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The Impact of Artificial Intelligence on Students: Learning, Agency, Ethics and Sustainable Academic Development

Dr. Puttaraju M. V[1], Madhu H. G.[2]
[1]Department of Political Science, Government First Grade College, Tumkur, Karnataka, India
[2]Research Scholar, Department of Studies and Research in Political Science, Karnataka State Open University, Mysuru, India

Abstract- Artificial intelligence (AI), particularly generative AI, has rapidly become part of students' everyday search, writing, problem-solving and communication practices. This article examines the impact of AI on students through a structured review of policy documents, peer-reviewed scholarship and selected higher-education reports. The study asks how AI changes access to information, reading and writing practices, creativity, decision-making, assessment, academic integrity and learner agency. A transparent secondary-research method was used: sources were screened for relevance to education, student outcomes, ethics, governance and digital inclusion; claims were then synthesized into benefit, risk and governance categories. The analysis shows that AI can provide rapid feedback, accessibility support, multilingual assistance and personalized learning pathways, but these gains are conditional. Uncritical dependence may weaken verification habits, sustained reading, original composition and independent judgement; inaccurate outputs, hidden bias, privacy risks and unequal access can also widen educational disadvantage. The paper proposes a human-centred model in which AI augments rather than replaces student reasoning. It recommends explicit AI literacy, redesigned assessment, disclosure of AI assistance, teacher-guided verification, privacy safeguards and equitable infrastructure. The central conclusion is that the educational value of AI depends less on the mere availability of tools than on the quality of pedagogy, institutional rules and students' capacity to question, verify and ethically use machine-generated outputs.

Keywords- Artificial intelligence; generative AI; students; higher education; academic integrity; learner agency; digital literacy; ethics.

I. Introduction

Artificial intelligence has moved from specialized laboratories into ordinary student life. Search engines, recommendation systems, automated translation, adaptive platforms and generative chatbots now influence how students locate information, prepare notes, draft assignments and make academic decisions. UNESCO (2023) and the OECD (2023, 2026) therefore treat AI in education not simply as a technical innovation but as a policy and human-development issue. The crucial question is no longer whether students will encounter AI, but whether institutions can shape its use so that it strengthens learning rather than displacing effort, judgement and responsibility.
The original manuscript correctly identified AI as a "double-edged" influence. The present revision develops that insight into a researchable framework. It distinguishes access from learning, assistance from substitution, and productivity from genuine intellectual development. Earlier work on open-source mathematical software,

visualization and algorithmic problem solving demonstrates that digital tools are most educationally valuable when students can inspect procedures, test results and understand the logic of a solution rather than merely copy an output (Yogeesh, 2014, 2015, 2016, 2018a, 2019a). This principle is directly relevant to contemporary generative AI.

II. Problem Statement and Research Gap

Public discussion often treats AI as either a universal tutor or a threat to education. Both positions are incomplete. Existing research documents potential improvements in feedback, personalization and accessibility, while also warning about hallucinated information, bias, privacy, surveillance and academic misconduct. Less attention is given to the political and educational question of learner agency: who retains control over judgement when students rely on systems whose training data, ranking logic and limitations are largely invisible? This article addresses that gap through an integrated analysis of learning, ethics and institutional governance.

III. Objectives and Research Questions

1. To examine the principal educational benefits of AI for students.
2. To identify risks to reading, writing, creativity, independent judgement and academic integrity.
3. To analyse how teacher guidance, assessment design, digital access and AI literacy moderate student outcomes.
4. To propose a practical framework for responsible and sustainable student use of AI.

The study addresses four questions: (RQ1) What student benefits are most consistently supported in the literature? (RQ2) Which cognitive, ethical and social risks are most significant? (RQ3) Under what institutional conditions does AI augment rather than replace learning? (RQ4) What policies can protect learner agency and equity?

IV. Methodology

The article uses a structured narrative review and policy-analysis design. The evidence base includes major international guidance, higher-education research, Indian education policy and relevant scholarship on digital learning, academic integrity and human-centred AI. Sources were included when they addressed student learning, assessment, access, governance, ethics or institutional implementation. Purely promotional material and claims without traceable authorship were excluded. Thematic coding grouped findings into six domains: access and support; learning and cognition; reading and writing; assessment and integrity; equity and privacy; and governance. Because the paper does not report a new student survey, all numerical or evaluative statements are explicitly treated as secondary evidence or qualitative synthesis. Computational and graphical methods used in earlier educational mathematics research informed the transparent organization and visualization of the review evidence (Yogeesh, 2014, 2015, 2016, 2018a, 2019a).

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Evidence domain	Illustrative indicators examined	Interpretive question
Access and support	Speed, multilingual assistance, accessibility, availability	Does AI reduce barriers without reducing effort?
Learning and cognition	Feedback, explanation, practice, metacognition	Does use deepen understanding or encourage passive acceptance?
Reading and writing	Comprehension, drafting, revision, source verification	Does AI improve expression while preserving authorship?
Assessment and integrity	Disclosure, originality, oral defence, process evidence	Can assessment distinguish learning from outsourced production?
Equity and privacy	Connectivity, device access, data collection, bias	Who benefits, who is excluded, and what data are exposed?
Governance	Policy clarity, teacher capacity, appeal, audit	Are institutional safeguards proportionate to risk?

V. Conceptual Framework

Figure 1 presents the study's central proposition: AI affects student outcomes through learning processes, but the direction of influence is moderated by AI literacy, teacher guidance, assessment design, digital access and privacy protection. Consequently, the same tool can produce different outcomes in different classrooms.

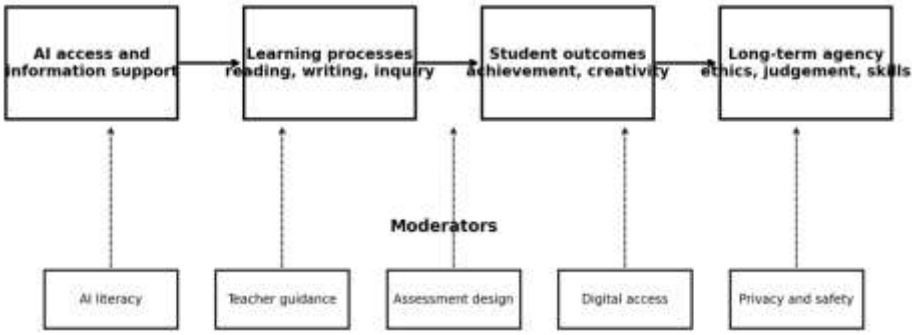

Figure 1. Human-centred framework linking AI use, learning processes, student outcomes and learner agency.

VI. Findings and Discussion

Access, Personalization and Academic Support

AI can provide explanations on demand, generate practice questions, translate difficult passages, summarize complex material and support students with disabilities or language barriers. Intelligent tutoring and analytics may help identify learning difficulties and provide timely intervention (Luckin et al., 2016; Zawacki-Richter et al.,

2019; OECD, 2021). Generative AI also lowers the cost of obtaining formative feedback. These functions are especially valuable when teacher time is limited, but automated feedback must remain contestable and should not be treated as authoritative.

Reading, Writing and Knowledge Construction

The strongest educational concern is not that students receive assistance, but that assistance may bypass the cognitive work through which learning occurs. Sustained reading develops attention, contextual understanding and the ability to compare arguments. Writing develops planning, selection, synthesis and revision. When a student submits generated prose without checking sources or reconstructing the argument, the visible product may improve while underlying competence stagnates. Kasneci et al. (2023) and UNESCO (2023) therefore emphasize verification, transparency and pedagogical redesign. Open-source and algorithmic learning research similarly supports "inspectable assistance": students should see steps, test alternatives and explain why a result is valid (Yogeesh, 2015, 2016, 2018a).

Creativity and Decision-Making

AI can widen ideation by suggesting examples, counterarguments and alternative formats. Yet creativity is not the number of generated options; it also involves selecting, rejecting and transforming ideas in relation to a purpose. Overdependence may standardize expression and weaken confidence in independent judgement. Students should therefore use AI for divergence and critique, not as the final decision-maker. This is consistent with the broader distinction between crisp automation and contextual or fuzzy judgement developed in Yogeesh (2019b), where uncertainty requires interpretation rather than mechanical acceptance.

Academic Integrity and Assessment

Generative AI makes conventional take-home assignments difficult to authenticate. Detection software is unreliable as a sole evidentiary basis and may produce false accusations. A stronger response is assessment redesign: staged submissions, annotated sources, reflective commentaries, oral defence, classroom writing and disclosure statements. The aim is not to ban legitimate assistance but to make the learning process visible. Clear rules should distinguish permitted brainstorming, language support and feedback from prohibited substitution of authorship (Cotton et al., 2024; Perkins, 2023).

Equity, Privacy and Bias

AI can improve inclusion, but unequal devices, connectivity, language coverage and paid features may reproduce existing inequalities. Student prompts and uploaded documents may contain personal or institutional data. Models can also reproduce stereotypes and dominant-language assumptions. Rights-based governance therefore requires data minimization, age-appropriate use, procurement scrutiny, accessibility testing and meaningful alternatives for students who cannot or choose not to use a specific system (UNESCO, 2023; European Commission, 2022).

Figure 2 summarizes the balanced evidence pattern: the largest opportunities are rapid feedback and personalized support, while the largest risks concern over-reliance, inaccurate output and integrity. The figure is a qualitative synthesis, not a statistical meta-analysis.

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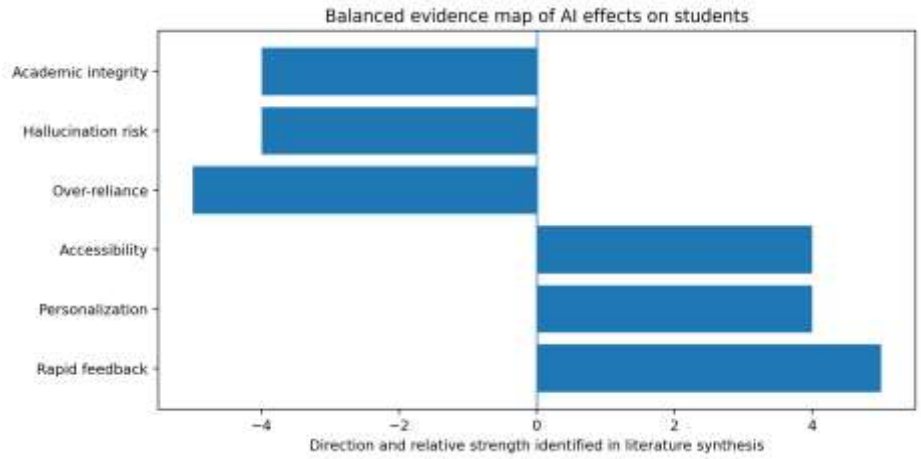

Figure 2. Qualitative evidence map of major benefits and risks identified in the reviewed literature.

AI use scenario	Potential educational value	Principal risk	Recommended safeguard
Explaining a difficult concept	Immediate, adaptive explanation	Confidently incorrect explanation	Require textbook/source comparison and student restatement
Drafting an essay outline	Supports planning and idea generation	Generic structure and loss of ownership	Student supplies thesis; disclose AI assistance
Language correction	Improves clarity and accessibility	Voice homogenization or meaning change	Retain version history and author review
Generating code or calculations	Provides examples and debugging support	Hidden errors and shallow understanding	Test cases, step explanation and oral defence
Personal academic advice	Convenient guidance	Inappropriate or biased recommendation	Human counsellor escalation and privacy limits
Assessment preparation	Practice questions and feedback	Teaching to generated patterns	Teacher-curated tasks and varied assessment

VII. Recommendations

- Adopt an institution-wide AI literacy curriculum covering prompting, verification, citation, bias, privacy and limitations.
- Require transparent disclosure of meaningful AI assistance in assessed work.

- Redesign assessment to include process evidence, oral explanation, local context and authentic problem solving.
- Train teachers to evaluate AI outputs and to model critical, ethical use rather than relying only on prohibition.
- Provide equitable access and non-AI alternatives so that policy does not disadvantage low-income or rural students.
- Prohibit the upload of sensitive personal, examination or institutional data to unapproved systems.
- Establish an appeal process for AI-related academic-integrity decisions and avoid sole reliance on automated detectors.

VIII. Limitations

This is a structured secondary review, not a meta-analysis or primary survey. The AI ecosystem changes rapidly, and evidence about long-term cognitive effects remains limited. Findings should therefore be tested through institution-specific student and teacher studies using ethically approved instruments and transparent sampling.

IX. Conclusion

AI can broaden access to explanation, feedback and creative support, but it can also conceal errors and displace the intellectual effort required for durable learning. The decisive issue is governance. When students are taught to verify, disclose, compare and defend their work, AI can function as an academic assistant. When speed and polished output become substitutes for reading, reasoning and authorship, learner agency is weakened. Sustainable adoption therefore requires human-centred pedagogy, assessment reform, equitable infrastructure and rights-based institutional policy.

Declarations
Funding: The authors received no specific funding for this study.
Conflict of interest: The authors declare no conflict of interest.
Ethical statement: This study used publicly available documents and secondary literature; no human participants or personal data were involved.
Data availability: All evidence used in the study is available in the cited publications and official reports.

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