noteworthy event when an AI model AlphaFold2 developed and presented by Demis Hassabis and John Jumper and team helped researchers solve a 50-year-old problem and they won the Nobel prize in Chemistry in the year 2024 [18]. This is only one of the few major STEM-related breakthroughs by artificial intelligence models. Students might not be aware of the full capacity, but they have arrived at these ratings based on personal experience, not instruction. The absence of formal subject-specific guidance means that errors, with students over-relying on AI in high-risk domains, can be completely overlooked.

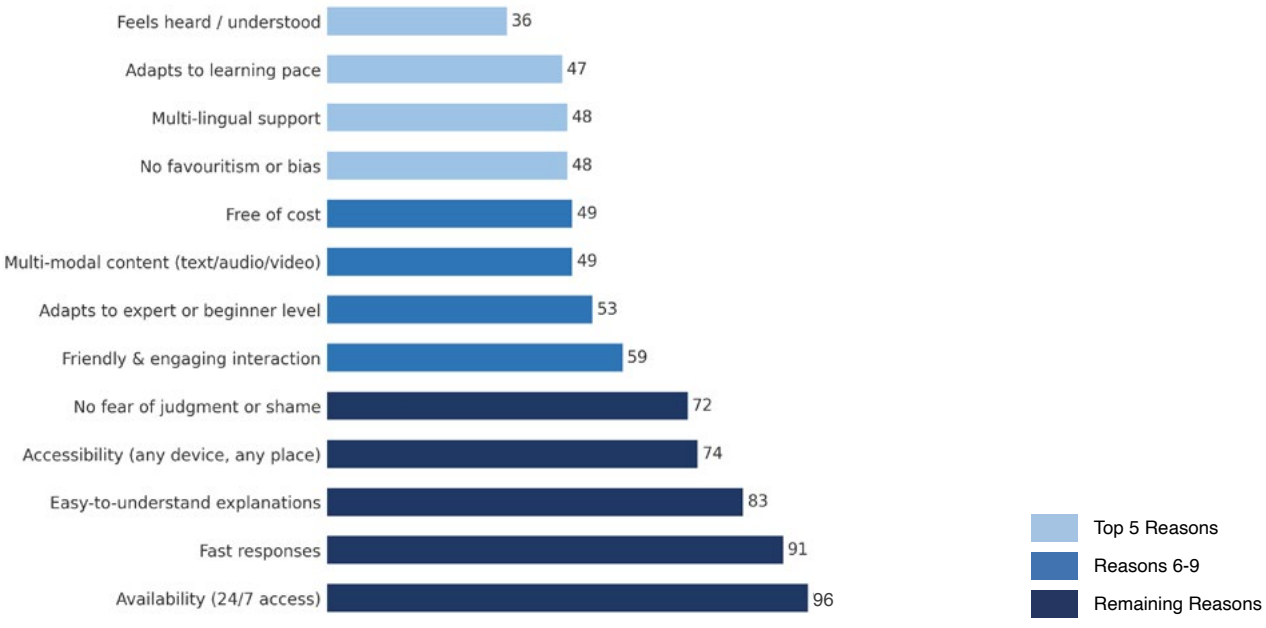
Figure 2: Average Student Ratings of AI for Different STEM Subjects (n=125)



5.3. THE LEADING PSYCHOLOGICAL MOTIVATION FOR AI USE SIGNALS INSTITUTIONAL FAILURE

Of 13 possible reasons for valuing AI-enhanced tutoring, round-the-clock availability received the highest number of responses (96 out of 125), followed by fast responses (91) (refer Fig. 3). The fifth most cited reason, chosen by 72 respondents, was the ability to ask questions without fear of judgment or shame. Freedom from discrimination and bias was also frequently cited. These choices are not based merely on convenience; they are evidence that a significant proportion of students experience conventional classroom environments as socially threatening or discriminatory. This finding is important not only for AI governance but it also reveals how the traditional classroom setting can be improved - by focusing on teacher professional development, institutional culture, and the implementation of NEP 2020's commitment to equitable, student-centred learning.

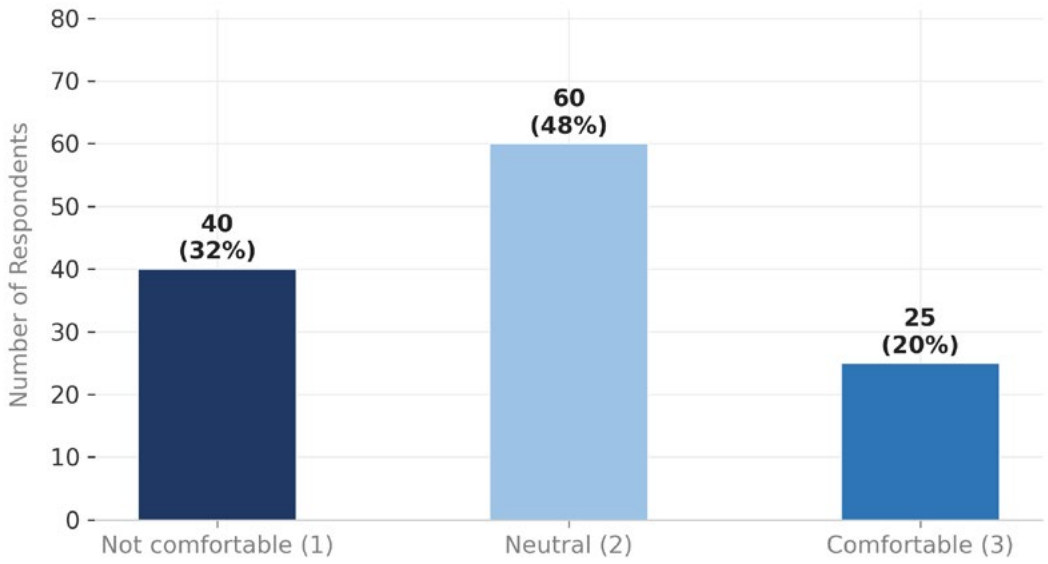
Figure 3: Reasons Students Prefer AI-Enhanced Learning (n=125)



5.4. STUDENTS DRAW A CLEAR LINE AT AI-BASED ASSESSMENT

When asked about their comfort with AI evaluating their essays, tests, and projects, 32% of respondents expressed active discomfort, 48% were neutral, and only 20% expressed comfort (refer Fig. 4). This difference with students who rely on AI daily for learning actively resisting AI as an evaluator is relevant in two directions: it suggests that student-side consent for AI grading is not established. It provides a basis for policy that distinguishes clearly between AI as a learning tool (which is highly preferred) and AI as an assessment instrument (where significant reservations exist). In a student-centric educational system, this concern must be taken seriously and it requires further investigation.

Figure 4: Students' Comfort Levels with AI Assessing Their Work (n=125)

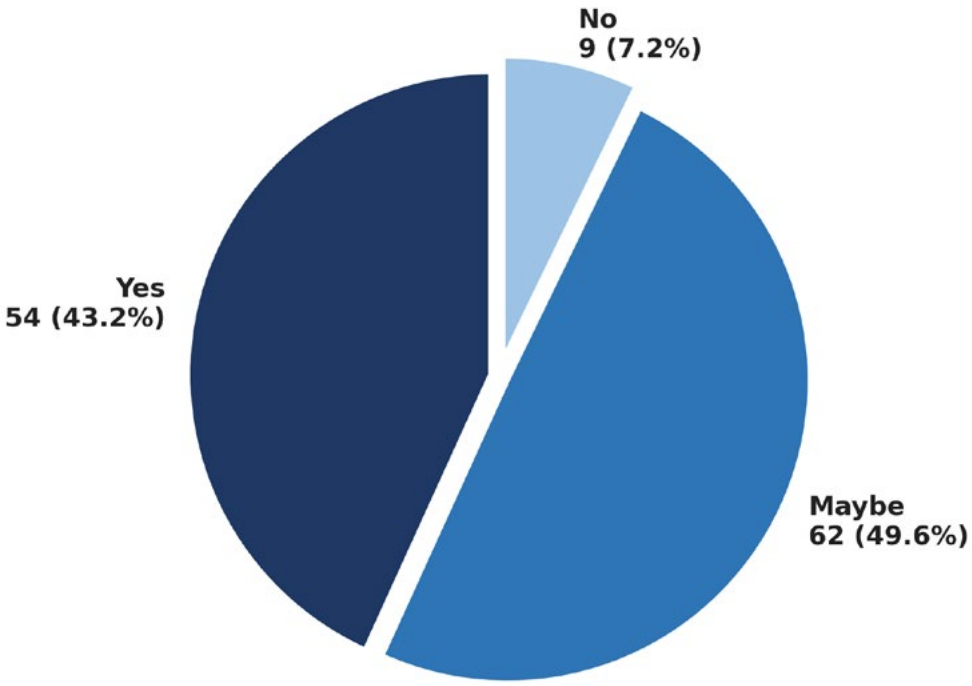


5.5. NEAR-UNIVERSAL OPTIMISM REGARDING THE FUTURE OF AI IN CLASSROOMS REINFORCES THE URGENCY OF GOVERNANCE

92.8% of respondents believe AI-based robots will be present in schools and colleges in the future (43.2% affirmative, 49.6% uncertain but expectant) as seen in Fig. 5. This optimism is consistent across all age groups. A broadly trusting student population engaging with an unregulated technology represents a major governance vulnerability: high levels of user trust and the absence of regulations are not evidence of safety. We are currently in a state where protective frameworks are most necessary and least likely to be demanded by users themselves.

Figure 5: Student Expectations for AI and Robots in Schools and Colleges in the Future

(n=125)



6. THE GOVERNANCE GAP: SPECIFIC REGULATORY DEFICITS

The survey findings, read alongside existing literature, identify five specific areas where India's current regulatory and policy frameworks are insufficient.

6.1. ABSENCE OF ACCURACY STANDARDS FOR AI EDUCATIONAL TOOLS

No Indian regulatory body currently defines, audits, or certifies AI tools for factual accuracy in educational contexts. LLM hallucination, which refers to the generation of confidently delivered but factually incorrect content, poses particular risks in STEM subjects, where accuracy is essential and errors may result in serious and long-term misunderstanding in a student's learning journey. The survey's finding that students have identified on their own which subjects to trust AI with suggests the need for formal, large-scale experiment-based accuracy standards, not merely user intuition.

6.2. ABSENCE OF AGE-SPECIFIC SAFEGUARDS

Survey data confirms that children aged 12 and below are actively using general-purpose AI platforms not designed for minors. The DPDPA 2023 establishes protections for children's data in principle; however, no sector-specific guidance can be observed for EdTech and AI platforms used in educational settings. The gap between formal intent and practical implementation is what children currently meet with.

6.3. RISK OF COGNITIVE OFFLOADING

Gerlich (2025) demonstrated an association between frequent cognitive offloading via AI tools and lower critical thinking capacity [12]. With 48% of respondents using AI daily, the scale of daily cognitive offloading among Indian students is significant. No institutional guidance currently exists on how students should use AI to augment rather than replace active reasoning, a distinction with long-term implications for educational outcomes and workforce capability.

6.4. SAFETY RISKS FROM UNGUARDED AI INTERACTIONS

AI platforms accessible to minors without guardrails pose documented safety risks. Legal action currently underway in the United States against OpenAI, alleging that ChatGPT facilitated a teenager's self-harm, informs us of a significant issue, the degree of severity of harm possible when vulnerable users interact with ungoverned AI systems [19]. India has no equivalent to the regulatory frameworks under development in the European Union's AI Act or the United Kingdom's Online Safety Act to address these risks for minor users of AI platforms.

6.5. NO NATIONAL FRAMEWORK FOR AI AND ACADEMIC INTEGRITY

Indian educational institutions are individually and inconsistently dealing with the consequences of AI use in assessed work. In the absence of national guidance, policies range from complete prohibition, which is not enforceable, to complete freedom, raising fairness concerns due to the lack of resources and quality assurance concerns. Such unregulated methods create inequity between students at institutions with different policies and reputational risk for Indian higher education in international contexts.

7. POLICY RECOMMENDATIONS

The following recommendations are meant for specific government bodies to consider to address the regulatory issues mentioned above. These might be interconnected, too because the ultimate goal would be to build a national framework for AI in education.

RECOMMENDATION 1: ESTABLISH SUBJECT-SPECIFIC ACCURACY STANDARDS FOR AI TOOLS USED IN STEM EDUCATION

Ministry of Education and NCERT - The Ministry of Education, in consultation with NCERT and domain-expert committees, should develop subject-specific benchmarks for factual accuracy in AI tools deployed or recommended for school and college STEM use. These benchmarks should be publicly available, regularly updated as AI evolves, and used to build a system that informs students and teachers of the reliability levels of specific tools in specific subjects. This way, if or when discrepancies arise between traditional sources of knowledge, such as books and notes and the answers provided by LLMs, users would know what sources to trust. This would change students' perception, help set up transparent standards, and establish a basis for liability where AI tools cause documented harm through inaccurate content. This could also in turn challenge AI service providers to consistently ensure that their content is as accurate as it can be and when not sure, the LLMs should at least state so instead of hallucinating and misleading the user.

RECOMMENDATION 2: ISSUE SECTOR-SPECIFIC DPDPA GUIDANCE FOR EDUCATIONAL AI PLATFORMS

MeitY and Ministry of Education - The Ministry of Electronics and Information Technology, jointly with the Ministry of Education, should issue sector-specific guidance under the Digital Personal Data Protection Act 2023 for AI and EdTech platforms used in educational settings. This guidance should require verifiable parental consent for users below a certain age, strict rules on what content can be shared and not be shared with minor users, prohibition of commercial use of minors' learning interaction data for model training, and mandatory disclosure to students and parents of what data is collected and retained. This is something the DPDPA should take seriously, as the intent has been child-protection, but the specific context of applications and usage of AI is what has been missing and is also most urgently needed.

RECOMMENDATION 3: DEVELOP A NATIONAL FRAMEWORK FOR AI AND ACADEMIC INTEGRITY

UGC and AICTE - The University Grants Commission and the All India Council for Technical Education should jointly develop a national academic integrity framework governing AI use in assessed work. The framework should distinguish clearly between AI-assisted learning - acceptable and encouraged where it supports understanding, given that students appear to enjoy learning this way, and AI substitution in assessed work - which would require disclosure to maintain transparency and also assessment redesign. The framework must establish baseline disclosure norms applicable for all institutions, provide model assessment design guidance, improve the AI literacy levels of the users, and avoid blanket prohibition, which is not really practical and not advisable either in a world where the use of AI is increasing everyday. The survey finding that students actively resist AI grading provides an evidential basis for a framework that maintains human judgment in assessment while permitting the support of AI when it comes to learning.

RECOMMENDATION 4: CONDUCT A NATIONAL-LEVEL SURVEY OF AI ADOPTION IN EDUCATION

Ministry of Education and NITI Aayog - The survey data presented in this paper, while original and relevant to the policy concerns raised, is limited in geographical scope. A national-level study, designed in partnership between the Ministry of Education, NITI Aayog's education department, and independent researchers, would definitely help establish the true scale at which AI is being used across different income groups, geographical areas, institution types (public vs private), different backgrounds and different linguistic communities. Without understanding the baseline, equity-related goals and appropriate interventions cannot be designed or implemented. The survey should be structured for regular updates as both the capacities of AI and the usage of AI continue to evolve.

RECOMMENDATION 5: INCLUDE AI LITERACY PROGRAMMES AND PEDAGOGICAL SAFETY IN PROFESSIONAL DEVELOPMENT PLANS ACROSS THE COUNTRY

Ministry of Education - NEP 2020's commitments to professional development of teachers and educators should be updated to include AI literacy, practical, subject-specific training on LLM capabilities and limitations, terms of ethical use, and assessment design in an AI-based set-up. Also, in response to this survey's finding that fear of judgment is a primary driver of AI usage over human-to-human interaction in educational settings, these teacher development programmes should include training in creating psychologically safe classroom spaces. This issue tells us that unintentionally there has been a silent institutional failure which makes AI more preferable, so this must be taken seriously to create educational settings that are truly welcoming and comforting for students of all age groups.

8. DISCUSSION AND LIMITATIONS

This paper makes an original empirical contribution to the evidence base for AI education policy in India, presenting primary survey data that reveals the extent of student AI adoption for learning purposes, identifies the psychological and institutional reasons for the same, and highlights the specific gaps in regulations that need to be addressed. The policy recommendations mentioned here are based on existing laws, the DPDPA 2023 and NEP 2020, and are addressed to different departments related to education and technology.

Several limitations of this study must be acknowledged. The survey sample of 125 students in Bangalore cannot be considered as nationally representative and these findings should be treated only as indicative and directional. Also, this study does not measure long-term learning outcomes, making it impossible from this data alone to assess the effects of daily AI use on educational achievement over time, which is a critical gap for policy that Recommendation 4 addresses. Since no participants had experienced live tutoring by a humanoid, findings about robot teachers and ITS are extrapolated from LLM experience. Finally, the AI industry is evolving rapidly; specific capability ratings and tool assessments should be interpreted in the context of the tools available for this population at the time of the survey.

Despite all these limitations, the paper's central argument remains: the governance gap is real and growing. A subset of the population most affected has already made AI part of their daily learning routine. The DPDPA 2023 and NEP 2020 provide a partial foundation for action. What is missing is a necessary upgrade of that foundation which would translate to specific, practical, and equity-based regulations. This paper aims to highlight the need for such a policy.

9. CONCLUSION

The pace at which India's students have adopted AI for academic learning has left institutional governance far behind. The findings of this survey: 48% daily usage, near-universal optimism, and the psychological motivations for the preference of AI over human teaching including fear of shame and freedom from judgment clearly display a remarkable transformation in how Indian children learn. And this sudden shift I learning has been happening without regulatory oversight, quality standards, or protective frameworks.

The question for policymakers is not whether to permit AI in Indian classrooms. The answer to that is not binary, and it has been answered by students themselves. The question is whether India's educational and regulatory authorities will govern this transformation carefully, to support students from different backgrounds, or let it progress by default, with students themselves deciding what is right and what is not, with its benefits reaching only the privileged, urban students and its risks posing significant threats for all children.

The recommendations stated in this paper: accuracy standards, DPDPA implementation, a national integrity framework, an equity audit, and updated teacher development mandates can be addressed within existing national mandates and legal frameworks. They require coordination between different bodies such as the Ministry of Education, MeitY, UGC, AICTE, and NITI Aayog. Above all, what is needed is the acknowledgement that the governance gap identified here is not a future challenge but a policy failure for the students of today.

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