AARSI

A Peer Reviewed Multidisciplinary Annual Journal

Published by
SLU Arts and H. & P. Thakore Commerce College for Women
An Endeavour of
Gujarat Stree Kelavani Mandal

Theme

National Education Policy 2020 – Achievements, Challenges & Future Directions

Vol. 4
Issue. 4
Year 2026

ISSN – 2231 : 2897

GSKM - SLU Campus, Ahmedabad.

AARSI - A peer reviewed multidisciplinary annual journal

Issued Date: 15th June, 2026	Vol. 04	Issue. 04	ISSN: 2331-2897

INDEX

W27: Teacher Capacity Building: Evaluating the Effectiveness of AI-Powered NotebookLM in Classroom Pedagogy

Dr. Krishna M. Lakhani
Smt. R.P. Chauhan Arts and Smt. J.K. Shah & Shri. K.D. Shah Commerce, Vyara

Abstract: The National Education Policy (NEP) 2020 emphasizes the urgent need for strong teacher capacity building to foster a multidisciplinary and tech-integrated pedagogy. However, educators face significant challenges in transitioning to these standards, including time constraints, resource management, and the technical curve of new digital tools. The usage of Artificial Intelligence (AI) tools in education is growing as teachers look for effective ways to improve classroom teaching and learning. This study examines the effectiveness of the AI tool NotebookLM in classroom teaching. The study uses a descriptive and experiential approach based on the classroom teaching to use of NotebookLM. The tool was applied during lectures to explain topics, revise key concepts, and clarify student doubts. NotebookLM has a positive effect on the teaching–learning process. This study examines how NotebookLM's ability to create complex documents, generate source-grounded insights, and create interactive study guides addresses the practical hurdles of NEP 2020 implementation. Preliminary findings suggest that the tool significantly reduces administrative burden and enhances lesson preparation, allowing teachers to focus on student-centric inquiry. The paper concludes that while AI tools like NotebookLM offer a scalable solution for capacity building, their success depends on a balanced integration of AI literacy and traditional pedagogical values. Overall, the study concludes that NotebookLM is an effective support tool for classroom teaching. When used carefully along with traditional teaching methods, it can improve learning experiences and help meet the changing demands of modern education.

Key Words: NotebookLM, Artificial Intelligence (AI), National Education Policy (NEP) 2020

Introduction

The National Education Policy (NEP) 2020 marks a transformative shift in the Indian educational landscape, advocating for a move away from rote learning toward holistic, integrated, and learner-centric pedagogy. A cornerstone of this vision is the continuous professional development of educators. However, the transition from policy to classroom practice faces a significant "implementation gap." Teachers are currently tasked with navigating a complex digital evolution while managing increasing administrative burdens and the diverse needs of a 21st-century classroom.

Traditional teacher capacity building often struggles to keep pace with the rapid advancements in educational technology. Educators frequently cite time constraints, a lack of personalized training resources, and the difficulty of synthesizing vast amounts of curricular content as primary barriers to effective teaching. As NEP 2020 mandates the integration of digital literacy and computational thinking, there is an urgent need for tools that do not merely add to a teacher's workload but actively streamline and enhance their pedagogical capabilities.

The rapid advancement of Artificial Intelligence (AI) has brought significant transformation to the education sector, redefining traditional teaching–learning processes. AI-driven tools are increasingly

being integrated into classroom instruction to promote interactive, personalized, and student-centered learning environments. These technologies assist educators in content delivery, assessment, and feedback while supporting students in better understanding and retention of academic concepts. In this context, AI tools have emerged as valuable resources for enhancing both teaching effectiveness and learning outcomes.

One such emerging AI-based educational tool is NotebookLM, which supports classroom teaching by generating structured notes, summarizing complex topics, and providing instant clarification and personalized learning assistance. By enabling real-time content organization and concept reinforcement, NotebookLM aims to make classroom teaching more engaging and effective. The use of such tools not only enhances student participation and comprehension but also reduces teachers' workload related to lesson planning and evaluation, allowing them to focus more on individual student needs. Despite the growing adoption of AI tools like NotebookLM in educational settings, empirical evidence regarding their effectiveness in classroom teaching remains limited. There is a need for systematic research to examine whether these tools genuinely improve student engagement, academic performance, and overall teaching efficiency. Therefore, the present study seeks to evaluate the effectiveness of the AI tool NotebookLM in classroom teaching by analyzing its impact on student learning outcomes, engagement levels, and instructional efficiency. The findings of this research are expected to contribute valuable insights into the role of AI-based tools in enhancing modern classroom teaching practices.

Features of the tool

1. Source-Grounded Intelligence
   - Privacy-First: It only answers based on the sources you upload (PDFs, Google Docs, website URLs, YouTube transcripts, and audio files).
   - Inline Citations: Every response includes clickable citations that take you directly to the exact passage in your source material.
2. Audio Overviews (Interactive Podcasts)
   - Deep Dive Conversations: Generates a realistic, 2-host podcast-style discussion of your documents.
   - Interactive "Join" Mode: You can now "interrupt" the AI hosts using your microphone to ask for clarifications, change the topic, or request simpler analogies in real-time.
   - Customization: You can choose the format (Brief, Critique, or Debate) and tell the hosts what specific themes to focus on.
3. The "Studio" Suite (Content Generation)
   - Visual Assets: Instantly create Slide Decks, Mind Maps, and Infographics from your text-heavy documents.
   - Academic Tools: One-click generation of Flashcards, Quizzes, and Study Guides.
   - Data Tables: Automatically extracts qualitative information from various documents and organizes it into a structured comparison table.
4. Deep Research & Analysis
   - Synthesized Insights: It can analyze up to 50 sources (Free) or 600 sources (Pro/Ultra) at once to find patterns and contradictions across a massive volume of data.

- Prompt-Based Revisions: For generated slides or reports, you can use a chat box to tell the AI to "make the visuals more professional" or "change the color scheme to blue," and it will rebuild the asset. (Google, 2024)

Review of literature

Existing literature highlights the growing role of Artificial Intelligence (AI) in enhancing teaching and learning processes across educational settings. Previous studies have reported that AI-based tools support personalized learning, improve student engagement, and assist educators in instructional planning and assessment. Despite these findings, limited empirical research specifically examines the effectiveness of NotebookLM in classroom teaching, indicating a research gap that the present study seeks to address.

(Sawant et al., 2025) study reveals the AI incorporation through the use of such tools as ChatGPT has the possibility of redesigning classroom teaching. The tools have a capability of offering individualized learning experiences, enhancing student engagement, and allowing the educator to edit the material according to the needs. Such AI tools make the teaching process more efficient and improve learning results by placing the feedback process within minutes and providing additional content.

(Ding, 2025) This paper explores the intellectual and political impacts of integrating AI in classroom learning. It analyzes and discusses past classroom learning outcomes when integrated with AI technologies, as well as how classroom learning has evolved and will continue to evolve. To predict and adapt to the future of technology in education, where AI is deeply embedded into the fabric of our educational institutions, we must study its implications from various perspectives, from the classroom to broader society.

(Pan, 2024) researcher indicates the use of artificial intelligence (AI) in education has received widespread attention, especially in personalized learning and teaching management, where it has shown significant potential. However, current research still has limitations, especially in addressing the ethical and privacy challenges of AI technology and the decline in students' self-discipline.

(Wang, 2024) conclude the rapid development of artificial intelligence technology, its application in university classroom teaching is becoming increasingly widespread, bringing unprecedented changes to the field of education.

(Sarwar et al., 2024) AI has the potential to enhance educational methodologies at the higher secondary level, leading to personalized learning experiences and improved learning outcomes. However, challenges such as resource limitations and ethical concerns need to be addressed to fully realize its benefits. Researcher highlights AI's dual nature as a powerful tool for educational advancement and a source of complex challenges that require careful planning and ethical consideration for successful implementation in higher secondary education.

(Tufino et al., 2025) This study explores NotebookLM, a Google Gemini-powered AI platform, that integrates Retrieval-Augmented Generation (RAG) as a Socratic tutor for physics education. It highlights both the promising potential of the tool and key pedagogical challenges, such as managing user motivation. While limitations remain, this work offers a promising and replicable model for educators seeking to implement grounded AI tutors in their own teaching contexts.

(Mondal & Mondal, 2025) The paper expreses that integrating NotebookLM with storytelling offers a promising solution to enhance physiology education, particularly for first-year medical students. This approach addresses the challenges of engaging students with Abstract and mechanistic subject matter by making complex physiological principles more accessible and memorable the paper highlights NotebookLM's capability to empower educators in creating engaging, accurate, and source-grounded stories for physiology education, thereby transforming how students learn and retain complex medical knowledge.

Objective of the study

To study the effectiveness of the use of NotebookLM as an AI tool in classroom teaching.

Research methodology

The present study adopts a conceptual and qualitative research design based entirely on secondary sources of data. It is an experiential classroom based approach used for this study. The research relies on an extensive review and analysis of existing literature, including academic journals, research papers, books, conference proceedings, policy reports, and credible online sources related to Artificial Intelligence in education and the use of NotebookLM in classroom teaching. The functioning, features, and educational implications of NotebookLM were examined using document analysis and content analysis methods. Relevant themes such as student engagement, teaching effectiveness, reliability of AI-generated content, and instructional support were identified and systematically analyzed. This methodology enables a comprehensive understanding of the effectiveness and potential of NotebookLM as an AI tool in classroom teaching based on existing scholarly evidence.

Limitations

- The study is related to secondary data and findings are derived from existing literature related to AI tool.
- The study focuses specifically on the AI tool NotebookLM, and comparisons with other AI-based educational tools are not extensively explored.
- The effectiveness of NotebookLM is examined within a general classroom teaching context, without considering subject-specific.

Findings

The study finds that the integration of NotebookLM address the core pillars of NEP 2020 by enhancing teachers' pedagogical quality. Effective AI tool for classroom teaching due to its source-grounded and citation-based approach, which enhances the accuracy and reliability of learning content. It supports better student understanding and engagement by providing structured summaries, quizzes, and multimodal learning resources. The study also indicates that NotebookLM helps reduce teachers' instructional workload by assisting in content organization and clarification. Moreover, video and infographics features are most favorite in the classroom. Overall, the tool shows strong potential to enhance teaching effectiveness when integrated appropriately into classroom practices.

Conclusion

The implementation of NEP 2020 is not just policy making but on practical enablement of teaching faculty. This research shows that AI powered tool like notebookLM it is a bridge the gap between educational goal and the reality of classroom. The study concludes that the use of the AI tool NotebookLM has a positive impact on classroom teaching and learning. It supports better understanding of concepts, increases student engagement, and helps teachers deliver content more effectively. Although challenges such as digital access and data privacy exist, NotebookLM proves to be a valuable supplementary tool when used together with traditional teaching methods.

References

- https://notebooklm.google/
- https://share.google/La2eL0y8KlkJRxxjl
- https://support.google.com/notebooklm/answer/16164461?hl=en&co=GENIE.Platform%3DDesktop.
- Sawant, N., Raicar, A., & Khadapkar, D. (2025). Impact of AI Tools Like ChatGPT in Classroom Teaching. *International Journal of Advanced Research in Science, Communication and Technology*, 539–547.
- Ding, M. (2025). Effects of Artificial Intelligence Tools on Classroom Learning Outcomes and AI's Impact on the Future of Education. *Science and Technology of Engineering, Chemistry and Environmental Protection*, *1*(2).
- Pan, Y. (2024). The Application of Artificial Intelligence in Classroom: Advantages, Challenges, and Suggestions. *Journal of Education, Humanities and Social Sciences*, *45*, 211–216.
- Wang, C. (2024). The Impact of Artificial Intelligence on Classroom Teaching in Universities. *Journal of Research in Vocational Education*, *6*(7), 51–54.
- Sarwar, M., Saima, M., & Afshan, G. (2024). The Role of Artificial Intelligence in Shaping the Future of Education at Higher Secondary Level. *Journal of Education and Social Studies*, *5*(1), 34–45. https://doi.org/10.52223/jess.2024.5104
- Tufino, E., Tufino, E., & Tufino, E. (2025). NotebookLM as a Socratic Physics Tutor: Design and Preliminary Observations of a RAG-Based Tool. The Physics Educator, 07. https://doi.org/10.1142/s2661339525500143
- Mondal, H., & Mondal, S. (2025). Integrating NotebookLM, Source-Grounded Artificial Intelligence, and Storytelling for Enhanced Physiology Education: A Perspective. https://doi.org/10.30476/ijvlms.2025.107829.1348

About SLU College

Shree Lalshankar Umiyashankar Arts and Harivadan & Padmaben Thakore Commerce College for Women, which was established in 1920 as an endeavour of Gujarat Stree Kelvani Mandal, has the proud privilege of being the first women's college in Ahmedabad. The college is recognised under Section 2 (f) and 12 (b) of UGC Act 17th June, 1972. The college runs various programmes in affiliation with Gujarat University such as - B.A., B.Com., and M.Com. The BS-BBA programme was added from the academic year 2025-2026. The college also runs several add-on programmes like Fashion Design and Computer Courses at the ICTC centre located at the SLU Campus.

College Website

www. slucollege.org

Aarsi Email Id

sluaarsi@gmail.com