Academia
AI and Applications

10.20935/AcadAI8422

Review Article

Agency in the age of generative AI: a critical review of educational implications

Jasper Roe[1,*], Mike Perkins[2]

[1] School of Education, Durham University, Durham, UK

[2] Centre for Research and Innovation, British University Vietnam, Hanoi, Vietnam

* Correspondence: jasper.j.roe@durham.ac.uk

Received: 11 March 2026 | **Accepted:** 1 July 2026 | **Published:** 17 July 2026

Abstract

Conversations regarding the societal implications of artificial intelligence (AI) and its integration into educational processes are ongoing. An area of great significance in this regard is agency, including how the use of AI technologies impacts an individual's ability to exercise autonomy. In educational contexts, this remains a relatively unexplored yet vital subject. To shed light on this subject, this paper provides an exploratory thematic review of works which investigate the relationship between generative artificial intelligence (GenAI) and agency in education, mapping and interpreting the available literature through the lens of critical digital pedagogy (CDP). The findings suggest that while GenAI may enhance learner agency through personalisation and support, it also risks exacerbating educational inequalities and diminishing learner autonomy in certain contexts. This review also contributes to new sociotechnical perspectives on AI, highlighting how GenAI technologies may shape and be shaped by power dynamics and pedagogical ideologies. This review contributes to the existing debate on how AI technologies can be deployed in education and society responsibly by exposing how the use of these technologies may lead to unintended impacts, including the entrenchment of inequality and the reshaping of concepts of individual agency, authorship, and autonomy.

Keywords: generative AI; learner agency; teacher agency; AI in education; thematic analysis; critical digital pedagogy

1. Introduction

Generative artificial intelligence (GenAI) is still in its infancy; however, it has been impactful across broad sections of society. One of the most important of these areas is education, given that GenAI tools may now find their way into classrooms at all levels, from kindergarten to university, and that these interactions will contribute to the development of youth and shape the next generation. However, while a growing number of studies are seeking to clarify the effects of GenAI on education, there is no consensus on whether the benefits of these new technologies outweigh their risks.

Some research in educational contexts has shown the positive effects of using GenAI for learning and teaching purposes, potentially enhancing efficiency. For example, systematic reviews have shown that tools such as ChatGPT may offer enhanced learning [1], while structured frameworks to enable the judicious use of GenAI

tools in assessments can lead to fewer cases of academic misconduct and promote critical digital literacy [2, 3]. Learners may desire feedback from GenAI models along with human guidance [4], potentially improving educational outcomes. Other theorised benefits include providing personalised learning experiences, tutoring, and feedback [5], as well as allowing for the gamification of learning materials and the creation of digital resources [6].

From the perspective of teachers, GenAI may help to shoulder administrative burdens [7], assist with tasks such as tailoring curricula to local contexts [8], and lessen the labour-intensive tasks of producing textual content for various educational purposes [9]. However, these preliminary results must be interpreted cautiously, given the rapid rate of change and development in this field. It is likely that we will not know the true impact of GenAI in education for many years to come when high-quality longitudinal data becomes available.

These benefits must be juxtaposed with the significant risks of using GenAI in education which could negatively impact society on a larger scale. GenAI tools are not transparent and produce unexplainable outputs [10]. Consequently, GenAI tools may be implemented in inequitable ways and contain unknown biases [11, 12]. The risks of GenAI tools in education also relate to academic integrity and ownership of work [13–15]. To some extent, the concept of ownership itself may need to evolve to account for the release of GenAI models, necessitating a reorganisation of underlying societal values, such as the individual ownership of ideas or texts.

Long-term impacts of GenAI in education could include the worsening of digital poverty [10], the 'monoculturing' of scientific knowledge [16], the devaluation of human relationships [17], and the erasure of 'productive struggle' in learning [18]. GenAI outputs are also increasingly used for nefarious purposes [19], including in educational contexts, such as deepfake scandals or cyberbullying [20]. In sum, the impact of GenAI on education can be considered a microcosm of its potential effects on society as a whole. The true extent of these impacts will not be known with clarity for some time; however, ongoing scholarship in this field can contribute to a fuller understanding of all the potential implications for those in educational environments.

These benefits and risks associated with GenAI in education can also be interpreted through the lens of agency. The use of GenAI invariably involves an entangled process in which some decisions are offloaded to a GenAI model. However, there is little understanding of how these decisions impact the agency of teachers and learners. From this perspective, we seek to explore the nature of knowledge on this topic that has been produced in the short period of time from the public release of early large language models (LLMs) in 2022 to today's high-powered, multimodal GenAI applications. While focused on educational contexts, our review also contributes to broader debates on algorithmic agency, digital subjectivity, and the role of AI and its entanglement with human autonomy. In Section 1.1 we examine the relationship between GenAI and learner agency in education. Following this, we explain our theoretical approach (critical digital pedagogy, or CDP), and our methods and process for undertaking this exploratory review and synthesising themes from the data. Finally, we discuss the implications and conclusions of our findings in Section 6.

1.1. Exploring the relationship between generative AI and learner agency in education

First, it is necessary to draw on existing theories of agency to contextualise our review and explain the link between GenAI and agency. There are multiple definitions of agency in relation to education, and although student agency is growing in importance as a field of study, it is commonly referred to without being clearly defined [21], and as a 'buzzword' rather than a developed notion [22]. In this review, we take a view of agency that encompasses cognitive, behavioural, and epistemic dimensions, as these forms are all present in the emerging literature on GenAI and education. At its simplest formulation, agency can be seen as the capacity to make

independent choices [23] or take intentional actions [24]. Throughout this paper, we distinguish between learner agency (the capacity of students to make choices and direct their own learning), teacher agency (the capacity of educators to shape pedagogical decisions within institutional and technological constraints), and epistemic agency (the capacity to participate in the construction and evaluation of knowledge). Educational research suggests that learner agency can be developed [25] and that it is desirable, especially as it is implicated in self-regulated learning, including self-efficacy, motivation, and metacognition [26].

Furthermore, environments that support the development of student agency are rich learning spaces for students and teachers [27]. It is important to note that while agency relates to independent choices, it is more than just an individual's capacity to act [28]. Agency is situated contextually, temporally, and intrapersonally [29]; thus, agency emerges in the processes of social relations [30]. Moreover, learner agency involves the interplay between multiple constructs, such as abilities, affordance, self-regulatory systems, and motivation [31], and developing agency can be considered from a process perspective, moving from powerlessness to a sense of control and future hopefulness [32]. From a constructivist viewpoint, learner agency is necessary in the construction of knowledge and development of competence, requiring learners to voluntarily enter a Vygotskian Zone of Proximal Development (ZPD), and the teacher or instructor to equally enter into a scaffolding role; thus, learner agency may be co-constructed between teacher and student [33].

In summary, it can be argued that agency is not a static phenomenon but develops and adapts in response to a system, varies across domains and contexts [31], and is interlinked with our relationships with the external environment [34]; thus, agency can be 'shared' [35]. From a critical perspective, agency is also embedded in power relations, for example, those that exist between teachers and students, or in the case of teacher agency, the autonomy offered by the environment in which they work [36]. Exercising agency can have significant effects. Moje and Lewis [37] argue that learning is situated within a discourse community and agency has the potential to transform the self, personal identity, and relationships with others. In fact, as learning creates identities, it positions learners in a way that they can 'take up' agency to alter dominant discourses, making agency central to learning [37].

As digital technologies, including GenAI, become increasingly embedded in educational environments, questions about how these tools influence agency are emerging. To this end, Dwivedi et al. [38] point out that a consequence of increased AI use will be an increased focus on who is responsible in the case of errors. If a GenAI tool is essentially an 'able slave' to which we delegate our work, we may become unable to write and think properly, thus impacting our own agency. In addition, the distinction between human agency and AI agency has attracted significant research attention. Dattahrani and De [39] argue that in an AI-enabled world, the notion of agency must distinguish between AI, human, and traditional information systems.

One of the key areas of discussion in this newly developing area of human–AI agency is in attempting to understand the extent to which GenAI systems may affect the agency of individuals in education. Research has suggested several potential benefits of GenAI technology in education for learner and teacher agency. Hwang and Chen [40] argue that AI tools can guide learners based on their performance while enhancing their ability to understand, analyse, and assess. Lashari and Umrani [41] emphasised that teachers should receive training in AI-assisted models to support student-centred learning, and Lim et al. [42] suggested that AI frameworks can be beneficial when they incorporate principles that promote learner agency.

It has also been argued that in new learning technologies such as Virtual Reality (VR), increased agency is an affordance, as it may enable full-body interaction within a digital environment [24]. A change in the learning environment through the use of GenAI may similarly lead to subsequent effects on agency in learners'

perception of their learning process [43], and AI-driven functionality may help increase learner agency in lifelong learning [44], with AI technologies specifically targeted at promoting self-regulated and proactive learning in a digital context [45]. In terms of theorised negative impacts, the automation of learning and education using AI technologies raises the concern that students' ability to engage in agentic decision-making will be limited [46], and there is the potential for GenAI tools, such as virtual teaching assistants, to disturb, intrude on, or negatively impact learner agency [17]. In some cases, this may mean offloading challenging tasks, for instance, in language learning, to a GenAI tool, thus circumventing the work required to achieve a learning outcome [47]. In the case of over-reliance on AI-enhanced learning, fundamental literacy skills may be affected [48]. Given these varied ideas on how emerging technologies may enhance or diminish learner agency, it is necessary to examine this existing body of knowledge through a theoretical lens that can specifically address questions of agency in digital learning environments.

1.2. Critical digital pedagogy as a guiding framework

In assessing the literature on agency in learning and GenAI, we have chosen to draw on principles relating to the developing field of critical digital pedagogy (CDP). CDP has yet to be fully defined but broadly stems from Freire's [49] *Pedagogy of the Oppressed*. For Freire, all education belongs to the pursuit of freedom, which is, by its nature, political and focused on offering students a notion of critical agency. Freire rejected forms of pedagogy that reduced agency to consumer activities [50]. Thus, if students live in a culture in which their education takes place through digital tools such as screens, their education should seek to empower them in that context; thus, the critical and digital classroom is a context in which intellectual and moral agency is important [51]. Furthermore, technology can be used to enable learners to make use of their agency or to allow them to critically analyse technology tools in educational contexts [52]. Simultaneously, educational technology has been criticised for its systems of surveillance, control, exploitation, and extraction of learners and teachers [53]. Thus, when we speak about interpreting studies from a CDP perspective, we seek to understand whether such effects exist and explicitly identify them as areas of focus. Ultimately, the CDP is a relevant framework for this scoping study as it fundamentally focuses on agency—the agency to know, understand, act on, or resist reality [54]. This lens helps us critically examine whether GenAI tools genuinely empower learners or reinforce existing power structures in education. This links to broader sociotechnical approaches to AI in society, foregrounding the relationship between human agency, power and tools in digitally mediated environments.

2. Review methodology

The rationale for this review on agency and GenAI is that in the short time frame from GenAI's release to the public, there has been growing use of this technology in educational settings; however, to date no comprehensive investigation has explored and mapped the evidence produced thus far. With this in mind, as a new frontier in educational technology research, a broad, exploratory, and thematic review is an appropriate first step [55].

The major objective for this review is to explore, identify, and map the existing scholarship regarding GenAI's impact on learner agency through the lens of CDP. Furthermore, we aim to identify gaps in the current research base and explore the potential for a future research agenda on GenAI and agency in an educational context. The guiding questions for this research are as follows:

- How is the relationship between GenAI and learner agency conceptualised in the academic literature?
- Through the lens of critical digital pedagogy, what are the implications of GenAI for learner agency, considering issues of power, equity, and digital literacy?

We conducted a comprehensive search using four primary databases: Google Scholar, Scopus, Web of Science, and Education Resources Information Center (ERIC). These databases were chosen for their complementary strengths and field coverage. **Table 1** provides the rationale for each selected database. Database searches were conducted in October 2024. The AI tool Claude (Opus 4.8) was used during the preparation of the manuscript. The tool assisted in conceptual discussion and the suggestion of draft text. All scientific content is based on original synthesis, the peer-reviewed literature, and the authors' subject matter expertise. The AI tool did not generate scientific content independently but rather aided in effectively expressing ideas already conceived by the authors.

Table 1. Databases selected.

Database selected for scoping review	Rationale
Scopus	Scopus contains extensive coverage of peer-reviewed literature in areas including computer science, education, and educational technology.
Google Scholar	Scholar provides broad coverage across multiple disciplines and includes grey literature and preprints, which is particularly valuable given the rapidly evolving nature of generative AI in education.
Web of Science (WoS)	Web of Science contains high-quality peer-reviewed literature and allows us to discover studies that may have been missed in Scopus.
Education Resources Information Centre (ERIC)	Although many ERIC resources are listed in the above databases, ERIC specialises in education research and resources, ensuring thorough coverage of educational studies that may not have been listed above.

The combination of these databases ensures that a wide net is cast over both interdisciplinary and education-specific research, capturing both the established academic literature and emerging scholarship in the fields of GenAI and agency in education.

The following search string was used, which was adapted for each database's specific syntax:

("Generative AI" OR "GenAI" OR "Large Language Model" OR "LLM" OR "ChatGPT") AND (education OR learning OR teaching) AND ("learner agency" OR "student agency" OR autonomy OR empowerment)

These search terms were adopted to ensure that specific and relevant studies were included, while also acknowledging that the field of GenAI and educational research is immature and beset with synonyms and abbreviations (for example, GenAI, Generative AI, and LLM may all return relevant results). Near-synonyms for agency, such as 'autonomy' or 'empowerment, were used to find relevant studies that did not specifically refer to the construct of agency. As shown in **Table 2**, strict inclusion criteria were set, and studies that did not meet these criteria were excluded from the review. This included the exclusion of studies that focused solely on AI in education without addressing GenAI specifically and those that did not substantially discuss learner or teacher agency, even if the term 'agency' was mentioned indirectly or as a single element in a larger study. We excluded news and media articles lacking sufficient academic or theoretical grounding, conference abstracts without accompanying full papers, and technical GenAI papers with no explicit connection to agency or education. Grey literature was included because the field moves faster than peer review: major organisations are producing

authoritative guidance that has not yet entered traditional publishing channels. Documents from established organisations meeting this standard were therefore eligible.

Table 2. Inclusion criteria.

Inclusion criteria	Detail
Time of publication	Published at any time
Language	English
Focus	Generative artificial intelligence (GenAI) and agency in education
Educational level	All levels of education
Geographical scope	International (no geographical restrictions)
Type of publication	Peer-reviewed articles, conference papers, preprints, and relevant grey literature (e.g., reports from reputable organisations).

2.1. Screening process

Two reviewers independently screened the titles and abstracts of the identified studies according to the inclusion and exclusion criteria. Full-text screening was conducted for potentially eligible studies. Given the limited number of studies that met our inclusion criteria, we did not employ formal inter-rater reliability (IRR) measures such as Cohen's Kappa. Instead, we implemented a rigorous consensus-building approach in which both reviewers independently reviewed all the papers and met to discuss each decision in detail. Disagreements were resolved through discussion and consultation of the inclusion and exclusion criteria. This approach, while less quantifiable than formal IRR measures, allowed for a detailed consideration of each study's relevance and content in the context of our research questions. A spreadsheet was used to extract relevant information from the included studies, including study characteristics, conceptualisations of learner agency, methodological approaches, and key findings, as well as any specific GenAI tools that were part of the research. Our initial database searches on Google Scholar, Scopus, Web of Science, and ERIC yielded 16 potentially relevant studies. After reviewing these studies against our inclusion criteria, we excluded four studies for not being fully relevant to our research questions and one duplicate record. Ultimately, we identified only 11 studies in our qualitative synthesis, demonstrating the emerging and immature nature of the field in relation to learner agency and the use of GenAI. This small sample size limits generalisability yet remains consistent with the goals of a scoping review in an emerging field, where the aim is evidence mapping and gap identification rather than statistical significance [56, 57]. We also note that our searches are culturally representative of the Anglosphere, with searches restricted to English-language publications and relied on databases with predominantly Anglophone, US- and Europe-indexed coverage. Consequently, any work published in other languages or indexed in regional databases not included in the above could lead to underrepresentation.

2.2. Data charting

Following the study selection process, we analysed the characteristics of the 11 included studies. This subsection provides an overview of these studies, focusing on key aspects relevant to our research questions on GenAI and learner agency.

All but one of the included studies were published in 2024, with the most recent published in 2025, indicating the recent nature of the research in this field. In total, nine studies focused on GenAI and learner agency in educational contexts, one focused on teacher agency, and one focused on broader notions of epistemic agency. **Table 3** provides an overview of the key characteristics of these studies. Most were published in peer-reviewed academic journals (six studies), with three conference papers, one open-access book chapter, and one preprint. The studies cover a range of educational contexts, including K-12, undergraduate education, doctoral education, language learning, and teachers (without a range or teaching level). In terms of methodology, most studies were theoretical. To provide a clearer descriptive synthesis of the corpus, its composition can be summarised numerically: of the 11 included studies, six (54.5%) were journal articles, three (27.3%) conference papers, one (9.1%) an open-access book chapter, and one (9.1%) a preprint, while eight (72.7%) were theoretical and three (27.3%) were empirical. Consistent with the final stage of Arksey and O'Malley's scoping review framework [56], these proportions are presented as a descriptive map of the literature rather than as inferential statistical analysis. The predominance of theoretical papers suggests that the field is still in its early stages, with researchers working to establish conceptual frameworks and a theoretical understanding. However, empirical studies (participatory research, surveys, and experiments) indicate that some researchers are already gathering data on the practical implications of Gen AI for agency in educational contexts.

Table 3. Study key characteristics.

Reference	Type of publication	Educational context	Methodology
Resnick [17]	Open-access book chapter	N/A	Theoretical paper
Darvishi et al. [46]	Journal article	Undergraduate	Empirical study
Cox [58]	Journal article	Epistemic agency	Theoretical paper
Frøsig and Romero [59]	Preprint	Teacher agency	Theoretical paper
Yang et al. [60]	Journal article	Undergraduate	Empirical study
Yan et al. [61]	Conference proceedings	Learning analytics	Theoretical paper
Shum [62]	Conference proceedings	N/A	Theoretical paper
Godwin-Jones [63]	Journal article	Language learning	Theoretical paper
Kumar et al. [64]	Journal article	N/A	Theoretical paper
Han et al. [65]	Conference proceedings	K-12 students, teachers, and parents	Empirical study
Zhai [66]	Journal article	Teacher agency	Theoretical paper

2.3. Hybrid thematic analysis

A hybrid thematic analysis methodology was employed to synthesise the themes from the data. Thematic analysis involves pattern recognition within the data, following an iterative, reflexive process [67], and is often described in six steps, as detailed in Braun and Clarke's [68] seminal work. However, recent work in thematic analysis has identified that using a hybrid approach, which combines inductive and deductive thematic analysis, can provide greater methodological rigour [69]. We followed this approach by first adopting a set of deductive codes based on the core principles of CDP as our guiding framework, while also working with the data to inductively make sense of the manuscripts, searching for common sets of meanings, and engaging in logical

inference. This represents both a 'top–down' and 'bottom–up' approach to data analysis [70]. In line with current ideas regarding thematic analysis (TA), we aimed to avoid generating mere 'topic summaries' and instead tried to creatively and organically code the data to move beyond a superficial approach [71].

We used a systematic three-phase approach to balance the deductive and inductive elements of the analysis. This began with two researchers jointly developing a deductive framework using CDP principles to create an initial high-level coding structure. This served as an analytical foundation for the present study. We then conducted separate data familiarisation and close readings of the manuscripts. GenAI tools were used to support the code and theme triangulation. This was done by inputting coding data into the Claude 3.5 Sonnet interface and then critically reviewing and cross-validating the results against manual analysis. Previous research has shown that while GenAI tools may not be capable of reasoning in the manner of human coders, as statistical pattern-matching software, they can produce sophisticated analyses of data that may closely match the results of human researchers [72, 73], thus making them suitable for supporting the triangulation of results. To achieve this, one researcher followed a traditional approach of taking memos during close reading of the source material, manually taking notes and developing sub-codes for the high-level deductive codes. During this process, they also identified further inductive codes which described the 'qualitative richness of the phenomenon' [74] when encountering meaningful segments that did not align with our existing analytical framework. The second researcher used the GenAI model to analyse the source material and identify deductive and inductive codes and sub-codes based on the agreed high-level coding structure. The known cultural biases and limitations of GenAI output [75] were mitigated by relying on manual coding and the researchers' judgement and evaluation, using the tool as an assistive resource, with final interpretation and synthesis conducted exclusively by the researchers.

In the third phase, we compared and discussed the two sets of coding frameworks to identify any potential missing codes and sub-codes. Once an agreed set of codes and sub-codes was developed, a further step of theme development was carried out by both researchers (one of whom was supported by the GenAI tool). A final discussion and comparison of the themes helped resolve the differences between our findings and iteratively and reflexively refined our overall themes.

3. Results

Our scoping review revealed a complex and limited body of research regarding the role of GenAI in the agency of both learners and teachers. The findings we present represent an exploratory first step in this field, identifying relevant gaps while not providing any definitive conclusions. Despite the small number of eligible studies for review, we were able to develop several themes that raise critical questions about the future of learning in GenAI-enhanced environments from a CDP perspective. Our analysis resulted in the output of three themes that helped us interpret the data from the review: control in digital spaces, variable engagement and access, and changing notions of agency. A summary of these themes and their descriptions is presented in **Table 4**.

Table 5 demonstrates a per-study mapping, identifying which of these three themes were addressed in each of the 11 included studies, together with approximated frequencies for each theme. These are expressed as proportions of the 11 included studies. Control in digital spaces appears in five (45.5%), variable engagement and access in six (54.5%), and changing notions of agency in seven (63.6%). As the themes are non-mutually exclusive, any individual study can contribute to more than one theme, and the proportions sum to more than 100% as a result.

Table 4. Developed themes.

Theme	Description	Example
Control in digital spaces	This theme refers to the negotiation of power and authority in generative artificial intelligence (GenAI)-driven educational environments, in which traditional roles and mechanisms of control are being redefined.	'There is an opportunity to consider HI (Hybrid Intelligence) to offer a potential answer in a system designed to give teachers (i) the power to act, (ii) the power to affect matters, (iii) the power to make decisions and choices, and (iv) the power to take a stance' [59].
Variable engagement and access	This theme covers patterns of varied engagement with GenAI in education, characterised by different levels of learner access, use, and participation.	'By analyzing student interviews conducted pre- and post-course, alongside their chat logs with GenAI and reflective journal entries detailing their learning approaches, the research uncovers a spectrum of student perspectives on GenAI's impact, ranging from beneficial optimism, to cautious skepticism and adaptable pragmatism' [60].
Changing notions of agency and human–AI hybrids	This theme relates to the changing ways in which learners incorporate critical capabilities and strategic approaches to using GenAI in education.	'For example, some students may use GenAI tools to improve the grammar and presentation of their reflective writing, while others may ask these tools to generate the entire reflective assessment, undermining the educational purpose of such tasks' [61].

Table 5. Per-study mapping of themes.

Reference	Control in digital spaces	Variable engagement and access	Changing notions of agency
Resnick [17]	✓		
Darvishi et al. [46]	✓		
Cox [58]			✓
Frøsig and Romero [59]	✓	✓	✓
Yang et al. [60]	✓	✓	
Yan et al. [61]		✓	✓
Shum [62]		✓	
Godwin-Jones [63]		✓	✓
Kumar et al. [64]			✓
Han et al. [65]	✓		✓
Zhai [66]		✓	✓
Frequency	**5**	**6**	**7**
% of studies (*N* = 11)	**45.5%**	**54.5%**	**63.6%**

3.1. Control in digital spaces

This theme is related to undertaking action in digital spaces and the way in which learners make agentic decisions on how to use GenAI. We noted that the literature strongly focused on how and why learners may engage in specific learning actions, such as submitting work, drafting, or reviewing. For example, Yang et al.'s [60] framework sought to understand how students exert control when using GenAI tools and noted that learners exhibit different behaviours, including whether to reject the use of such tools or integrate them with varying methods and techniques. Those who used the tools most effectively sat on the 'reflective' end of the spectrum and were able to demonstrate critical skills such as introspection, reflection and evaluation. This approach aligns with Bearman et al.'s [76] notion of evaluative judgement as an essential tool for the future. We noted little discussion on the potential constraints that GenAI tools may place on learners' agency. It can be asked whether the limitations of GenAI tools, for example, their culture-bound knowledge [75] or potential for manipulation [19], create conditions that constrain the agency of the learner and limit their choices for engaging in academic tasks.

3.2. Variable engagement and access

The potential for GenAI to exacerbate educational inequalities is a concern that emerged during our review and has been noted in the literature. This aligns with broader thinking on the relationship between AI and education, which postulates that unequal access may worsen digital poverty and drive a divide between those with and without access to GenAI [10]. An example of this relates to access: if GenAI access benefits learner agency, then students in countries that have less access to the newest GenAI models may comparatively reap fewer benefits in their educational process. In our review, we found data to support the awareness that limited access to GenAI tools may constrain learner agency, but also that resistance to their use is possible. Shum [62], for example, warns that the disadvantages faced by those unable or unwilling to use AI tools highlight the risk of creating new forms of digital divide. Frøsig and Romero [59] also highlighted that in the domain of teacher agency, it is important to recognise that GenAI may widen the digital divide among students who can and cannot afford access to AI tools.

Further evidence underpinning this theme comes from Yan et al. [61], who envision a world in which affluent learners may experience more dynamic and personalised learning content than less affluent learners. In contrast, Godwin-Jones [63] argues the opposite, framing AI tools as a way to reduce social and linguistic inequalities, for example, for those with a lower level of English proficiency. Therefore, the extent to which GenAI may impact agency by enhancing or exacerbating educational inequalities is a topic of clear interest in the literature, which led us to the development of this theme. From a CDP perspective, this theme strongly relates to questions of equality, power, and the potential social effects of GenAI on learner agency.

3.3. Changing notions of agency and human–AI hybrids

The third theme we developed within our scoping review is based on the concept of agency in GenAI-enhanced learning environments undergoing a shift. This indicates that agency is perceived as evolving to include nonhuman GenAI technologies. The idea that agency is 'shared' [35] is not new, and agency is related to the external environment [34]. However, agency in the GenAI period may now be shared between humans and nonhuman technologies, as proposed by Godwin-Jones [63]. Similarly, as Dattahrani and De [39] contend, agency must now be shared between AI actors and humans, and AI tools such as ChatGPT may be able to

exhibit agency (or at least appear to do so) [77]. From a CDP perspective, this raises questions regarding whether individuals should resist the forfeiture of agency to machinery.

With this in mind, more work is needed to describe exactly what level of agency we may ascribe to GenAI tools and whether they have some semblance of agentic behaviour or are merely an 'able slave' [38]. From a CDP perspective, reconceptualising notions of agency and to whom it belongs is part of a broader examination of the power relationships inherent in learning environments, particularly those which are digitally enhanced. This aligns with Cox's [58] analysis of evolving epistemic agency in AI-enhanced education, where he argues that traditional notions of learners as 'makers' of knowledge are being challenged by new conceptualisations of learners as 'managers' of information or even as 'information organisms' (inforgs) embedded within AI systems. If GenAI tools are used not just as tools but as more active participants in the learning process and knowledge construction, then we see a greater opportunity for the types of 'entanglement' between human and nonhuman actors, as described by Kumar et al. [64]. This suggests that new frameworks must be developed to understand how agency operates in hybrid human–AI collaborative learning environments. These must account for both the algorithmic decision-making principles of GenAI tools and the intentional actions of human educators and learners.

4. Discussion

Our review of the literature on GenAI and learner agency in education, viewed through the lens of critical digital pedagogy (CDP), resulted in the development of three themes that carry implications for future research in this area. Our novel conceptual contribution is the use of a CDP lens to explore the emerging and fragmented literature on GenAI in agency, while also distinguishing between student, teacher, and epistemic agency as distinct domains.

The focus on learner control and the potential to empower or diminish learner agency has recurred throughout the literature. For example, Resnick [17] stated that AI tutors may disempower or intrude into the learning process. From a CDP perspective, this warrants additional attention—the product-focused nature of many AI-driven EdTech tools and the drive for profit mean that any benefits to learning are likely to be emphasised, while the possibility of disempowerment is likely to be downplayed at the commercial stage. Therefore, it is vital to conduct impartial, independent studies on whether such tools have an empowering, disempowering, or mixed effect on learner agency. From a CDP standpoint, the power asymmetries that are at the core of issues of GenAI adoption deserve attention. How models are trained, developed, and commercially utilised in education by a small number of technology corporations presents risks for educators and students, effectively treating them as consumers rather than co-producers of digital environments. This inequality is structural, and could risk further entrenching existing hierarchies in education. Specifically, those marginalised groups with little power over the technologies that are utilised and employed within their learning contexts may suffer the most.

Another finding that emerged from our review is the way in which GenAI may contribute to reshaping knowledge ownership and construction in educational environments. For example, Han et al. [65] observed that among 8–12-year-old students, when engaging with GenAI in a storytelling task, many simply copied and pasted outputs directly from the GenAI tool without making any amendments. Extending this concern to teacher agency, Zhai [66] shows that teachers' perceptions, acceptance, knowledge, and practices shape how teacher roles and agency are reconfigured in the GenAI era. This is a concerning issue in relation to the agency, intellectual engagement, and autonomy that CDP advocates strive for. However, the reasons for this and whether it represents a diminishment of agency require further research. Our review also highlighted that existing studies

acknowledged and discussed the potential of GenAI to exacerbate existing societal and educational inequalities. Shum [62], for example, warned that professionals unable or unwilling to use AI tools might find it impossible to meet the productivity of those who embrace AI tools, thus creating an inequitable environment for those with aptitude and access and those without. However, some studies noted GenAI's potential for increased personalisation, which could align with CDP's emphasis on learner-centred education if implemented critically. The need for ethical frameworks and responsible AI use in education was another recurring pattern in the data. For example, Yan et al. [61] highlighted the importance of transparency in AI use, aligning with CDP's emphasis on demystifying digital tools and processes.

Our analysis revealed a tendency for a binary view of Gen AI in learner and teacher agency as retaining a fixed set of 'benefits' and 'challenges'. However, such value judgments are likely dependent on the context in which the usage takes place and are multifaceted by nature, going beyond this dichotomous view. An example of this nuanced understanding comes from Kumar [64], who challenged the notion of GenAI inevitably transforming education, emphasising that human lives are inevitably entangled in multiple nonhuman learning-related tools. This perspective aligns with CDP's view of technology as entangled with social and cultural contexts. These findings demonstrate the developing picture of GenAI for learner agency in education. Viewed through the lens of CDP, there is an urgent need for critical engagement with these technologies, the development of refined digital literacies, and careful consideration of ethical implications. Simultaneously, the unclear balance between the potential benefits and risks of GenAI presents significant challenges for researchers, educators, and policymakers.

Figure 1 shows how GenAI-mediated educational contexts interact with the three thematic findings identified in the review. Using a CDP lens as the mode of exploration, we identify how learner agency may be enhanced, redistributed, or constrained depending on power relations, access, digital literacy, pedagogical design, and institutional conditions.

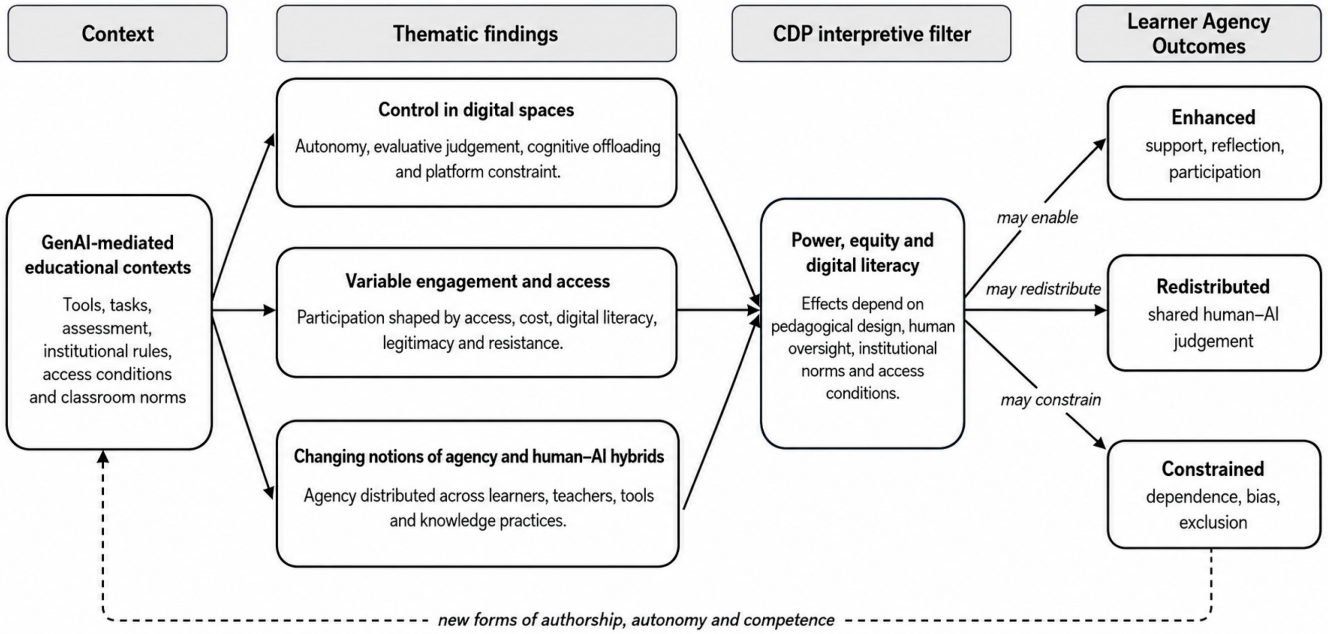

Figure 1. Conceptual synthesis of generative artificial intelligence (GenAI) and learner agency through a critical digital pedagogy lens. Solid arrows show direct links, dashed arrow shows potential future changes. CDP: critical digital pedagogy.

4.1. Limitations

While this review provides insights into the intersection of GenAI and learner and teacher agency in education, there are several limitations that affect the interpretation and replicability of our findings. The field of GenAI in education is rapidly evolving, with all but one of the included studies published in 2024 (and the most recent in 2025), suggesting that this topic is only beginning to be explored. Consequently, the long-term impacts and trends are not yet observable. Furthermore, the capabilities of GenAI tools are advancing at such a speed that any potential impact on agency will likely shift as new capabilities and forms of GenAI become available. The use of GenAI tools (Claude 3.5 Sonnet) in our analysis process, while aimed at enhancing the identification of sub-codes and supporting the creation of themes, may have introduced unforeseen biases or limitations in the interpretation of data. The capabilities and limitations of the AI model used should be considered when interpreting the results. In order to support reproducibility, both researchers independently evaluated model-generated codes and theme suggestions. Any interpretation that both authors did not fully agree with was excluded from the research. We also note that there is a clear epistemological tension in using GenAI experimentally to study the impact of GenAI in education. One of the tools under investigation is also a research instrument; this may shape the analytical lens as it was applied to the data. We acknowledge this concern and highlight that GenAI usage in this study was supportive and triangulatory, with all final interpretations made solely by human researchers.

A significant limitation is the dominance of theoretical studies in the identified data. While these provide interesting insights, discussions, and considerations of how agency might shift in relation to GenAI, the lack of practical applications and empirical studies makes it difficult to measure the success of theoretical models against real-world applications. Finally, our review included a small number of studies, which constrains the breadth and depth of our analysis. That said, in identifying the key issues currently underpinning this topic, the review captures a snapshot of the current concerns regarding GenAI and agency in education. Given the recent emergence of GenAI technologies in education, our review lacks a longitudinal perspective on the evolution of the relationship between GenAI and learner agency over time.

While CDP provides a valuable theoretical lens, operationalising its principles in the context of GenAI and learner agency presents challenges for educators. The interpretation and application of CDP concepts may vary from one researcher to another. As with any review, there is a risk of publication bias, as studies with positive or significant findings are more likely to be published and included in our review. Given the theoretical nature of most of the papers identified, this is unlikely to be a significant limitation.

5. Conclusions

Our review reveals that, at present, studies on learner agency and GenAI focus on issues of control, access, engagement, and exploring a shifting notion of agency. Viewed through the lens of CDP, our findings suggest that further research is required on the power dynamics at play when GenAI is implemented to enhance learner agency. We encourage critical research that questions the assumption that technology will, by its nature, enhance learning and improve the agency of learners and teachers, as well as longitudinal studies which can assess the effects on agency over time and relate these findings to the broader social implications discussed above. From a practical perspective, educators should critically consider the relevance and need to integrate GenAI technologies in education and reflect on whether such usage has the possibility to constrain or enhance agency. Our findings call for further engagement at the institutional level for governments and

policymakers to take seriously the potential implications of a shifting notion of agency in a Gen AI-enabled educational environment. To further this field, we propose that future empirical research focuses on three key priorities: (1) studies that further examine the themes of control, access, and hybrid agency through empirical and quasi-experimental approaches; (2) comparative approaches across different educational contexts and regions to explore the role of cultural and socioeconomic factors, and (3) longitudinal studies that examine changes in agency over sustained periods of GenAI use.

Finally, we note that questions regarding the ethical responsibilities of teachers and students and epistemic trust are a cause for concern. These technologies are not objective entities; they exist in complex webs of social, cultural, and economic relationships. Consequently, the use of GenAI technologies in educational settings may lead to a long-term restructuring of notions around agency and contribute to shaping new cultural norms regarding ownership, authorship, and individual competences. While our review primarily focuses on educational contexts, it can be situated within broader concerns about the effects of GenAI on society as a whole and the shifting relationships between humans and machines.

Acknowledgments

The authors acknowledge the use of the AI tool Claude (Opus 4.8) for language editing. The tool was applied to enhance clarity and scholarly tone, and all edits were carefully reviewed and validated by the authors to ensure accuracy, compliance with academic standards, and research integrity. The authors fully support Academia.edu Journals' adherence to COPE guidelines on AI in publication ethics and confirm that this use has been managed responsibly and ethically.

Funding

This research received no external funding.

Author contributions

Conceptualization, J.R.; methodology, J.R. and M.P.; formal analysis, J.R. and M.P.; investigation, J.R. and M.P.; data curation, J.R.; writing—original draft preparation, J.R. and M.P.; writing—review and editing, J.R. and M.P. All authors have read and agreed to the published version of the manuscript.

Conflict of interest

The authors declare that they have no competing interests.

Data availability statement

No new data was created or analyzed in this study. Data sharing is not applicable to this article.

Publisher's note

Academia.edu Journals stays neutral regarding jurisdictional claims in published maps and institutional affiliations. All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors, and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Copyright

© 2026 copyright by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license.

References

1. Deng R, Jiang M, Yu X, Lu Y, Liu S. Does ChatGPT enhance student learning? A systematic review and meta-analysis of experimental studies. Comput Educ. 2025; 227: 105224. doi: 10.1016/j.compedu.2024.105224
2. Furze L, Perkins M, Roe J, MacVaugh J. The AI assessment scale (AIAS) in action: a pilot implementation of GenAI-supported assessment. Australas J Educ Technol. 2024; 40 (4): 38–55. doi: 10.14742/ajet.9434
3. Perkins M, Furze L, Roe J, MacVaugh J. The artificial intelligence assessment scale (AIAS): a framework for ethical integration of generative AI in educational assessment. J Univ Teach Learn Pract. 2024; 21 (6): 1–18. doi: 10.53761/q3azde36
4. Roe J, Perkins M, Ruelle D. Is GenAI the future of feedback? Understanding student and staff perspectives on AI in assessment. Intell Technol Educ. 2026; 1 (1). doi: 10.53761/ITED/1.7
5. Kasneci E, Seßler K, Küchemann S, Bannert M, Dementieva D, Fischer F, et al. ChatGPT for good? On opportunities and challenges of large language models for education. EdArXiv. 2023. doi: 10.35542/osf.io/5er8f
6. Zhai X, Chu X, Chai CS, Jong MSY, Istenic A, Spector M, et al. A review of artificial intelligence (AI) in education from 2010 to 2020. Complexity. 2021; 2021 (1): 8812542. doi: 10.1155/2021/8812542
7. Fui-Hoon Nah F, Zheng R, Cai J, Siau K, Chen L. Generative AI and ChatGPT: applications, challenges, and AI-human collaboration. J Inf Technol Case Appl Res. 2023; 25 (3): 277–304. doi: 10.1080/15228053.2023.2233814
8. Karataş F, Eriçok B, Tanrikulu L. Reshaping curriculum adaptation in the age of artificial intelligence: mapping teachers' AI-driven curriculum adaptation patterns. Br Educ Res J. 2025; 51 (1): 154–80. doi: 10.1002/berj.4068
9. Yan L, Sha L, Zhao L, Li Y, Martinez-Maldonado R, Chen G, et al. Practical and ethical challenges of large language models in education: a systematic scoping review. Br J Educ Technol. 2024; 55 (1): 90–112. doi: 10.1111/bjet.13370
10. Miao F, Holmes W. Guidance for generative AI in education and research. Paris, France: UNESCO; 2023.
11. Hacker P, Mittelstadt B, Borgesius FZ, Wachter S. Generative discrimination: what happens when generative AI exhibits bias, and what can be done about it. arXiv. 2024. doi: 10.48550/arXiv.2407.10329
12. Kwak Y, Pardos ZA. Bridging large language model disparities: skill tagging of multilingual educational content. Br J Educ Technol. 2024; 55 (5): 2039–57. doi: 10.1111/bjet.13465
13. Cotton DRE, Cotton PA, Shipway JR. Chatting and cheating: ensuring academic integrity in the era of ChatGPT. Innov Educ Teach Int. 2023; 61 (2): 228–39. doi: 10.1080/14703297.2023.2190148

14. Perkins M. Academic integrity considerations of AI large language models in the post-pandemic era: ChatGPT and beyond. J Univ Teach Learn Pract. 2023; 20 (2): 1–24. doi: 10.53761/1.20.02.07
15. Rudolph J, Tan S, Tan S. ChatGPT: bullshit spewer or the end of traditional assessments in higher education? J Appl Learn Teach. 2023; 6 (1): 342–63. doi: 10.37074/jalt.2023.6.1.9
16. Messeri L, Crockett MJ. Artificial intelligence and illusions of understanding in scientific research. Nature. 2024; 627 (8002): 49–58. doi: 10.1038/s41586-024-07146-0
17. Resnick M. Generative AI and creative learning: concerns, opportunities, and choices. An MIT Exploration of Generative AI. 27 March 2024. doi: 10.21428/e4baedd9.cf3e35e5
18. Rus V, Kendeou P. Are LLMs actually good for learning? AI Soc. 2025; 40 (7): 5617–8. doi: 10.1007/s00146-025-02323-9
19. Ferrara E. GenAI against humanity: nefarious applications of generative artificial intelligence and large language models. J Comput Soc Sci. 2024; 7 (1): 549–69. doi: 10.1007/s42001-024-00250-1
20. Roe J, Perkins M, Furze L. Deepfakes and higher education: a research agenda and scoping review of synthetic media. J Univ Teach Learn Pract. 2024; 21 (10): 1–22. doi: 10.53761/2y2np178
21. Stenalt MH, Lassesen B. Does student agency benefit student learning? A systematic review of higher education research. Assess Eval High Educ. 2022; 47 (5): 653–69. doi: 10.1080/02602938.2021.1967874
22. Inouye K, Lee S, Oldac YI. A systematic review of student agency in international higher education. High Educ. 2023; 86 (4): 891–911. doi: 10.1007/s10734-022-00952-3
23. Campbell E. Teacher agency in curriculum contexts. Curric Inq. 2012; 42 (2): 183–90. doi: 10.1111/j.1467-873X.2012.00593.x
24. McGivney E. Interactivity and identity impact learners' sense of agency in virtual reality field trips. Br J Educ Technol. 2025; 56 (1): 410–34. doi: 10.1111/bjet.13513
25. Ahn T. Learner agency and the use of affordances in language-exchange interactions. Lang Intercult Commun. 2016; 16 (2): 164–81. doi: 10.1080/14708477.2015.1125911
26. Xiao J. Learner agency in language learning: the story of a distance learner of EFL in China. Distance Educ. 2014; 35 (1): 4–17. doi: 10.1080/01587919.2014.891429
27. Vaughn M. What is student agency and why is it needed now more than ever? Theory Pract. 2020; 59 (2): 109–18. doi: 10.1080/00405841.2019.1702393
28. Chisholm JS, Alford J, Halliday LM, Cox FM. Teacher agency in English language arts teaching: a scoping review of the literature. Engl Teach Pract Crit. 2019; 18 (2): 124–52. doi: 10.1108/ETPC-05-2019-0080
29. Manyukhina Y, Wyse D. Learner agency and the curriculum: a critical realist perspective. Curric J. 2019; 30 (3): 223–43. doi: 10.1080/09585176.2019.1599973
30. Biesta G, Priestley M, Robinson S. The role of beliefs in teacher agency. Teach Teach. 2015; 21 (6): 624–40. doi: 10.1080/13540602.2015.1044325
31. Mercer S. Understanding learner agency as a complex dynamic system. System. 2011; 39 (4): 427–36. doi: 10.1016/j.system.2011.08.001
32. Blair DV. Learner agency: to understand and to be understood. Br J Music Educ. 2009; 26 (2): 173–87. doi: 10.1017/S0265051709008420
33. Hempel-Jorgensen A. Learner agency and social justice: what can creative pedagogy contribute to socially just pedagogies? Pedagog Cult Soc. 2015; 23 (4): 531–54. doi: 10.1080/14681366.2015.1082497
34. Rappa NA, Tang K. Student agency: an analysis of students' networked relations across the informal and formal learning domains. Res Sci Educ. 2017; 47 (3): 673–84. doi: 10.1007/s11165-016-9523-0
35. Yang Y, Chen Q, Yu Y, Feng X, Aalst J. Collective reflective assessment for shared epistemic agency by undergraduates in knowledge building. Br J Educ Technol. 2020; 51 (4): 1136–54. doi: 10.1111/bjet.12909

36. Rodriguez GM. Power and agency in education: exploring the pedagogical dimensions of funds of knowledge. Rev Res Educ. 2013; 37 (1): 87–120. doi: 10.3102/0091732X12462686
37. Moje EB, Lewis C. Examining opportunities to learn literacy: the role of critical sociocultural literacy research. New York, NY, USA: Routledge; 2007.
38. Dwivedi YK, Kshetri N, Hughes L, Slade EL, Jeyaraj A, Kar AK, et al. Opinion paper: "so what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. Int J Inf Manag. 2023; 71: 102642. doi: 10.1016/j.ijinfomgt.2023.102642
39. Dattathrani S, De' R. The concept of agency in the era of artificial intelligence: dimensions and degrees. Inf Syst Front. 2023; 25 (1): 29–54. doi: 10.1007/s10796-022-10336-8
40. Hwang G, Chen N. Editorial position paper: exploring the potential of generative artificial intelligence in education: applications, challenges, and future research directions. Educ Technol Soc. 2023; 26 (2): i–xviii. doi: 10.30191/ETS.202304_26(2).0014
41. Lashari AA, Umrani S. Reimagining self-directed learning language in the age of artificial intelligence: a systematic review. Grassroots. 2023; 57 (1): 92–114.
42. Lim WM, Gunasekara A, Pallant JL, Pallant JI, Pechenkina E. Generative AI and the future of education: Ragnarök or reformation? A paradoxical perspective from management educators. Int J Manag Educ. 2023; 21 (2): 100790. doi: 10.1016/j.ijme.2023.100790
43. Li B, Bonk CJ, Wang C, Kou X. Reconceptualizing self-directed learning in the era of generative AI: an exploratory analysis of language learning. IEEE Trans Learn Technol. 2024; 17: 1515–29. doi: 10.1109/TLT.2024.3386098
44. Poquet O, De Laat M. Developing capabilities: lifelong learning in the age of AI. Br J Educ Technol. 2021; 52 (4): 1695–708. doi: 10.1111/bjet.13123
45. Ng DTK, Tan CW, Leung JKL. Empowering student self-regulated learning and science education through ChatGPT: a pioneering pilot study. Br J Educ Technol. 2024; 55 (4): 1328–53. doi: 10.1111/bjet.13454
46. Darvishi A, Khosravi H, Sadiq S, Gašević D, Siemens G. Impact of AI assistance on student agency. Comput Educ. 2024; 210: 104967. doi: 10.1016/j.compedu.2023.104967
47. Roe J, O'Sullivan D, Arumynathan P, Kappen B. Paraphrase or plagiarism? Exploring EAP students' use of source material in a transnational university context. J Appl Learn Teach. 2024; 7 (2): 1–14. doi: 10.37074/jalt.2024.7.2.11
48. Kılıçkaya F, Kic-Drgas J. The future of tutoring: AI as an augmenting force. AI Soc. 2025; 40 (8): 6489–90. doi: 10.1007/s00146-025-02356-0
49. Freire P. Pedagogy of the oppressed. New York, NY, USA: Routledge; 1978.
50. Giroux HA. Rethinking education as the practice of freedom: Paulo Freire and the promise of critical pedagogy. Policy Futures Educ. 2010; 8 (6): 715–21. doi: 10.2304/pfie.2010.8.6.715
51. Rorabaugh P. Occupy the digital: critical pedagogy and new media. Hybrid Pedagogy. 6 August 2012. Available from: https://hybridpedagogy.org/occupy-the-digital-critical-pedagogy-and-new-media/
52. Masood MM, Haque MM. From critical pedagogy to critical digital pedagogy: a prospective model for the EFL classrooms. Saudi J Lang Stud. 2021; 1 (1): 67–80. doi: 10.1108/SJLS-03-2021-0005
53. Watters A. Maggie's digital content farm. In: jessifer, Friend C, Morris SM, editors. Critical digital pedagogy: a collection. Washington, DC, USA: Hybrid Pedagogy Inc.; 2020.
54. Morris SM, Stommel J. A guide for resisting edtech: the case against Turnitin. Washington, DC, USA: Hybrid Pedagogy Inc.; 2017.

55. Munn Z, Peters MD, Stern C, Tufanaru C, McArthur A, Aromataris E. Systematic review or scoping review?Guidance for authors when choosing between a systematic or scoping review approach. BMC Med Res Methodol. 2018; 18: 143. doi: 10.1186/s12874-018-0611-x
56. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. Int J Soc Res Methodol. 2005; 8 (1): 19–32. doi: 10.1080/1364557032000119616
57. Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): checklist and explanation. Ann Intern Med. 2018; 169 (7): 467–73. doi: 10.7326/M18-0850
58. Cox GM. Artificial intelligence and the aims of education: makers, managers, or inforgs? Stud Philos Educ. 2024; 43 (1): 15–30. doi: 10.1007/s11217-023-09907-2
59. Frøsig TB, Romero M. Teacher agency in the age of generative AI: towards a framework of hybrid intelligence for learning design. arXiv. 2024. doi: 10.48550/arXiv.2407.06655
60. Yang Y, Luo J, Yang M, Yang R, Chen J. From surface to deep learning approaches with generative AI in higher education: an analytical framework of student agency. Stud High Educ. 2024; 49 (5): 817–30. doi: 10.1080/03075079.2024.2327003
61. Yan L, Martinez-Maldonado R, Gasevic D. Generative artificial intelligence in learning analytics: contextualising opportunities and challenges through the learning analytics cycle. In: Proceedings of the 14th Learning Analytics and Knowledge Conference; 18–22 March 2024; Kyoto, Japan. 2024. p. 101–11. doi: 10.1145/3636555.3636856
62. Buckingham Shum S. Generative AI for critical analysis: practical tools, cognitive offloading and human agency. In: Joint Proceedings of LAK 2024 Workshops; 18–22 March 2024; Kyoto, Japan. 3667. 2024. p. 205–13.
63. Godwin-Jones R. Distributed agency in language learning and teaching through generative AI. Lang Learn Technol. 2024; 28 (2): 5–30. doi: 10.64152/10125/73570
64. Kumar PC, Cotter K, Cabrera LY. Taking responsibility for meaning and mattering: an agential realist approach to generative AI and literacy. Read Res Q. 2024; 59 (4): 570–8. doi: 10.1002/rrq.570
65. Han A, Zhou X, Cai Z, Han S, Ko R, Corrigan S, et al. Teachers, parents, and students' perspectives on integrating generative AI into elementary literacy education. In: Proceedings of the 2024 CHI Conference; 11–16 May 2024; Honolulu, HI, USA. New York, NY, USA: ACM; 2024. doi: 10.1145/3613904.3642438
66. Zhai X. Transforming teachers' roles and agencies in the era of generative AI: perceptions, acceptance, knowledge, and practices. J Sci Educ Technol. 2025; 34 (6): 1323–33. doi: 10.1007/s10956-024-10174-0
67. Fereday J, Muir-Cochrane E. Demonstrating rigor using thematic analysis: a hybrid approach of inductive and deductive coding and theme development. Int J Qual Methods. 2006; 5 (1): 80–92. doi: 10.1177/160940690600500107
68. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006; 3 (2): 77–101. doi: 10.1191/1478088706qp063oa
69. Proudfoot K. Inductive/deductive hybrid thematic analysis in mixed methods research. J Mix Methods Res. 2023; 17 (3): 308–26. doi: 10.1177/15586898221126816
70. Xu W, Zammit K. Applying thematic analysis to education: a hybrid approach to interpreting data in practitioner research. Int J Qual Methods. 2020; 19: 1609406920918810. doi: 10.1177/1609406920918810
71. Braun V, Clarke V. Toward good practice in thematic analysis: avoiding common problems and be(com)ing a knowing researcher. Int J Transgend Health. 2023; 24 (1): 1–6. doi: 10.1080/26895269.2022.2129597
72. Perkins M, Roe J. Academic publisher guidelines on AI usage: a ChatGPT supported thematic analysis. F1000Research. 2024; 12: 1398. doi: 10.12688/f1000research.142411.2

73. Perkins M, Roe J. Generative AI tools in academic research: applications and implications for qualitative and quantitative research methodologies. In: Handbook of artificial intelligence in higher education. Cheltenham, UK: Edward Elgar Publishing; 2025. p. 76–91. doi: 10.4337/9781035338764.00012
74. Boyatzis RE. Transforming qualitative information: thematic analysis and code development. Thousand Oaks, CA, USA: Sage Publications; 1998.
75. Roe, J. Generative AI as cultural artifact: applying anthropological methods to AI literacy. Postdigital Sci Educ. 2025; 7 (4): 1107–24. doi: 10.1007/s42438-025-00547-y
76. Bearman M, Tai J, Dawson P, Boud D, Ajjawi R. Developing evaluative judgement for a time of generative artificial intelligence. Assess Eval High Educ. 2024; 49 (6): 893–905. doi: 10.1080/02602938.2024.2335321
77. Boulus-Rødje N, Cranefield J, Doyle C, Fleron B. GenAI and me: the hidden work of building and maintaining an augmentative partnership. Pers Ubiquitous Comput. 2024; 28 (6): 861–74. doi: 10.1007/s00779-024-01810-y