Digital-Pedagogy.eu Institute for Education

Journal of Digital Pedagogy 2026, Vol. 5, No. 1, pp. 113-124

ISSN 3008-2021 doi.org/10.61071/JDP.2690

Digital Pedagogy and Curriculum Transformation in Higher Education: A Structured Review of Approaches, Benefits, and Challenges

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Abstract: Digital technologies are increasingly reshaping higher education, yet their educational value depends less on technology adoption itself than on how technologies are integrated into curriculum and pedagogy. This structured review synthesises literature on digital pedagogical approaches, educational benefits, and implementation challenges to examine how digital pedagogy contributes to curriculum transformation in higher education. The review conceptualises digital pedagogy as a deliberate integration of digital technologies with learning outcomes, content, and assessment. Drawing on twenty-one included sources identified through a structured search, the review finds that the included sources report benefits of purposeful digital integration including flexibility, engagement, personalised learning, formative feedback, and the development of digital competence, and constraints including uneven digital competence, limited institutional support, digital inequality, and ethical and academic integrity concerns associated with artificial intelligence. Applying an operational definition of curriculum transformation to each source, however, the review finds that transformation is directly evidenced in very few of the twenty-one sources and is not assessable in the large majority, indicating that the available literature largely describes or theorises digital pedagogy rather than measuring whether curriculum-level change occurred.

Received: 15.07.2026. Accepted and published: 16.09.2026

Citation:

Ndikubwimana, F., & Wu, Y. (2026). Digital Pedagogy and Curriculum Transformation in Higher Education: A Structured Review of Approaches, Benefits, and Challenges. *Journal of Digital Pedagogy, 5*(1) 113-124. Bucharest: Institute for Education. https://doi.org/10.61071/JDP.2690

The review argues that digital curriculum transformation is best understood as a pedagogical and curricular process that technology supports, rather than a technological process that automatically produces educational change, and that it requires sustained alignment among learning outcomes, pedagogy, technology, assessment, teacher competence, and institutional conditions.

Keywords: digital pedagogy, curriculum transformation, higher education, technology-enhanced learning, structured review

1. Introduction

Digital technologies are now embedded across higher education, reshaping teaching, learning, communication, assessment, and access to resources. Learning management systems, online environments, collaborative platforms, learning analytics, open educational resources, and artificial intelligence all form part of the contemporary educational landscape. Yet the growing presence of these tools does not automatically constitute pedagogical or curricular transformation. Castro Benavides et al. (2020) conceptualised digital transformation in higher education as a multidimensional process that extends beyond technology adoption to encompass organisational and educational change, while Bond et al. (2020) showed that technology integration produces different effects depending on how it is embedded in teaching practice.

The distinction between adoption and transformation matters because introducing a learning management system, digital lecture materials, or automated assessment alone does not change the underlying curriculum. This review defines curriculum transformation operationally as a demonstrable change in what students are asked to do, how learning is assessed, or how content and pedagogy are structured, rather than a change limited to the medium of delivery; evidence of transformation therefore requires a reported change in learning tasks, assessment design, or curricular structure, not merely the introduction of a digital tool. Technology can simply reproduce teacher-centred transmission, or it can facilitate collaboration, inquiry, and formative feedback depending on how it is used. Mishra and Koehler (2006) established an influential account of this relationship through the Technological Pedagogical Content Knowledge (TPACK) framework, which situates effective technology integration at the intersection of technological, pedagogical, and content knowledge. More recent work reinforces that meaningful digital education depends on the relationship between technological affordances and pedagogical intentions rather than on availability alone (Suárez-Guerrero et al., 2024).

Digital pedagogy offers a more focused lens for examining this relationship, encompassing the ways educators deliberately use digital technologies to design learning experiences, support participation, and assess learning. Suárez-Guerrero et al. (2024) found considerable conceptual diversity in this literature, spanning methodological, technological, and critical perspectives, and Santoveña-Casal and López (2024) similarly identified a broad range of digital pedagogical practices across higher education. This diversity reads not as a weakness in the field but as evidence that digital pedagogy has outgrown any single technology or delivery mode; the concept now does real curricular work, touching learning outcomes, content organisation, teaching approaches, learner roles, assessment, and links to professional practice. Redecker (2017) captures this shift precisely in arguing that educators need competencies not merely to operate technology but to use it to improve teaching, learning, assessment, and learner empowerment.

The relationship between digital pedagogy and curriculum transformation gained further significance following the rapid expansion of online and blended education during the COVID-19 pandemic. Rapanta et al. (2020) carefully distinguished between designed online learning and emergency remote teaching, underscoring the importance of pedagogical planning, while Martin et al. (2020) identified instructional design, learner interaction, infrastructure, and teacher preparation as central to the quality of online and blended learning. The subsequent expansion of generative artificial intelligence has added further complexity, offering support for content creation, feedback, and personalised assistance while raising concerns about academic integrity, assessment validity, authorship, bias, and privacy (Kasneci et al., 2023; Tlili et al., 2023).

Despite this growing literature, fragmentation persists in how researchers conceptualise the relationship between digital pedagogy and curriculum transformation. Some studies concentrate on single technologies such as artificial intelligence or learning analytics, others on particular pedagogical models such as blended or flipped learning, and a separate body of work addresses institutional digital transformation and organisational readiness (Singun, 2025;

Mabotha and Ngcamu, 2026). A curriculum-oriented synthesis is therefore needed to bring evidence on digital pedagogical approaches, educational benefits, and implementation challenges together within a single analytic frame.

This review takes up that need through three interconnected questions. First, what digital pedagogical approaches are associated with curriculum transformation in higher education? Second, what educational benefits are associated with integrating digital pedagogy into higher education curricula? Third, what challenges constrain the effective integration of digital pedagogy into higher education curricula? The review is grounded in TPACK (Mishra and Koehler, 2006) as an interpretive lens, since curriculum transformation requires decisions at the intersection of technological, pedagogical, and content knowledge rather than technology adoption alone. The resulting synthesis reframes the internationally common gap between technological investment and educational transformation as a matter of curricular and pedagogical design, with implications for faculty development, technology provision, and curriculum alignment in higher education systems.

2. Methodology

This review used a structured literature search to identify relevant literature and scholarly sources addressing digital pedagogy, technology-enhanced learning, curriculum transformation, and higher education. The search combined the terms digital pedagogy, digital pedagogies, technology-enhanced pedagogy, technology-enhanced learning, and digital teaching with curriculum, curriculum design, curriculum transformation, and curriculum development, restricted to higher education, university, or college contexts. The search covered literature published mainly between 2013 and 2026, a period selected to capture the expansion of digital pedagogy and technology-enhanced learning while allowing consideration of recent developments in artificial intelligence.

The literature search was conducted across five scholarly databases and search platforms, namely Scopus, Web of Science, ERIC, Google Scholar, and Semantic Scholar. The searches were conducted from 5 to 12 August 2026 using structured combinations of terms related to digital pedagogy, curriculum transformation, higher education, teaching, learning, and technology-supported instruction. The searches yielded a combined total of 52 candidate records. Individual retrieval counts for each database or search platform were not recorded separately and are therefore not reported. The identified records were combined for screening, after which duplicate, non-scholarly, and clearly off-topic records were removed. The corresponding author conducted the search and initial screening; the co-author subsequently verified the search strategy and the resulting selection of included studies. This verification process differs from fully independent dual screening with a calculated inter-rater agreement statistic, and the review reports this as a limitation below rather than presenting it as equivalent to a dual-reviewer systematic search.

A study qualified for inclusion when it focused on higher education, examined digital pedagogy or a closely related form of digitally mediated teaching and learning, addressed at least one curriculum-related dimension such as design, delivery, learning activities, assessment, or learning outcomes, and reported sufficient detail in English for analysis. Peer-reviewed empirical studies and reviews were eligible on this basis; conceptual, policy, and position papers were also eligible where they advanced a substantive, evidence-informed argument addressing one of the review questions, since such sources shape how digital pedagogy is defined and pursued in practice and are therefore relevant to a review concerned partly with approaches rather than only with measured outcomes. The review excluded studies that focused exclusively on primary or secondary education, treated technology from a purely technical standpoint, addressed institutional digital transformation without meaningful attention to teaching and learning, or consisted of editorials, commentaries, or opinion pieces that did not engage with evidence or a developed argument.

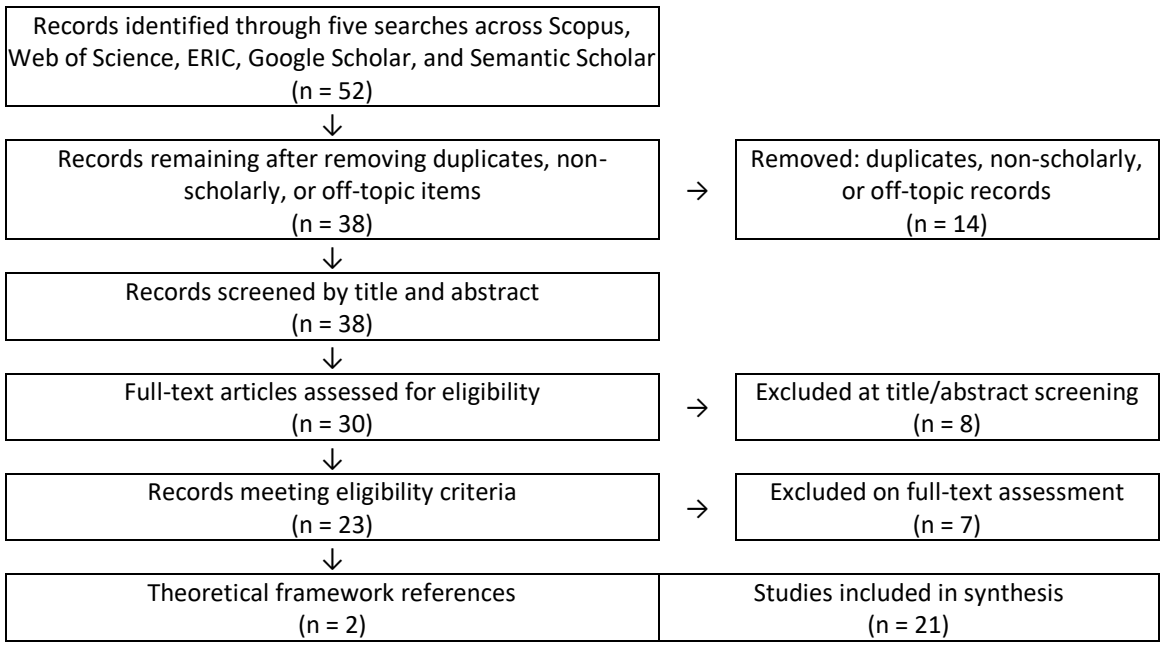
Five identification searches, conducted from 5 to 12 August 2026, covered the approaches, benefits, and challenges dimensions of the review questions; the individual yields of each search were not recorded separately, and the searches returned 52 candidate records in total. After removing 14 duplicates, non-scholarly or clearly off-topic items such as conference listings and institutional blog posts, and title and abstract screening against the eligibility criteria above, this narrowed to 38 records. Full-text assessment covered 30 of these; the seven excluded at this stage were judged, on full-text reading, not to engage substantively with digital pedagogy or curriculum transformation despite appearing potentially relevant at the title and abstract stage, and 23 met all eligibility requirements. Of these 23, two (Mishra and Koehler, 2006; Koehler et al., 2013) together constitute the study's theoretical framework (TPACK) rather than reporting new empirical or review evidence addressing the review questions and are therefore reported separately; the remaining 21 studies are included in the synthesis reported below. Each included study underwent a

final individual verification against its publisher, indexer, or repository record on 14 August 2026 to confirm authorship and digital object identifier before citation.

Of the 21 included studies, 12 are themselves systematic reviews, scoping reviews, or meta-analyses rather than primary empirical studies, and approximately five report new primary data; the remainder are conceptual, policy, or position papers. This composition means the synthesis draws substantially on secondary syntheses of an underlying primary literature that this review did not independently access, which creates a risk that the same primary studies are represented more than once across the included reviews and that this review's conclusions partly reflect how existing reviewers have already framed the field rather than an independent reading of primary evidence. This limitation is revisited in the Limitations section below.

Figure 1

PRISMA-style flow diagram of the search and screening process



The analysis applied thematic synthesis organised around the three review questions, namely digital pedagogical approaches, educational benefits, and implementation challenges, and their relationship to curriculum design, enactment, and assessment. The corresponding author derived themes by first coding each study's stated approach, benefit, or challenge against the three review questions, then grouping related codes into the broader thematic categories reported in the Findings below through iterative comparison across the dataset. TPACK (Mishra and Koehler, 2006) informed interpretation throughout, alongside findings concerning institutional, ethical, and equity conditions that extend beyond the framework's original scope.

Table 1 summarises the 21 studies synthesised in the findings below, distinct from the two theoretical framework references (Mishra and Koehler, 2006; Koehler et al., 2013), which are reported separately.

Table 1

Characteristics of included studies

Study	Design	Context	Technology/ Approach	Curricular Dimension	Main Finding	Evidence of Transformation
Boelens et al. (2017)	Systematic review (PRISMA, 20 studies from 640 sources)	International, higher education	Blended learning design	Pedagogical approach	Identified flexibility, interaction, learning processes, and affective climate as the four key design challenges in blended learning.	Not assessable (design challenges, not empirical transformation evidence)
Bond et al. (2020)	Systematic mapping review	International, higher education	Educational technology generally	Educational benefit (engagement)	Found that technology influences behavioural, emotional, and cognitive engagement, contingent on	Not assessable (engagement mapping, not curriculum-level change)

Study	Design	Context	Technology/ Approach	Curricular Dimension	Main Finding	Evidence of Transformation
					interaction design rather than platform choice.	
Castro Benavides et al. (2020)	Systematic literature review (19 studies)	International higher education institutions	Institutional digital transformation	Approach/conceptual framing	Concluded that digital transformation in HEIs is an emerging field; no reviewed initiative had been implemented in a fully holistic dimension.	Absent (found no reviewed initiative fully holistic)
Choi-Lundberg et al. (2023)	Systematic review (130 publications)	International, higher education	Technology-enhanced learning designs (8 categories)	Pedagogical approach	Identified eight overlapping categories of digital innovation and emphasised that educational value depends on integration with curricular context.	Not assessable (categorisation, not measured transformation)
Graham et al. (2023)	Multiple case studies	Colombia, Brazil, Mongolia (higher education)	Blended teaching readiness	Institutional transformation process	Described how local policy, human capacity development, and institutional support shaped each university's digital transformation efforts.	Present (institutional transformation efforts directly studied)
Huang et al. (2024)	Conceptual/narrative review	International, higher education	Learner-centred digital pedagogy	Pedagogical approach	Argued for enhancing learner-centred approaches as central to sustainable digital education transformation.	Not assessable (conceptual argument, not empirical measurement)
Kasneci et al. (2023)	Position/perspective paper	International, higher education	Generative AI / large language models	Emerging technology, assessment implications	Identified substantial opportunities from large language models in education alongside concerns about accuracy, bias, and overreliance.	Not assessable (position paper, not curriculum-level measurement)
Mabotha and Ngcamu (2026)	Systematic literature review (ATLAS.ti coding)	International, higher education sector	Institutional digital transformation	Approach/conceptual framing	Applied a connectivism lens to argue that digital transformation in the higher education sector remains uneven and under-theorised.	Absent (found transformation uneven and under-theorised)
Martin and Bolliger (2018)	Survey study	United States, online higher education	Online engagement strategies	Educational benefit (engagement)	Found that student perceptions of engagement strategies confirm the importance of interaction design in online courses.	Not assessable (engagement perceptions, not curriculum change)
Martin et al. (2020)	Systematic review (2009-2018 literature)	International, higher education	Online teaching and learning generally	Pedagogical approach	Found that online learning research spans a wide range of pedagogical practices rather than a single instructional model.	Not assessable (practice diversity, not transformation measurement)
Panadero et al. (2017)	Meta-analysis (four meta-analyses)	International, higher education	Digital self-assessment tools	Educational benefit (formative feedback)	Found that self-assessment practices support self-regulated learning and self-efficacy, relevant to digitally delivered formative feedback.	Not assessable (assessment tool effects, not curriculum-level change)
Rapanta et al. (2020)	Conceptual/position paper	International, higher education (COVID-19 context)	Online university teaching	Pedagogical approach	Distinguished carefully designed online teaching from emergency remote teaching, emphasising teacher presence and purposeful interaction.	Present (explicitly distinguishes designed redesign from delivery change)
Redecker (2017)	Policy framework document	European Union,	Digital competence of educators	Educational benefit/educator capacity	Established the DigCompEdu framework describing the digital competencies	Not assessable (competency framework, not

Study	Design	Context	Technology/ Approach	Curricular Dimension	Main Finding	Evidence of Transformation
		higher education			educators need for effective digital pedagogy.	empirical measurement)
Redecker and Johannessen (2013)	Conceptual paper	European, higher education	ICT-based assessment	Educational benefit (assessment)	Argued for a new assessment paradigm using ICT to provide more frequent, formative feedback to students.	Not assessable (conceptual argument for assessment reform)
Santoveña-Casal and López (2024)	Mapping/scoping review	International, higher education	Digital pedagogies generally	Approach/conceptual framing	Mapped the range of digital pedagogical practices reported in the higher education literature.	Not assessable (mapping exercise, not transformation measurement)
Singun (2025)	Systematic literature review	International higher education institutions	Institutional digital transformation barriers	Implementation challenge	Identified institutional, infrastructural, and cultural barriers that constrain digital transformation in higher education.	Absent (barriers to transformation are the focus)
Suárez-Guerrero et al. (2024)	Systematic review of the concept	International, higher education	Digital pedagogy (conceptual)	Approach/conceptual framing	Reviewed how 'digital pedagogy' has been conceptualised in the literature, distinguishing it from technology adoption alone.	Not assessable (conceptual distinction, not empirical measurement)
Tlili et al. (2023)	Case study	International, higher education	ChatGPT / educational chatbots	Emerging technology, ethical implications	Examined ChatGPT as a case study of chatbot use in education, highlighting both opportunities and risks.	Not assessable (tool use case study, not curriculum-level measurement)
van Deursen and van Dijk (2019)	Conceptual/empirical paper	Netherlands	Digital divide (general)	Implementation challenge (equity)	Argued that digital inequality has shifted from physical access to inequalities in skills and material access, relevant to educational equity.	Not assessable (equity/access focus, not curriculum change)
Viberg et al. (2018)	Scoping review	International, higher education	Learning analytics	Educational benefit (personalisation)	Mapped the current landscape of learning analytics in higher education, noting its potential for personalised learning.	Not assessable (landscape mapping, not transformation measurement)
Yusuf et al. (2024)	Multi-country survey study	Multicultural, higher education	Generative AI	Implementation challenge (academic integrity)	Examined generative AI's implications for academic integrity across multicultural perspectives, finding mixed threat/opportunity perceptions.	Not assessable (academic integrity focus, not curriculum change)

Evidence of transformation, as operationally defined above, was not assessable for the majority of included sources. The predominance of 'not assessable' ratings reflects a broader pattern in this literature, in which most available sources describe or theorise digital pedagogy rather than directly measuring whether curriculum-level transformation occurred, itself a finding relevant to future research priorities in this field.

3. Findings

3.1 Digital Pedagogical Approaches

The included studies point to a diverse range of approaches, including blended learning, online learning, collaborative digital learning, technology-supported active learning, learning analytics, digital assessment, and emerging artificial intelligence applications. What unites them is not any shared technology but a shared pedagogical logic. Each approach becomes curricularly significant only at the point where it changes what students do, not merely how content reaches them.

Blended learning remains one of the most established approaches. Boelens et al. (2017) identify flexibility, interaction, students' learning processes, and affective learning climate as key design dimensions, while a systematic review by Choi-Lundberg et al. (2023) of 130 publications identified eight overlapping categories of digital innovation in higher education learning designs, from simulation and virtual reality to learning management systems and mobile learning. Online and flexible learning provide further opportunities for curriculum reorganisation. Martin et al. (2020) show that online learning research spans a wide range of pedagogical practices rather than a single instructional model, and Rapanta et al. (2020) emphasise teacher presence and purposeful interaction as conditions for effective online university teaching. Graham et al. (2023) present case studies of three universities in Colombia, Brazil, and Mongolia at different stages of digital pedagogical transformation, describing how local policy, human capacity development, and institutional support shaped each university's transformation efforts alongside technology adoption.

Technology-supported active and collaborative learning represents a further dimension. Bond et al. (2020) found that student engagement with educational technology involves behavioural, emotional, and cognitive dimensions, and Martin and Bolliger (2018) reported that purposeful interaction and collaborative activity strengthen engagement in online environments. Learning analytics has emerged as another approach with curricular implications. Viberg et al. (2018) found that analytics can support learning and decision-making, though its value depends on how institutions interpret and act on the information it generates. Digital assessment offers a related pathway, with Panadero et al. (2017) highlighting the role of self-assessment and formative processes, and Redecker and Johannessen (2013) arguing that digital tools expand the forms of evidence available for evaluating learning.

Artificial intelligence introduces a rapidly developing dimension of digital pedagogy. Kasneci et al. (2023) identify substantial opportunities associated with large language models alongside concerns about accuracy, bias, and overreliance, and Tlili et al. (2023) similarly document both opportunities and challenges associated with ChatGPT in education. Huang et al. (2024) argue that existing pedagogical frameworks, developed before ubiquitous generative AI, are insufficient on their own and call for pedagogical models that explicitly address learner-centred design in AI-mediated environments. Yusuf et al. (2024), drawing on multicultural perspectives, likewise found that generative AI is perceived simultaneously as a threat to academic integrity and an opportunity for curriculum reform, depending heavily on institutional response. These findings indicate that digital approaches become transformative when they change the nature of learning activities, interaction, or assessment, rather than when they merely substitute a digital format for an established practice.

3.2 Educational Benefits

The included studies point to a consistent set of educational benefits associated with purposeful digital integration. Flexibility appears in 1 of the 21 included studies (Boelens et al., 2017), which identifies it as a key design dimension of blended learning; it lets students access resources and participate beyond fixed schedules, and at the curriculum level, this can prompt institutions to reconsider assumptions about when and where learning occurs. Engagement appears in 2 of the 21 included studies. Bond et al. (2020) found that educational technologies influence behavioural, emotional, and cognitive dimensions of engagement specifically when interaction is built into the activity design, not the platform, a distinction Martin and Bolliger (2018) confirm empirically in online higher education settings. No included study reported findings contrary to this general pattern, though studies varied in which specific benefit they emphasised, and several benefits discussed below are drawn from the broader literature these studies engage with rather than from a specific count of the 21 included studies themselves (see Limitations).

Two further benefits commonly associated with digital pedagogy, namely extended access to diverse learning resources and support for collaboration through digital discussion tools, shared documents, and peer feedback platforms, are not reported as findings by any of the 21 included sources. They are noted here as context for the discussion that follows and are not claimed as results of this review. Personalised learning appears in 1 of the 21 included studies (Viberg et al., 2018), which describes how learning analytics and adaptive systems can help identify individual learning needs and support differentiated instruction, while formative feedback appears in 2 of the 21 included studies (Panadero et al., 2017; Redecker and Johannessen, 2013), which describe digital assessment tools providing more frequent and timely information about student progress.

Digital competence as an outcome in its own right appears in 1 of the 21 included studies (Redecker, 2017), and digital pedagogy can strengthen connections between academic learning and professional practice when curricula incorporate authentic, technology-mediated tasks that mirror workplace conditions. Across these benefits, the

evidence indicates that value emerges not from technology availability but from deliberate pedagogical design that aligns digital tools with intended learning outcomes.

3.3 Implementation Challenges

The included studies point to several recurring challenges that constrain meaningful curriculum transformation. Uneven digital competence among both educators and students is discussed in 1 of the 21 included studies (Redecker, 2017), which links this to professional development not keeping pace with technological change. Infrastructure limitations, including unreliable connectivity and insufficient devices, are widely discussed in the wider field but are not reported as a finding by any of the 21 included sources and are therefore not claimed here as a result of this review; limited institutional support, by contrast, features in 2 of the 21 included studies (Singun, 2025; Mabotha and Ngcamu, 2026), which describe inadequate incentives and unclear digital strategy as further constraints on adoption.

Increased academic workload associated with designing and maintaining digital learning environments is a further barrier widely discussed in the wider field; as with infrastructure, it is not reported as a finding by any of the 21 included sources and is therefore not claimed here as a result of this review. Digital inequality, by contrast, surfaces in 1 of the 21 included studies (van Deursen and van Dijk, 2019), which finds that unequal access to devices, connectivity, and skills can reproduce or deepen existing disadvantage rather than resolve it. Pedagogical resistance to changing established teaching practices and assessment concerns about validity and academic integrity fall into the same category and are likewise not claimed as findings of this review. Ethical and academic integrity concerns associated with generative artificial intelligence, however, are addressed in 3 of the 21 included studies (Kasneci et al., 2023; Tlili et al., 2023; Yusuf et al., 2024), which raise questions concerning learner data, algorithmic bias, and the appropriate boundaries of AI assistance in academic work. No included study reported that digital integration was free of implementation barriers.

4. Discussion

This section interprets the findings reported above. Considered together, the 21 sources point towards a claim stronger than any one of them makes individually. Digital pedagogy contributes to curriculum transformation only when digital technologies are integrated with pedagogical purpose, not when platforms are simply introduced alongside existing practice. TPACK (Mishra and Koehler, 2006) supplies the clearest theoretical account of why this is so, conceptualising effective integration as the interaction of technological, pedagogical, and content knowledge. Knowing how to operate a learning management system does not, by itself, enable an educator to redesign a curriculum; that requires understanding of disciplinary content, an appropriate pedagogical strategy, and the affordances and limitations of the chosen technology. Koehler et al. (2013) extend this argument, showing that meaningful integration requires teachers to understand how technology changes the relationship between content and pedagogy itself, and this is consistent with the included studies more broadly. Choi-Lundberg et al.'s (2023) review of 130 technology-enhanced learning designs found that educational value depended on how technologies were embedded within specific curricular contexts rather than on the technology itself, and Graham et al.'s (2023) case studies of three universities similarly describe institutional capacity and policy support, not technology provision alone, as central to their transformation efforts.

This point deserves pressing further than the reviewed literature typically does. Much of this research treats technology adoption and pedagogical transformation as points on a single continuum, as though enough time or enough training would eventually convert one into the other. This review suggests an alternative interpretation, though the available evidence cannot yet confirm it directly. Adoption and transformation may be better treated as separate variables that happen to correlate under favourable conditions, rather than as stages of the same process. This interpretation is consistent with the broader pattern reported across the reviewed literature, in which digital transformation is repeatedly described as an emerging, uneven process rather than one that follows predictably from infrastructure investment (Castro Benavides et al., 2020; Mabotha and Ngcamu, 2026), though neither review offers institutional-level data that could test the distinction directly. Curriculum teams that conflate the two risk mistaking infrastructure spending for curricular progress. Testing this distinction through institutional-level studies that separately measure technology adoption and pedagogical transformation is an important direction for future research.

The evidence also points to assessment as a particularly sensitive site of transformation. Digital and AI-enabled assessment tools expand the forms of evidence available to evaluate learning (Redecker and Johannessen, 2013). They can support more frequent formative feedback (Panadero et al., 2017), yet the growth of generative AI has intensified longstanding concerns about validity and integrity rather than resolved them (Kasneci et al., 2023; Yusuf et al., 2024). This suggests that curriculum transformation cannot treat assessment as a technical add-on; it requires reconsidering what forms of evidence remain meaningful once AI-assisted production of text, code, and analysis becomes widely available to students.

Equity considerations run through the findings as a further cross-cutting concern. van Deursen and van Dijk (2019), using survey data from the Netherlands, demonstrate that digital inequality extends beyond physical access to include differences in skills and material use, meaning that expanding technology provision alone does not guarantee equitable participation; whether this pattern holds in less digitally developed contexts remains an open question this review cannot answer directly. Institutions pursuing curriculum transformation through digital pedagogy therefore need to treat accessibility, affordability, and digital competence as integral elements of curriculum quality rather than as secondary implementation details.

5. Implications for Higher Education Practice

Curriculum teams should resist starting with technology selection at all. Institutions should instead begin with intended learning outcomes, learner needs, disciplinary requirements, and appropriate assessment, and only then ask which digital technologies, if any, would serve those purposes. Practically, this means procurement and curriculum design cannot remain separate institutional functions; a learning management system chosen without curricular input will rarely produce the redesign that meaningful integration requires.

Stronger alignment among learning outcomes, pedagogy, learning activities, and assessment also remains essential, since digital technologies create opportunities for collaboration, inquiry, and personalised learning that become educationally meaningful only when they correspond to intended outcomes (Redecker and Johannessen, 2013; Panadero et al., 2017). In practice, this points toward institutions auditing existing digital tools against learning outcomes before acquiring new ones. The evidence reviewed here indicates that additional technology rarely compensates for weak alignment and can instead add workload without adding educational value.

Faculty development therefore warrants sustained institutional investment, extending beyond operational training in specific tools toward pedagogical capacity to redesign curricula around digital possibilities. Institutions should also treat infrastructure and digital competence support as conditions for participation rather than optional extras, particularly for students and educators in less resourced settings, since equitable access determines whether curriculum redesign reaches all learners rather than only those already well served. Finally, given the pace of change associated with generative AI, institutions need active, iterative assessment policies rather than one-time guidance, which should be revisited as the capabilities and risks of these tools continue to shift.

6. Limitations

This review has several limitations. First, the review did not apply a formal quality appraisal instrument (such as the Mixed Methods Appraisal Tool or a domain-specific critical appraisal checklist) to the 21 included studies; consequently, the synthesis weighs studies of varying methodological rigour without a documented, systematic basis for distinguishing among them. Second, as noted above, the corresponding author conducted the search and initial screening, which the co-author subsequently verified rather than independently repeating; this verification process differs from fully independent dual screening with a calculated inter-rater agreement statistic and increases the risk of selection or interpretation bias relative to reviews conducted by multiple independent coders. Third, no review protocol was registered in advance (for example, with PROSPERO), which means the review questions and eligibility criteria, although reported transparently here, were not fixed through independent prior registration. Fourth, as noted above, 12 of the 21 included studies are themselves reviews or meta-analyses rather than primary studies; this synthesis therefore rests substantially on secondary literature, which carries a risk that the same primary studies are

represented more than once across included reviews and that the conclusions reported here partly reflect existing reviewers' framing of the field rather than an independent reading of primary evidence.

Fifth, several of the interpretive claims advanced in the discussion, including the proposed distinction between technology adoption and pedagogical transformation as separate rather than sequential variables, are grounded in patterns observed across included reviews rather than in institutional-level primary data capable of directly testing that distinction; these claims are presented as hypotheses for future research rather than as established findings. Given these limitations, the findings reported here should be read as a structured, transparent synthesis of the literature identified through this search, rather than as an exhaustive or formally appraised systematic review, and the conclusions should be interpreted accordingly.

7. Conclusion

This review examined how digital pedagogy contributes to curriculum transformation in higher education, drawing on 21 included sources identified through a structured, transparently reported search. Its central argument is that digital pedagogy should not be equated with the technological modernisation of existing curricula. Meaningful transformation occurs when digital technologies enable educators and institutions to reconsider what students should learn, how they should learn, how teaching should be facilitated, and how achievement should be assessed, a curriculum question that measuring technology adoption alone cannot answer.

Digital pedagogy can support this kind of transformation through blended learning, online and flexible learning, collaborative digital learning, learning analytics, digital assessment, and artificial intelligence, expanding flexibility, engagement, access, collaboration, personalisation, and feedback, but only under conditions of purposeful pedagogical design. Unequal access, limited educator competence, insufficient institutional support, assessment concerns, and the ethical issues associated with artificial intelligence continue to constrain that transformation, and placing responsibility for change on individual educators alone, as many institutions still implicitly do, is therefore not just unfair but structurally unlikely to work. Assessment stands out as a particularly important site of this transformation given the rapid development of generative AI and its implications for academic integrity and authorship. At the same time, equity remains a persistent, cross-cutting concern that technology provision alone does not resolve.

Future research should examine this relationship across disciplines, institutional contexts, and geographical settings, ideally with a registered protocol and fully independent dual screening. It should give particular attention to the longer-term effects of artificial intelligence and learning analytics on curriculum design and student learning.

Declarations

Funding. This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of interest. The authors declare that there is no conflict of interest.

Ethics approval and informed consent. This study is a literature review and did not involve direct research with human participants; accordingly, ethics approval and informed consent were not applicable.

Data availability. This review synthesises previously published, publicly available studies, full details of which are provided in the reference list and Table 1. No new primary data were generated or analysed.

Author contributions. Faustin Ndikubwimana conceived the review, conducted the literature search and initial screening, and wrote the manuscript. Yuanyue Wu verified the search strategy and the selection of included studies and reviewed the manuscript.

Declaration of generative AI and AI-assisted technologies in the writing process. During the preparation of this work, the authors used Claude (Anthropic) for language editing, accuracy verification, and checking that in-text citations corresponded correctly to their reference list entries. The tool was not used to collect data, conduct the analysis, or interpret the study's findings. The authors reviewed all AI-assisted edits and took full responsibility for the content of this publication.

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