

## A Study on Embracing Digital Media and AI in Higher Education: From Chalkboards to Chatbots

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### Abstract

The integration of digital media and artificial intelligence (AI) is fundamentally reshaping higher education, leading to a profound pedagogical transformation. This study explores the impact of these technologies, encompassing online learning platforms, social media, adaptive learning systems, and AI chatbots, on teaching and learning practices. A comprehensive review of literature, global surveys, and case studies reveals both significant opportunities and inherent challenges. Digital tools enhance learning through increased flexibility, broader accessibility, and greater personalization. For example, online platforms and AI-powered chatbots can provide individualized feedback, assist with coursework, and help identify at-risk students. The COVID-19 pandemic accelerated these trends, compelling institutions globally to rapidly adopt remote learning. A recent global survey indicates that 86% of students already use AI tools for tasks like information search and summarization, yet less than half feel prepared for an AI-enabled curriculum. Key challenges include unequal access to technology, data privacy concerns, potential algorithmic bias, and threats to academic integrity. The transition from traditional methods to the integration of chatbots necessitates addressing infrastructure and training gaps. UNESCO emphasizes that AI in education must be applied with inclusion and equity. In conclusion, universities must invest in faculty development, digital infrastructure, and policy frameworks to ensure the responsible and inclusive use of AI and digital media in teaching and learning. Strategic investment in educational technology is crucial for navigating this evolving landscape and maximizing the benefits for all learners.

**Key Words:** higher education, AI tools, chatbots, educational technology etc.

### Introduction

Higher education is currently navigating a profound pedagogical shift, characterized by a departure from traditional, lecture-centric instruction towards increasingly sophisticated digital learning environments. Universities worldwide are embracing a diverse array of technological tools, including multimedia presentations, comprehensive online platforms, and cutting-edge artificial intelligence (AI) applications, to augment and, in some cases, replace conventional teaching methodologies. This transition, often described as a move from the era of “chalkboards” to the burgeoning influence of digital interfaces, has been significantly accelerated by the unprecedented circumstances of the COVID-19 pandemic. The widespread campus closures during lockdowns necessitated a rapid and often abrupt adoption of virtual learning modalities, compelling both educators and students to adapt their behaviors almost overnight.

Interestingly, emerging evidence suggests that this forced transition to digital learning may not only be sustainable but could potentially lead to enhanced educational outcomes. A meta-

analysis conducted by Stevens et al. (2021), examining studies spanning two decades (2000-2020), revealed that a notable 41% of the analyzed research reported superior learning outcomes resulting from online instruction compared to traditional face-to-face methods. These findings underscore a significant paradigm shift, indicating that digitization is no longer merely a supplementary tool but an increasingly integral component of contemporary pedagogy in higher education.

The realm of digital media in education encompasses a broad spectrum of technologies designed to enrich curricula and expand access to learning opportunities. These include robust learning management systems (LMS), engaging multimedia content, collaborative social networking platforms, and the ubiquitous presence of mobile devices. Such resources offer numerous pedagogical advantages. For instance, recorded lectures and interactive videos empower students to learn at their own pace, revisiting complex concepts as needed, while online discussion forums and social media platforms can cultivate supportive and interactive learning communities, fostering peer-to-peer engagement and knowledge sharing.

Concurrently, artificial intelligence (AI) is rapidly establishing itself as a transformative force within higher education. AI-driven systems, such as sophisticated adaptive tutoring platforms that tailor instruction to individual student needs, automated grading software that streamlines assessment processes, and intelligent chatbots capable of providing instant support and answering student queries, are personalizing the learning experience to an unprecedented degree. Recent experiments have demonstrated the efficacy of AI chatbots in providing detailed and timely feedback on assignments, thereby enhancing student understanding and learning. Furthermore, learning analytics powered by AI algorithms can continuously monitor student progress, identify those at risk of falling behind academically, and provide valuable insights to educators for targeted interventions. These innovations hold the promise of making education more individualized, efficient, and data-informed.

Despite the numerous benefits, the integration of digital media and AI into higher education also presents significant challenges that require careful consideration and proactive solutions. Persistent infrastructure gaps remain a critical concern, as access to reliable technology and internet connectivity varies widely across different contexts. UNESCO data from 2022 indicates that only approximately 66% of the global population had access to the internet, highlighting the digital divide. Moreover, surveys of educators have revealed disparities in digital literacy and access, with a significant percentage reporting poor digital skills among staff as a major challenge during lockdown periods.

Ethical and privacy concerns are also paramount. AI systems are susceptible to reflecting biases present in their training data, potentially leading to inequitable outcomes. Unauthorized collection and use of student data raise serious privacy issues that must be addressed through robust policies and safeguards. Furthermore, educators are increasingly concerned about preserving academic integrity in an era where AI can generate sophisticated text. The potential for students to use AI tools to complete assignments necessitates a re-evaluation of assessment methods to ensure genuine understanding is being evaluated. Surveys of pre-service teachers reveal a nuanced perspective, acknowledging AI's potential benefits (e.g., for language assistance) while also expressing fears about its potential to undermine critical thinking skills and facilitate plagiarism. These mixed findings underscore the inherent complexities of seamlessly and ethically integrating technology into pedagogical practices.

In conclusion, the advent of digital media and AI has undeniably brought about a significant transformation in higher education pedagogy, presenting a wealth of opportunities alongside considerable challenges. UNESCO's emphasis on applying AI in education with the core principles of inclusion and equity serves as a crucial guiding principle. Recognizing this

evolving landscape, this study undertakes a comprehensive review of how universities globally are embracing these technologies. By synthesizing recent academic research and industry insights, we aim to assess the multifaceted impacts of digital media and AI on learning, delineate the key benefits and obstacles identified in the literature, and propose evidence-based strategies for successful and equitable implementation. This foundational analysis will inform our subsequent research endeavors, guiding the formulation of specific hypotheses and objectives to further explore this dynamic and increasingly critical area of higher education.

### **Review of Literature**

The academic literature on the integration of digital media and artificial intelligence (AI) within higher education is extensive, drawing from diverse disciplines and encompassing a multitude of perspectives. Digital media, broadly defined as digital content distributed via networks, has been a feature of pedagogical practices for several years; however, recent global crises have significantly accelerated its widespread adoption. Klein (2023) notes that while the utilization of digital media in universities is not a novel phenomenon, the unprecedented COVID-19 lockdowns compelled higher education institutions to fundamentally alter their operational practices with remarkable speed. Many institutions, traditionally reliant on face-to-face instruction, were forced to rapidly transition to fully online teaching modalities. Across numerous scholarly investigations, researchers have consistently observed that various digital technologies, such as online quizzes, educational videos, and specialized learning applications, effectively support and enhance student learning strategies. Klein's analysis, for instance, highlights the particular effectiveness of digitally delivered resources designed for exam preparation, instructional content delivery, and facilitating student self-study. This aligns with broader findings indicating that the flexibility and self-paced learning opportunities afforded by digital media can lead to increased student engagement and improved academic outcomes. The role of social media and online networking platforms has also been a subject of considerable scholarly attention within the educational context. Greenhow and Chapman (2020) examined the impact of emergency remote teaching during the pandemic and found that the strategic use of social media platforms enriched active learning experiences, fostered community building among students, and even promoted civic participation. However, they astutely cautioned that these tools are most effective as supplementary resources to formal instruction rather than outright replacements, primarily because their fundamental design often prioritizes commercial objectives over specific educational goals. Similarly, Rueda et al. (2024) reported that Spanish faculty members perceived online learning as offering significant advantages in terms of flexibility and accessibility but also encountered notable technical and motivational obstacles among students. These studies collectively suggest that when thoughtfully and purposefully integrated into the curriculum, digital media has the potential to make learning more interactive, engaging, and inclusive, although adequate technical support and comprehensive training for both educators and students are indispensable for successful implementation.

Despite these potential benefits, significant digital divides persist on a global scale. UNESCO's 2023 Global Education Monitoring report starkly emphasizes the uneven adoption of technology across different regions. In 2022, only approximately two-thirds of the world's population had access to the internet, and in many low-income countries, even basic internet connectivity within school environments remains severely limited. Within university settings, disparities often exist between well-resourced urban campuses and their rural counterparts, or between academic disciplines with substantial funding for laboratories and those without. These inherent inequities imply that the advantages of digital media often accrue disproportionately to institutions with greater financial and technological resources, thereby potentially widening

existing educational gaps. Empirical surveys corroborate these observations. For example, a Statista study revealed that a substantial 60% of students reported a lamentable loss of social interaction during lockdown periods, while 35% of instructors cited poor digital competencies among their colleagues as a significant challenge. Such findings underscore the presence of a readiness gap that can significantly hinder the effectiveness of even the most well-intentioned digital learning initiatives.

The burgeoning influence of AI in higher education has generated a substantial and parallel body of academic literature. Prominent organizations such as UNESCO emphasize AI's considerable potential to address pressing educational challenges, including the provision of personalized learning experiences and the enhancement of administrative efficiency, provided that its implementation is guided by ethical and responsible principles. In practice, universities are actively exploring the application of AI in two broad domains: administrative and data analytics, and as a direct aid to teaching and learning processes. On the administrative front, AI-driven systems are increasingly being utilized to streamline routine tasks such as scheduling, enrollment management, and financial aid processes, thereby reducing the administrative workload on staff. Learning analytics platforms, which leverage sophisticated AI algorithms, can analyze vast amounts of student data to predict those who may be at risk of dropping out, enabling timely and targeted support interventions. Meanwhile, educational chatbots and intelligent tutoring systems are at the forefront of AI applications in teaching. Labadze et al. (2023) conducted a comprehensive systematic review of AI chatbots in education and found consistent evidence of their benefits, with students reporting advantages in homework assistance, personalized learning experiences tailored to their individual needs, and the development of specific skills. Chatbots can provide immediate feedback and detailed explanations, effectively acting as on-demand study aids; remarkably, one study even found that the exam performance of ChatGPT matched that of human medical students. Similarly, AI can enhance writing and critical thinking exercises by automatically generating relevant problems, quizzes, and realistic scenario simulations.

However, the existing literature also robustly emphasizes the limitations and potential risks associated with the widespread adoption of AI in higher education. Reliability and the potential for inherent bias are frequently cited concerns. AI models may generate inaccurate or skewed information, particularly if they have been trained on flawed or unrepresentative datasets. For instance, some scholars caution that chatbots could inadvertently learn and propagate societal prejudices embedded within their training data. Another significant issue is the challenge to academic integrity. With the advent of powerful generative AI tools like ChatGPT, students can readily use these technologies to draft essays or solve complex assignments, making it increasingly difficult for instructors to accurately assess genuine student learning and understanding. Labadze et al. specifically highlight that concerns regarding "reliability, accuracy, and ethical considerations" are particularly salient in educational contexts. Kalniņa et al. (2024) similarly found that many pre-service teachers express significant worries about AI's potential negative impact on the development of students' critical thinking skills and the increased potential for plagiarism. Faculty surveys echo these concerns, with educators acknowledging the potential for AI to save time and diversify pedagogical approaches but also expressing skepticism regarding the accuracy and fairness of AI-generated content and assessments. These multifaceted concerns underscore the critical need for the development of new assessment methodologies and comprehensive ethical guidelines to govern the use of AI in educational settings.

Beyond the benefits and challenges, the literature also identifies crucial contextual factors that significantly influence the outcomes of digital media and AI integration in higher education.

The effective utilization of these technologies often hinges on the presence of supportive institutional policies and a culture that embraces innovation. A recurring recommendation in the literature is the necessity of providing faculty with ongoing training and robust support to enable them to integrate technology productively and ethically. For example, Grace (2025) persuasively argues that structured faculty development programs are essential for the ethical and practical application of AI in educational settings. Institutions that make strategic investments in robust technological infrastructure, such as reliable Wi-Fi access and readily available devices for students and faculty, and in comprehensive pedagogical training programs, tend to report more positive results from their technology integration initiatives. Conversely, institutions lacking such crucial support often experience lower rates of adoption or even resistance to technological change. Government and industry reports corroborate these findings, noting that universities in North America and Europe generally have more well-established and resourced programs for educational technology and AI implementation, while many universities in the Global South are only beginning to explore and pilot such initiatives. In summary, the existing body of literature paints a complex picture of rapid technological innovation in higher education, tempered by significant practical and ethical challenges. While digital media and AI tools hold immense potential to enrich the learning experience, realizing their full potential requires a sustained and concerted effort to address issues of equity, ethics, and comprehensive capacity-building across the global higher education landscape.

### Hypothesis

Null Hypothesis ( $H_0$ ): The integration of digital media and AI tools has no significant effect on student learning outcomes and engagement in higher education.

Alternative Hypothesis ( $H_1$ ): The integration of digital media and AI in higher education positively impacts student learning outcomes and engagement, with this effect moderated by institutional factors such as infrastructure, training, and equitable access.

### Objectives

The objectives of this study are:

- To evaluate the current landscape of digital media and AI usage in higher education globally.
- To identify and categorize the pedagogical benefits of integrating these technologies.
- To analyze the challenges and barriers that institutions face in integrating digital media and AI.
- To examine illustrative case examples and regional data demonstrating implementation outcomes.
- To develop evidence-based recommendations for effective and responsible leveraging of digital media and AI.

### Methodology

This study employs a systematic review and thematic analysis of existing literature and data from 2015 through 2024. We collected scholarly articles, conference proceedings, and institutional reports using academic databases and search terms such as “digital media higher education Delhi NCR,” “AI in education India,” “e-learning technology Ghaziabad universities,” “chatbots higher ed India,” and related keywords. Authoritative sources included peer-reviewed journals (e.g., the International Journal of Educational Technology in Higher Education and Frontiers in Education) and policy documents from organizations like the Ministry of Education (India) and UGC (University Grants Commission of India), alongside relevant reports from UNESCO. We also included recent industry and academic surveys (e.g., the Digital Education Council’s student surveys, potentially focusing on Indian participation if available) and credible news sources reporting on educational technology trends within India.



Each source was evaluated for relevance to the Delhi/NCR context and overall credibility. Qualitative findings were synthesized to extract key themes regarding benefits, challenges, and contextual factors relevant to higher education in Delhi/NCR. Quantitative data from reports (such as internet usage statistics in India and technology adoption rates in Indian universities) were summarized to provide context. Case studies and examples were drawn from academic papers and news reports illustrating real-world applications of digital media and AI in universities within Delhi, Noida, Gurgaon, and Ghaziabad, as well as relevant examples from other Indian institutions. As a secondary-data analysis, no new empirical data or human subjects were collected; the analysis aims to triangulate findings across sources to draw comprehensive conclusions specific to the Delhi/NCR higher education landscape.

### Area of Study

This study focuses specifically on the higher education landscape within the Delhi/NCR region, including universities located in Delhi, Noida, Gurgaon, and Ghaziabad. While our primary analysis centers on the adoption and impact of digital media and AI within these local institutions, we may also draw upon relevant examples and data from other universities within India and globally to provide comparative context and illustrate broader trends. Where possible, we prioritize regional data, such as national education policies from the Government of India, reports from the UGC, and statistics specific to internet penetration and technology adoption within the Delhi/NCR region. The intent is to provide a focused understanding of the integration of digital media and AI within the unique environment of Delhi/NCR universities, informed by relevant national and international trends.

### Limitations of the Study

**Literature-based analysis:** Findings are contingent on the accuracy and scope of existing publications and reports, as no new empirical data were collected for this study.

**Rapidly evolving field:** The dynamic nature of educational technology and AI means that some references may be outdated, with this review reflecting knowledge up to 2025.

**Publication bias:** The potential for positive outcomes being overrepresented in published research on educational innovations could skew perceptions of technology effectiveness.

**Regional bias:** The predominantly Western and select Asian origin of much literature and survey data limits the generalizability of findings, particularly to low-income contexts.

**Heterogeneity of technologies:** The broad categories of "digital media" and "AI tools" encompass diverse systems, making unified conclusions across implementations challenging.

**Contextual variability:** The significant differences among higher education institutions necessitate caution in generalizing findings, as effective practices in one setting may not be universally applicable.

### Analysis

Our analysis, focusing on the higher education landscape of Delhi/NCR, reveals several key patterns:

**Student Outcomes and Engagement in Delhi/NCR:** Mirroring global trends, students in Delhi/NCR are increasingly utilizing digital media and AI tools in their learning. The potential for AI-powered chatbots to enhance engagement through immediate and personalized support is significant for universities in this region. The widespread reported use of AI for tasks like information retrieval, grammar assistance, and drafting suggests a high level of student acceptance within Delhi/NCR. However, concerns raised by educators globally regarding the potential for over-reliance on AI to hinder critical thinking skills are also pertinent to the Delhi/NCR context and warrant careful consideration.

**Faculty Adoption and Pedagogy in Delhi/NCR:** Faculty attitudes towards digital and AI tools within Delhi/NCR institutions are likely evolving. Many instructors may recognize the potential for these technologies to streamline tasks such as grading and generating learning materials. AI could also assist in creating more engaging and personalized content relevant to the local context. However, a crucial need for comprehensive training in the effective and ethical integration of these tools is evident among faculty in Delhi/NCR. Concerns about AI accuracy and fairness, observed in global literature, are also likely present among instructors in this region, underscoring the importance of robust institutional support and clear guidelines.

**Institutional Processes in Delhi/NCR:** Universities in Delhi/NCR are beginning to explore the application of AI and digital media at the institutional level. Learning analytics platforms powered by AI could be leveraged to predict student success and identify at-risk learners, enabling proactive interventions. Administrative functions, such as admissions and registrar offices, may also be experimenting with AI to handle inquiries and streamline workflows. The adoption of online degree programs and MOOCs is a likely trend, potentially expanding student enrollment beyond the limitations of physical campuses within the Delhi/NCR region. While the global higher education sector has embraced technology, the specific pace and impact within Delhi/NCR institutions require ongoing evaluation.

**Access and Equity in Delhi/NCR:** A critical challenge in realizing the full potential of digital media and AI in Delhi/NCR higher education is the issue of equitable access to technology. Disparities in internet infrastructure and device availability across the region, particularly between well-resourced institutions in central Delhi and those in more peripheral areas within the NCR and Ghaziabad, can create significant barriers for some students. These equity gaps could exacerbate existing achievement disparities if not addressed through targeted interventions and resource allocation within Delhi/NCR universities.

**Ethical, Privacy, and Academic Integrity Concerns in Delhi/NCR:** Ethical considerations surrounding AI bias and the privacy of student data are highly relevant for Delhi/NCR universities. The challenge of maintaining academic integrity in the face of sophisticated AI tools capable of generating human-like text is also a significant concern. Institutions in the region are likely exploring methods such as oral exams and AI detection software, alongside emphasizing the importance of teaching students responsible AI usage. Clear policies on acceptable technology use and strong ethical guidelines are crucial for safeguarding both students and educators within the Delhi/NCR higher education system.

**Overall Patterns in Delhi/NCR:** The analysis indicates that while digital media and AI offer demonstrable pedagogical benefits for higher education in Delhi/NCR, their successful implementation is heavily dependent on contextual factors. Well-supported students and institutions within the region are likely to reap greater benefits, while those facing resource constraints or lacking adequate training may encounter more challenges. The field is rapidly evolving, necessitating continuous evaluation and adaptation within Delhi/NCR universities to ensure effective and responsible integration of these transformative technologies.

## Findings

Our analysis of the literature and available data reveals several crucial patterns regarding the integration of digital media and Artificial Intelligence (AI) within higher education, with specific relevance to the Delhi/NCR region:

**Widespread Student Adoption, Variable Institutional Readiness:** Students in Delhi/NCR, mirroring global trends, are rapidly adopting digital and AI tools, with a significant majority reporting their use in studies. While institutions in the region have implemented online platforms and are piloting AI solutions, a gap exists in formal guidance for students and

adequate training for faculty to effectively integrate these technologies into teaching practices. This highlights a need for systematic support structures.

**Potential for Enhanced Learning Experiences:** When thoughtfully implemented, digital media and AI offer the potential to enhance learning flexibility, personalization, and student engagement within Delhi/NCR universities. Access to materials anytime and individualized feedback mechanisms, facilitated by tools like AI chatbots, can contribute to improved learning outcomes, particularly for self-directed learners. The combination of AI with multimedia content also enables tailored adaptive learning paths.

**Persistent Equity and Access Barriers:** A significant challenge in the Delhi/NCR context, consistent with global trends, is the issue of equitable access to technology. Disparities in internet infrastructure and device availability across the region, particularly between urban and more rural areas within the NCR and Ghaziabad, can limit the benefits of digital initiatives and potentially widen achievement gaps if not strategically addressed.

**Crucial Role of Faculty Development and Institutional Policy:** The successful integration of digital media and AI in Delhi/NCR universities hinges on adequately supporting faculty. Professional development in digital pedagogy and AI literacy is essential. Clear institutional policies regarding technology use, data privacy, and AI ethics are also critical for responsible and effective implementation.

**Ethical and Regulatory Imperative:** Ethical considerations surrounding AI bias, data privacy, and academic integrity are paramount in the Delhi/NCR context. Establishing clear guidelines and educating both students and faculty on the responsible use of AI and digital media are necessary to mitigate potential risks.

Based on the reviewed literature and data, we draw the following key findings relevant to the higher education landscape of Delhi/NCR:

**Widespread Student Adoption, Varied Institutional Readiness:** Digital and AI tools are being adopted at scale by students in Delhi/NCR, aligning with the reported 86% usage rate in a 2024 survey. Universities in the region have implemented online platforms and are piloting AI solutions. However, a disparity exists in preparedness, with many students using these tools informally and a minority of faculty feeling equipped to integrate AI into their teaching practices. This underscores the need for systematic training and curriculum support tailored to the Delhi/NCR context.

**Potential for Enhanced Learning Opportunities:** When properly integrated, digital media and AI can enhance learning flexibility, personalization, and engagement for students in Delhi/NCR institutions. Online and hybrid models offer anytime access to materials and the potential for individualized feedback. AI-powered chatbots can provide step-by-step assistance, potentially improving learning gains. The convergence of AI with multimedia can enable adaptive learning paths suited to the diverse needs of students in the region.

**Persistent Equity and Access Gaps:** Infrastructure and equity issues remain significant barriers in Delhi/NCR. Disparities in internet connectivity and device availability across the region can hinder the potential benefits of digital media and AI, particularly for students in less privileged areas within the NCR and Ghaziabad. Addressing this digital divide is crucial for ensuring equitable access to technology-enhanced learning opportunities for all students in Delhi/NCR.

**Critical Role of Faculty and Policy:** Faculty support is paramount for successful integration in Delhi/NCR universities. Professional development in digital pedagogy and AI literacy is essential for educators to design effective learning experiences. Clear institutional policies on technology use, data privacy, and AI ethics are also necessary to guide responsible implementation within the region.



**Ethical and Regulatory Needs:** Ethical frameworks and regulations are needed to keep pace with technology adoption in Delhi/NCR higher education. Developing standards for digital literacy, data security, and AI ethics is crucial. Preparing both students and teachers to critically engage with AI is vital to mitigate risks of misuse, bias, and privacy violations within the local context.

This study highlights the significant shift towards digital media and AI in Delhi/NCR higher education. These technologies offer substantial opportunities to enhance learning, improve efficiency, and expand access. However, realizing these benefits hinges on addressing challenges related to readiness, equity, faculty support, and ethical considerations within the specific context of Delhi/NCR universities. A strategic focus on building digital and AI literacy, upgrading infrastructure, and crafting clear policies will be essential for harnessing the full potential of this technological transformation in the region.

#### **Future Research Directions for Delhi/NCR:**

**Longitudinal and Experimental Studies:** Conduct long-term studies and controlled experiments within Delhi/NCR universities to measure the specific impact of AI and digital media on student learning outcomes over time.

**Cross-Institutional Analysis within Delhi/NCR:** Examine how digital media and AI adoption and impact differ across various types of higher education institutions within the Delhi/NCR region (e.g., central universities, state universities, private colleges).

**Integration Frameworks for Delhi/NCR Curricula:** Develop and test comprehensive frameworks for integrating digital media and AI into curricula that are specifically tailored to the needs and resources of Delhi/NCR universities.

**Faculty Development Research Focused on Delhi/NCR:** Evaluate the effectiveness of different training methods for faculty in Delhi/NCR to integrate AI and digital media ethically and practically into their teaching.

**Emerging Technologies in Delhi/NCR:** Explore the potential of novel digital media forms (VR/AR, gamification) and advanced AI applications within Delhi/NCR universities and their impact on student engagement and retention.

**Policy Impact Studies in Delhi/NCR:** Analyze the effects of institutional and state-level policies on the adoption and equitable use of digital media and AI in higher education within the Delhi/NCR region.

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