
DIGITAL DEPENDENCY AND THE DECLINING CULTURE OF READING AND HANDWRITING IN HIGHER EDUCATION: A NARRATIVE REVIEW OF LEARNING BEHAVIOUR, ACADEMIC WRITING SKILLS, AND CORRECTIVE STRATEGIES

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ABSTRACT

Digital technologies have transformed higher education by expanding access to smartphones, artificial intelligence, e-books, online platforms, recorded lectures, podcasts, and downloadable study materials. While these resources improve flexibility, accessibility, and self-directed learning, excessive dependence on digital content may weaken sustained reading, handwriting practice, vocabulary development, spelling accuracy, academic writing, critical thinking, and examination performance. This narrative review examines the transition from traditional book-centred learning to digitally dependent educational practices, with reference to Indian higher education and comparisons with global trends. It synthesises published literature, educational policy documents, and academic observations to analyse changes in student and teacher behaviour, library use, note-making, deep reading, sentence construction, and descriptive writing. The review indicates that students rely on summarised PDFs, short videos, AI-generated explanations, and ready-made notes rather than textbooks and reflective writing. Such practices may create difficulties in handwritten examinations, including slow writing speed, poor organisation, weak spelling recall, and incomplete answers. The article proposes a balanced hybrid learning model integrating digital resources with printed books, library engagement, handwritten notes, reflective writing, descriptive assignments, ethical AI use, and critical discussion. It also recommends student-centred routines, teacher-led writing activities, revitalised academic libraries, institutional writing support, and policies promoting responsible digital learning. The review concludes that the central challenge is not technology itself but educational imbalance. Sustainable higher

education should combine digital competence with academic literacy to produce graduates capable of effective communication, independent thinking, research, innovation, professional practice, and lifelong learning. This balanced approach is important where handwritten assessments remain common despite digitalisation.

KEYWORDS: Academic writing; Digital dependency; Handwriting skills; Higher education; Hybrid learning; Reading culture.

1. INTRODUCTION

Digital technology has transformed higher education by expanding access to smartphones, computers, high-speed internet, artificial intelligence, e-books, PDF notes, recorded lectures, podcasts, online videos, and learning management systems. These resources support flexible, personalised, and self-directed learning beyond the conventional classroom. Their use increased sharply after the COVID-19 pandemic, during which more than 1.6 billion learners experienced educational disruption worldwide, accelerating the adoption of online, hybrid, and blended learning models (Bond et al., 2021; UNESCO, 2023).

In India, initiatives such as Digital India, the National Education Policy 2020, SWAYAM, DIKSHA, e-PG Pathshala, and the National Digital Library of India have promoted the rapid expansion of digital education (Ministry of Human Resource Development, Government of India, 2020). Affordable smartphones, internet connectivity, recorded lectures, educational videos, AI-based platforms, and electronic textbooks have reduced students' dependence on printed books and conventional libraries. Similar changes have been reported internationally, where digital resources increasingly complement or replace printed learning materials (Baron, 2021; OECD, 2021).

Despite these advantages, excessive dependence on digital resources may negatively affect sustained reading, handwriting, vocabulary, spelling, sentence construction, and descriptive writing. Many students now rely on brief notes, presentation slides, AI-generated summaries, audio lectures, and short videos instead of comprehensive textbooks. Predictive keyboards, autocorrect, speech-to-text, and AI-assisted writing may further reduce opportunities to practise grammar and manual writing. Consequently, students may struggle to organise coherent paragraphs, write detailed answers, and maintain speed during handwritten examinations, particularly in professional programmes requiring analytical and descriptive responses (Delgado et al., 2018; Mueller & Oppenheimer, 2014).

Teaching practices have also become increasingly digital. PowerPoint presentations, downloadable notes, online repositories, AI-generated content, and digital communication improve instructional efficiency but may reduce textbook-based teaching, library consultation, handwritten note-making, and reflective reading. As a result, the traditional academic culture of extensive reading, critical thinking, and structured writing may gradually decline among both students and teachers.

Evidence suggests that digital learning improves accessibility, collaboration, and independent learning; however, printed materials may provide better deep comprehension, sustained attention, and long-term retention in certain learning situations (Delgado et al., 2018; Mangen et al., 2013). The concern is therefore not the use of technology itself, but its unbalanced use without preserving essential academic practices. This issue is especially important in India, where digital learning is expanding rapidly while most university examinations remain handwritten.

Although many studies have examined e-learning and screen-based education, limited research has assessed the combined influence of PDFs, smartphones, video lectures, audio content, computers, internet resources, and AI-generated materials on reading culture, handwriting, vocabulary, spelling, sentence construction, and examination-writing skills. Therefore, the present narrative review examines the transition from traditional book-centred learning to digital dependence and compares past, present, and anticipated future learning behaviours. It also proposes practical strategies for students, teachers, libraries, and higher education institutions to balance technological advancement with the preservation of essential reading and writing competencies.

2. REVIEW METHODOLOGY

This narrative review was developed using peer-reviewed research articles, scholarly books, government policy documents, and reports published by recognised national and international organisations. Literature related to digital learning, screen-based reading, handwriting, note-taking, artificial intelligence in education, academic writing, library use, and higher education was consulted. Relevant literature was searched through Google Scholar and the official websites of UNESCO, OECD, and the Government of India. The search covered English-language publications available up to July 2026. Research articles, scholarly books, policy documents, and institutional reports directly related to digital learning, screen-based reading, handwriting, note-taking, academic writing, artificial intelligence in education, and higher

education were considered. Duplicate, unrelated, promotional, and non-academic materials were excluded.

3. Evolution of learning behaviour: A comparative analysis of the past, present, and future: Learning behaviour in higher education has changed substantially over the past three decades, shifting from print-based, teacher-centred instruction to digitally supported and increasingly technology-dependent learning. This transition has transformed how students access, understand, retain, and reproduce knowledge. Digital tools have improved flexibility, accessibility, and availability of educational resources, but they have also influenced reading habits, handwriting practice, concentration, and academic writing skills (OECD, 2021; UNESCO, 2023).

A comparison of past, present, and anticipated future learning practices is therefore essential for understanding the benefits and risks of digital education. Such an analysis is particularly relevant in India, where online and AI-supported learning are expanding rapidly, while handwritten examinations and traditional assessment methods continue to remain important.

3.1 Learning behaviour in the past: The era of books and libraries: Before digital technology became widespread, higher education relied mainly on printed textbooks, reference books, handwritten notes, libraries, and direct teacher–student interaction. Students spent substantial time reading, consulting multiple sources, preparing notes, revising repeatedly, and discussing academic topics, which encouraged deeper engagement and independent learning.

Regular handwriting through classroom notes, assignments, laboratory records, and descriptive examinations helped strengthen spelling, vocabulary, grammar, sentence construction, memory, and conceptual understanding. Teachers commonly used textbooks, chalk-and-board instruction, and classroom discussion, promoting active learning rather than dependence on summarized content. Handwritten note-taking has also been associated with deeper cognitive processing and better knowledge retention than passive digital note collection (Mueller & Oppenheimer, 2014).

3.2 Learning behaviour in the present: The digital learning revolution: Smartphones, computers, internet connectivity, artificial intelligence, and digital learning platforms have created an information-rich educational environment. Students can now access e-books, PDF notes, online journals, recorded lectures, podcasts, educational videos, and AI-based learning tools at any time. In India, initiatives such as Digital India, SWAYAM, DIKSHA, e-PG

Pathshala, NDLI, and NEP 2020 have further expanded access to digital education (Ministry of Human Resource Development, Government of India, 2020).

However, these developments have also changed study habits. Many students now depend on summarized notes, presentation slides, short videos, and AI-generated explanations instead of reading complete textbooks or preparing handwritten notes. Teachers increasingly use PowerPoint presentations, virtual classrooms, digital assessments, and online content sharing, which improve efficiency but may reduce textbook-based discussion, blackboard teaching, and active classroom interaction.

Excessive dependence on screen-based learning may weaken sustained attention, deep reading, long-term retention, handwriting fluency, spelling, vocabulary, and paragraph construction (Delgado et al., 2018; Mangen et al., 2013). This concern is especially important in India, where most professional programmes still use handwritten descriptive examinations. Students accustomed mainly to digital content may therefore struggle with writing speed, coherent answer construction, accurate spelling, and effective recall during examinations.

3.3 Future learning behaviour: Towards a balanced hybrid educational model: Future higher education will increasingly use artificial intelligence, adaptive learning systems, virtual laboratories, augmented reality, and personalised digital platforms. These technologies can improve accessibility, flexibility, assessment, and student engagement; however, replacing traditional reading and handwriting entirely may weaken academic literacy, sustained attention, and written communication skills (Bond et al., 2021; UNESCO, 2023).

A balanced hybrid model should therefore combine digital learning with printed textbooks, library reading, handwritten notes, reflective writing, and descriptive assignments. This integration can preserve conceptual understanding, vocabulary, critical thinking, and analytical writing while retaining the convenience and accessibility of digital resources (Delgado et al., 2018; Mueller & Oppenheimer, 2014).

Institutions should use digital platforms mainly to support information access and interactive learning while maintaining regular textbook reading, library use, handwritten work, and structured writing practice. Teachers should similarly balance technology-based instruction with discussion, note-making, and reflective learning. Such an approach can produce graduates who are digitally competent, academically literate, professionally skilled, and capable of effective written communication.

Table 1. Comparative analysis of learning behaviour across past, present, and future.

Parameter	Past (Traditional learning)	Present (Digital learning)	Future (Balanced learning)
Primary learning source	Printed books	PDFs, internet, AI, videos	Books + Digital resources
Library utilization	Very high	Declining	Revitalized through blended learning
Handwriting practice	Extensive	Limited	Regular structured practice
Reading habit	Deep reading	Selective/surface reading	Deep + digital reading
Vocabulary development	Strong	Moderate	Strong through integrated learning
Spelling accuracy	High	Declining	Improved with writing practice
Sentence construction	Well developed	Frequently affected	Enhanced through academic writing
Note preparation	Handwritten	Downloaded/typed	Mixed approach
Examination readiness	High descriptive ability	Difficulty in long-answer writing	Improved analytical writing
Teacher's role	Facilitator using books and board	Digital content provider	Hybrid educator and mentor

4. Digital dependency in higher education: Indian and global perspectives: Digital technology has become central to higher education, enabling students and teachers to access e-books, PDF notes, online lectures, podcasts, artificial intelligence tools, and cloud-based learning platforms. The COVID-19 pandemic accelerated this shift and established digital learning as a permanent component of modern education. These technologies have improved flexibility, accessibility, and resource availability across both developed and developing countries (UNESCO, 2023).

However, excessive dependence on digital resources may reduce sustained reading, handwriting practice, critical thinking, and academic writing proficiency. The major challenge is therefore not digitalisation itself, but ensuring that technology supports rather than replaces essential academic practices such as textbook reading, note-making, reflective learning, and structured writing.

4.1 Current scenario in India: India has experienced rapid growth in digital education due to affordable smartphones, expanding internet access, and initiatives such as Digital India, NEP 2020, SWAYAM, DIKSHA, e-PG Pathshala, and the National Digital Library of India. These platforms allow students to access textbooks, lecture notes, previous examination papers, recorded classes, and AI-generated learning materials within seconds (Ministry of Human Resource Development, Government of India, 2020).

Students in professional programmes increasingly prefer PDF notes, YouTube lectures, online coaching, and AI-assisted platforms over standard textbooks and regular library use. Although these resources improve convenience and save time, excessive dependence on concise digital material may reduce extensive reading, handwritten note-making, vocabulary development, and reflective learning.

Teachers also increasingly use PowerPoint presentations, digital boards, learning management systems, and AI-generated content. While these tools improve instructional efficiency, they may reduce textbook-based teaching, handwritten explanation, and classroom discussion. At the same time, declining physical library use suggests that many libraries are becoming examination-oriented resource centres rather than regular spaces for sustained reading and academic engagement.

4.2 Global perspective: The digital transformation of higher education is a global trend. Universities across the United States, Canada, the United Kingdom, Australia, Finland, South Korea, Singapore, and Europe increasingly use blended learning, virtual classrooms, online assessments, digital libraries, MOOCs, virtual laboratories, and AI-supported platforms to expand access and flexibility (OECD, 2021).

However, digital convenience should not replace deep reading and active learning. Research shows that printed materials often support better reading comprehension and long-term retention than prolonged screen-based reading, while handwritten note-taking promotes stronger conceptual processing and memory than typing alone (Delgado et al., 2018; Mueller & Oppenheimer, 2014).

Highly digitized education systems are therefore promoting digital well-being, balanced screen use, reflective writing, printed reading, and library-based learning. Such practices help preserve critical thinking, academic literacy, and sustained attention while retaining the benefits of technological innovation.

4.3 Emerging educational concerns: Growing dependence on digital learning may reduce sustained attention and encourage fragmented information consumption. Continuous exposure to short videos, notifications, and multitasking often shifts students away from comprehensive reading, conceptual integration, and critical analysis (UNESCO, 2023).

The decline in handwriting practice is another major concern. Downloaded notes, typing, spell-checkers, predictive text, and AI-assisted writing reduce opportunities to practise spelling, grammar, sentence construction, and writing fluency. As a result, students may understand technical terms but struggle to reproduce them accurately or organise coherent descriptive answers in handwritten examinations (Mueller & Oppenheimer, 2014).

Teachers also face increasing demand for ready-made notes, summaries, and recorded lectures, which may discourage independent reading and library use. The central issue is therefore not digital technology itself, but its excessive use without preserving traditional academic practices. A balanced approach is essential to maintain reading culture, vocabulary, handwriting, critical thinking, and academic writing, particularly in India, where handwritten descriptive examinations remain common (Delgado et al., 2018).

Table 2. Comparison of the current digital learning scenario in India and International higher education.

Parameter	India	International scenario
Government digital initiatives	Digital India, NEP 2020, SWAYAM, DIKSHA, NDLI	MOOCs, Canvas, Blackboard, Coursera, edX
Primary learning resources	PDFs, YouTube, AI tools, online coaching	LMS, e-books, institutional digital libraries
Library utilization	Declining physical visits	Increasing hybrid library models
Examination system	Predominantly handwritten	Increasing computer-based assessments
Reading habit	Examination-oriented	Greater emphasis on research reading
Handwriting practice	Declining	Variable; less emphasis in digital assessment systems
AI adoption	Rapidly increasing	Extensive integration with institutional policies
Emerging challenge	Weak academic writing despite digital access	Balancing technology with deep learning

Table 3. Selected International evidence and Indian policy context.

Source	Context	Major finding
Mueller & Oppenheimer (2014)	USA	Handwriting improves conceptual learning
Delgado et al. (2018)	International meta-analysis	Paper reading improves comprehension
UNESCO (2023)	Global	Rapid increase in digital learning
OECD (2021)	International	Highlights the skills required for digital reading and inequalities in access to digital learning.
Ministry of Human Resource Development, Government of India (2020)	India	Promotes digital learning while emphasising critical thinking

5. Educational consequences of digital dependency: Digital learning has improved access, flexibility, and convenience in higher education. However, excessive dependence on PDF notes, AI-generated summaries, audio lectures, short videos, and online resources may

weaken academic skills traditionally developed through sustained reading, handwritten note-taking, and engagement with printed materials (Delgado et al., 2018; UNESCO, 2023).

Reduced textbook reading and handwriting practice may negatively affect vocabulary, spelling, sentence construction, critical thinking, and academic writing. Students may understand concepts through digital content but struggle to present them clearly and accurately in written form. Handwritten note-taking is also associated with deeper processing and better conceptual retention than passive digital collection of information (Mueller & Oppenheimer, 2014).

These effects are especially important in India, where descriptive handwritten examinations remain common. Students who rely mainly on digital resources may face difficulties in writing speed, answer organisation, spelling accuracy, and long-form expression. Therefore, digital learning should complement, rather than replace, regular reading, handwriting, and structured academic writing practice.

5.1 Declining reading culture: Sustained reading of textbooks, reference books, research articles, and library materials traditionally supported conceptual understanding, analytical thinking, vocabulary development, and independent learning. However, many students now prefer summarized PDFs, AI-generated notes, presentation slides, question banks, and short educational videos. Although convenient, these resources may promote surface learning and fragmented understanding rather than deep engagement with academic content (Delgado et al., 2018).

This trend is particularly evident in professional programmes such as pharmacy, medicine, engineering, nursing, and law, where examination-oriented digital material often replaces comprehensive textbook reading. Reduced library use and limited exposure to original academic sources may therefore weaken scholarly curiosity, critical reading, and lifelong learning habits.

5.2 Decline in handwriting skills: Handwriting supports memory encoding, language processing, fine motor coordination, and conceptual organisation. Regular handwritten note-taking promotes deeper cognitive processing and better retention than passive digital note collection (Mueller & Oppenheimer, 2014).

However, smartphones, laptops, photographed notes, and downloadable PDFs have reduced handwriting practice. Consequently, many students experience slower writing speed, poor legibility, reduced endurance, and hand fatigue. This is especially important in Indian universities, where descriptive examinations remain handwritten and must be completed within limited time.

5.3 Poor vocabulary development and spelling competency: Vocabulary and spelling traditionally develop through regular reading, repeated exposure to printed text, and handwritten note preparation. These practices help students learn technical terminology, sentence structure, and correct word usage.

Predictive keyboards, autocorrect, speech-to-text, and AI-assisted writing reduce active spelling practice. As a result, students may recognise scientific terms while reading but struggle to reproduce them accurately in handwritten examinations. Weak spelling and vocabulary can also affect sentence construction, paragraph organisation, and overall academic writing quality.

5.4 Weak sentence construction and academic writing skills: Academic writing requires logical organisation, vocabulary, grammar, and regular practice. Traditional activities such as essay writing, descriptive assignments, laboratory records, and handwritten notes helped students develop these skills.

Digital communication increasingly promotes brief messages, bullet points, emojis, and AI-generated summaries. Consequently, students may understand individual facts but struggle to construct coherent paragraphs, integrate concepts, and present analytical arguments. This problem is especially important in professional programmes, where examinations require detailed explanations of mechanisms, principles, applications, and critical interpretations (Baron, 2021).

5.5 Declining critical thinking and deep learning: Reading complete textbooks encourages students to compare ideas, evaluate evidence, connect concepts, and synthesize information, thereby strengthening critical thinking and higher-order learning.

In contrast, digital platforms often promote rapid answer-seeking and fragmented information use. AI-generated summaries are useful for revision, but excessive dependence on them may reduce independent reasoning and conceptual exploration.

This shift can encourage surface learning focused on memorization rather than deep understanding and application. Digital resources should therefore be balanced with structured reading, problem-solving, discussion, and reflective writing activities.

5.6 Impact on examination performance: Excessive digital dependency can adversely affect performance in handwritten descriptive examinations. Students accustomed to typing, downloaded notes, and short digital content may experience slow writing speed, poor spelling recall, weak sentence construction, disorganised answers, limited elaboration, hand fatigue, and incomplete responses within the allotted time.

This concern is particularly important in Indian higher education, where most universities still rely on handwritten examinations. The mismatch between digital learning practices and traditional assessment methods may disadvantage students who possess adequate conceptual knowledge but lack regular handwriting and descriptive writing practice.

5.7 Impact on teachers and teaching practices: Digital tools, ready-made presentations, online platforms, and AI-assisted lesson preparation have improved teaching efficiency and resource accessibility. However, excessive dependence on these materials may reduce textbook-based instruction, blackboard explanation, spontaneous discussion, and demonstration of handwritten problem-solving.

Teachers also increasingly encounter AI-generated or copied assignments, making it difficult to assess students' original understanding, reasoning, and writing ability. Instructional strategies should therefore promote independent reading, authentic assignments, reflective writing, classroom discussion, and oral defence of submitted work (Baron, 2021; UNESCO, 2023).

Digital dependency is thus not only a technological concern but also a pedagogical challenge affecting academic literacy, cognitive development, and professional competence. Higher education should balance digital efficiency with regular reading, handwriting, discussion, and reflective academic writing.

Table 4. Major educational consequences of digital dependency in higher education.

Academic area	Traditional learning outcome	Digital dependency outcome	Long-term educational impact
Reading habits	Extensive textbook reading	Preference for summaries and short content	Reduced deep learning
Library use	Regular academic visits	Declining physical utilization	Reduced independent learning
Handwriting	Frequent practice	Minimal writing	Reduced writing fluency
Vocabulary	Progressive enrichment	Limited exposure	Poor technical vocabulary
Spelling	High accuracy	Dependence on autocorrect	Increased spelling errors
Sentence construction	Logical and descriptive	Fragmented writing	Weak academic communication
Critical thinking	Analytical reasoning	Rapid information retrieval	Superficial understanding
Examination performance	Strong descriptive answers	Difficulty writing long answers	Lower academic performance

6. Corrective strategies for restoring reading, handwriting, and academic writing skills:

Digital technology should complement rather than replace traditional learning. A balanced educational approach should combine digital resources with printed books, library use, handwritten note-making, and reflective writing. Restoring these practices requires coordinated action by students, teachers, institutions, libraries, and policymakers (Ministry of Human Resource Development, Government of India, 2020; UNESCO, 2023).

6.1 Student-centred strategies: Students should balance textbook reading and handwritten study with digital learning. As a proposed practical framework, students may allocate approximately 60% of structured study time to textbook reading, reference consultation, and handwritten note preparation, and 40% to digital resources. This suggested ratio requires empirical validation and should be adapted to the subject, learner, and educational context (Delgado et al., 2018; Mueller & Oppenheimer, 2014).

6.2 Teacher-centred strategies: Teachers should combine digital presentations with textbook-based instruction, blackboard explanation, classroom discussion, and handwritten demonstrations. Weekly written assignments, descriptive tests, journal clubs, book reviews, and critical literature-based tasks can strengthen original thinking and academic writing. AI literacy should also be taught with clear emphasis on ethical use, verification, and independent interpretation (Baron, 2021; UNESCO, 2023).

6.3 Role of libraries and institutions: Academic libraries should function as active learning centres rather than only book repositories. Institutions may introduce weekly library hours, reading logs, book discussions, writing workshops, handwriting sessions, and “One Book per Semester” programmes. Writing Development Centres can further support academic writing, scientific communication, research skills, and plagiarism awareness.

6.4 Policy recommendations: Universities and regulatory bodies should assess reading culture, library utilisation, writing competency, and digital infrastructure together. Policies may include compulsory reading periods, reflective journals, reading-based internal assessment, AI-use guidelines, and faculty development programmes on balanced pedagogy. These measures are consistent with the NEP 2020 emphasis on critical thinking, experiential learning, and multidisciplinary education (Ministry of Human Resource Development, Government of India, 2020).

6.5 Integrated hybrid learning model: The proposed model includes five interconnected components:

- a. Digital learning for accessibility and flexibility.

- b. Book reading for conceptual understanding.
- c. Library use for independent learning.
- d. Handwriting practice for written communication.
- e. Critical thinking for academic and professional development.

Together, these components can create a balanced learning environment that preserves academic literacy while benefiting from technological advancement.

Table 5. Multi-level corrective strategies for restoring academic literacy.

Stakeholder	Major problem	Recommended intervention	Expected outcome
Students	Excessive dependence on digital notes	Daily book reading, handwritten notes, vocabulary diary	Improved reading and writing competency
Teachers	Excessive use of PowerPoint and digital content	Blackboard teaching, descriptive assignments, book-based discussions	Better conceptual understanding
Libraries	Declining physical utilization	Weekly reading hours, book clubs, reading competitions	Enhanced reading culture
Institutions	Reduced academic writing practice	Writing centres, library programmes, AI usage policy	Stronger academic literacy
Universities	Examination–learning mismatch	Balanced digital and handwritten assessments	Improved examination performance
Policymakers	Overemphasis on digital infrastructure	Reading promotion policies, library strengthening, faculty development	Sustainable higher education ecosystem

7. Challenges and future research opportunities

7.1 Challenges: The growing use of digital and AI-based learning creates several educational challenges. Excessive dependence on AI may reduce independent thinking and original writing, while notifications, social media, and multitasking contribute to digital distraction and shorter attention spans. Reduced library visits and limited handwriting practice may further weaken deep reading, writing fluency, and academic literacy (Baron, 2021; UNESCO, 2023).

Digital inequality also remains a major concern because students do not have equal access to devices, reliable internet, or paid learning platforms. In addition, many teachers require training to integrate technology effectively, evaluate AI-generated work, and maintain a balance between digital instruction and traditional academic practices (Ministry of Human Resource Development, Government of India, 2020; OECD, 2021).

7.2 Future research opportunities: Future studies should examine the effects of AI-assisted tools on scientific writing, originality, critical thinking, and academic integrity. Research is

also needed on digital dependency among pharmacy and other professional students, changes in reading behaviour across Indian universities, and patterns of library use following implementation of NEP 2020.

Comparative studies may assess handwriting versus tablet-based writing in relation to memory, comprehension, spelling, and examination performance. The effects of audiobooks and recorded lectures on knowledge retention should also be investigated. Longitudinal studies following students over several academic years would provide stronger evidence regarding the lasting influence of digital learning on reading, writing, and professional competence (Delgado et al., 2018; Mueller & Oppenheimer, 2014).

8. Limitations of the present narrative review: This narrative review is based on selected published literature, policy documents, and educational observations and does not include primary data from students, teachers, or institutions. It therefore provides a conceptual synthesis rather than causal evidence. The literature was not selected through a formal systematic-review protocol, and publication bias or omission of relevant studies cannot be excluded. The proposed Digital Balance Framework and corrective strategies should be tested through multicentric surveys, experimental comparisons, and longitudinal studies across different disciplines and higher education settings (Delgado et al., 2018; UNESCO, 2023).

9. Future directions: Building a digitally balanced higher education system: Future higher education will increasingly use artificial intelligence, adaptive learning, virtual and augmented reality, cloud platforms, learning analytics, and intelligent tutoring systems. These technologies can improve accessibility, personalisation, and lifelong learning, but they should not weaken reading comprehension, handwriting, critical thinking, scientific writing, or communication skills. The key challenge is therefore balanced and pedagogically responsible integration rather than unrestricted digital expansion (OECD, 2021; UNESCO, 2023).

Institutions should adopt a Digital Balance Framework combining printed books, library use, handwritten note-making, classroom discussion, AI-assisted learning, digital libraries, and multimedia resources. AI should support conceptual clarification, literature exploration, and revision, but not replace independent reading, critical analysis, or original writing. Clear policies on ethical AI use and academic integrity are therefore essential (UNESCO, 2023).

Academic libraries should evolve into integrated learning resource centres offering printed and electronic collections, collaborative spaces, writing support, multimedia facilities, and research assistance. Curricula should also include structured training in scientific reading,

academic writing, referencing, research ethics, reflective journals, and responsible AI use. These activities can strengthen academic literacy and prepare students for research and professional practice.

Assessment should balance handwritten examinations with digital assignments, oral presentations, case studies, and project reports. Faculty development programmes should train teachers in both educational technology and methods that promote active reading, reflective writing, critical thinking, and original work. National policies and accreditation systems should likewise recognise library use, reading promotion, scientific writing, and academic integrity as indicators of educational quality (Ministry of Human Resource Development, Government of India, 2020).

The future of higher education should not require a choice between books and technology. Graduates should be digitally competent while retaining strong reading, writing, critical thinking, ethical reasoning, and communication skills. A balanced model will better prepare them for examinations, research, innovation, professional practice, and lifelong learning.

Table 6. Future roadmap for balanced digital learning in higher education.

Area	Present situation	Future recommendation	Expected outcome
Learning resources	Predominantly digital	Balanced print and digital resources	Improved conceptual learning
Artificial Intelligence	Rapid adoption	Ethical and guided educational use	Responsible AI literacy
Libraries	Declining physical use	Integrated Learning Resource Centres	Enhanced independent learning
Teaching	PPT-technology-dominant and	Hybrid pedagogy with active reading	Better classroom engagement
Assessment	Increasing digital evaluation	Mixed handwritten and digital assessments	Strong academic writing skills
Student learning	Examination-oriented	Inquiry-based lifelong learning	Higher-order cognitive development
Faculty development	Technology-focused	Technology + pedagogy + literacy training	Improved teaching effectiveness
Educational policy	Digital expansion	Digital balance and literacy promotion	Sustainable higher education

10. CONCLUSION

Digital technologies have transformed higher education by improving access, flexibility, and self-directed learning through smartphones, artificial intelligence, e-books, online platforms,

recorded lectures, and digital study materials. In India, initiatives such as Digital India, NEP 2020, SWAYAM, DIKSHA, and NDLI have accelerated this transition.

However, excessive dependence on digital resources may reduce sustained reading, library use, handwriting practice, vocabulary development, spelling accuracy, academic writing, and critical thinking. Reliance on brief PDFs, AI-generated summaries, short videos, and audio content may encourage rapid information consumption rather than deep learning and reflective engagement.

The effects extend to teachers and institutions, where increased use of presentations, downloadable notes, and AI-assisted materials may reduce textbook-based teaching, classroom discussion, and handwritten practice. This creates particular difficulties in higher education systems that continue to rely on descriptive handwritten examinations, as students may struggle with writing speed, spelling, paragraph organisation, and detailed explanation.

The solution is not to reject technology but to establish a balanced hybrid learning model. Digital resources should complement printed books, library learning, handwritten note-making, reflective writing, and classroom interaction. Students, teachers, libraries, institutions, and policymakers must work together to promote responsible AI use, academic literacy, critical thinking, and lifelong learning.

Ultimately, higher education should integrate the accessibility of technology with the cognitive benefits of traditional learning. Such balance can produce graduates who are digitally competent, academically literate, ethically responsible, and capable of effective communication, research, innovation, and professional practice.

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