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Redefining Educational Technology: A Critical Collaborative Inquiry

RESEARCH ARTICLES

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ABSTRACT

Educational technologists have not settled on a fixed definition of the field and likely never will. However, attempting to define the field helps to understand the epistemological meanings that shape what the field sees, values, and considers worth pursuing. Through a critical historical review spanning over a century, alongside theoretical engagement with the concepts of entanglement and distributed agency, this paper identifies three key insufficiencies in current educational technology frameworks. These are the persistence of an instrumental-facilitative paradigm that treats technology as a resource deployed by human agents; the theoretical dissolution of the pedagogy-technology dichotomy that existing definitions have not absorbed; and the near-total silence on generative and agentic artificial intelligence, systems that now function not as tools but as active co-participants in educational processes. In response, we propose a new definition: *Educational technology, as a field of inquiry and practice, encompasses the research, understanding, design, orchestration, and evaluation of entangled human-technological systems — spanning analog, digital, organizational, social, and agentic dimensions — through which learning and meaning-making are enabled, mediated, supported, and transformed. The field brings together researchers, practitioners, educators, communities, and institutions in ongoing efforts to study and improve educational experiences across formal, non-formal, and*

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informal contexts. The field holds as a core commitment that its theory, research and practice should be ethically grounded and critically reflexive — attending to the societal implications of technological integration, with particular concern for equity and the distribution of agency among all participants in educational processes. These commitments describe what the field aspires to, not a guarantee of how all its practice is enacted. This definition is offered not as a resolution but as a basis for ongoing discussion, as it is best understood as a living definition. The field's task is not to settle on a definition, but to keep it constantly evolving.

INTRODUCTION: EDUCATIONAL TECHNOLOGY AS A LIVING ENTITY

What does it mean to define a field? What happens when that definition lags behind the reality it is supposed to describe? The history of educational technology is, in large part, a history of definitional debate, a recurring attempt to capture in language a field of inquiry that perpetually outpaces its own description. Examining this history critically reveals not merely an evolution of terminology, but a deeper tension between what the field does, what it aspires to be, and how it chooses to represent itself to the world. Importantly, this paper does not treat definitional disagreement as a problem to be solved. A field in which all practitioners share a single, uncontested definition may be less intellectually alive than one in which definitions are continuously renegotiated. The aim here is not to end that debate but to contribute to it with greater theoretical rigour.

For decades, the field of educational technology (We use the word *field* as a working term throughout, while acknowledging that the disciplinary status of educational technology is itself contested; a productive tension the paper returns to in its conclusion) has operated within a predominantly human-centric framework: technology as a passive, manageable resource, selected, deployed, and controlled by human practitioners in the service of learning (Anderson & Rivera-Vargas, 2020). This framing, however intuitive, is increasingly difficult to sustain. As we move deeper into a digitally intensive era increasingly pervaded by artificial intelligence, the systems that populate educational environments go well beyond simply reacting to human input; they sequence content, generate feedback, adapt to learner behavior, and shape educational experiences with a degree of autonomy that earlier definitions were not designed to accommodate.

We are, in this sense, operating in conditions that a growing body of scholarship describes as qualitatively different from earlier periods of human-technology interaction. Scholars working in posthumanist and complexity traditions have proposed the concept of *entanglement* (Barad, 2007; Fawns, 2022) to describe the condition in which human agency and technological systems are so deeply intertwined that neither can be fully understood in isolation from the other: a theoretical position developed and examined in the sections that follow, and one that carries direct consequences for how the field defines itself. This is not to suggest that such entanglement is without precedent; humans have always been constitutively shaped by the tools they make and use (McLuhan, 1964).

What is distinctive about the present moment is not entanglement itself but its character: the scale of technological mediation, the speed at which AI systems adapt and influence behavior, and the emergence of systems capable of generating, evaluating, and adapting content with a degree of autonomy that earlier tools did not possess. These shifts raise a question the field can no longer defer: if our definitions were constructed for a world in which humans managed tools, do they remain adequate for a world in which those tools increasingly shape, mediate, and co-design the human experience of learning? The answer, or the unsettling lack of one, is the catalyst for this re-examination.

We are collectively attempting to build the future of education using a conceptual vocabulary that was constructed for a world of human-managed tools; a vocabulary that has not kept pace with the reality it now seeks to describe. From this perspective, this paper asks: what definition of educational technology is adequate to the sociotechnical conditions of the postdigital present, and what theoretical and historical work is required to justify it?

This paper makes three contributions to the field. First, it offers a critical historical synthesis of AECT definitions read through the lens of entanglement theory, revealing the persistent structural assumptions that successive definitions have reproduced. Second, it provides an empirically grounded account of convergent expert understanding of the field, drawn from the contributed definitions of 26 international scholars. Third, it proposes a revised definition that names entanglement, distributed algorithmic agency, and agentic AI as constitutive dimensions of educational technology in the postdigital present.

Before moving on to the other sections, a note on terminology is warranted here. 'educational technology' and 'edtech' are sometimes treated as synonymous, but the two terms do not always carry the same meaning. Educational technology, in its broadest sense, refers to the full field of research and practice encompassing analog, digital, organizational, and social dimensions of technology in education (Hlynka & Jacobsen, 2010; Januszewski & Molenda, 2013; Luppicini, 2005). Edtech, by contrast, is more commonly used to refer to the narrower sub-field concerned specifically with digital and electronic systems — platforms, applications, and tools — and the commercial and institutional ecosystem surrounding them (Lakhana, 2014; Selwyn, 2022). Throughout this paper, we use 'educational technology' when referring to the field in its full scope, and 'edtech' when the discussion pertains specifically to digital technologies and their particular challenges and affordances.

METHODOLOGY: COLLECTIVE WRITING AS SCHOLARLY INQUIRY

This paper follows a qualitative research paradigm, employing collective writing as its primary method of inquiry (Gale & Bowstead, 2013). This methodological choice is not incidental; it is a statement about how knowledge in a field as contested and rapidly evolving as educational technology ought to be produced.

Collective writing resists the tendency toward singular authoritative voices (Bozkurt, 2024). No single scholar, however experienced, can fully account for the breadth of contexts, disciplines, and lived realities that educational technology now encompasses. Definitions produced in isolation risk reflecting the blind spots of their authors: cultural assumptions, disciplinary boundaries, and institutional positions that go unexamined precisely because they are uncontested. Collective writing exposes these tensions, allowing diverse ideas to merge into a more critically examined and coherent whole (Jandrić et al., 2023; Peters et al., 2021), and promotes knowledge creation through sustained collaborative discourse (Burns et al., 2023).

The importance of a collective stance in this work cannot be overstated. Bringing creative and critical minds together in collective inquiry consistently yields insights that surpass individual capacities (Huijser et al., 2024). Collaborated and co-created discourses minimize the limitations inherent in any single perspective while amplifying collective strengths through critical exchange (Bozkurt et al., 2024).

In this study, contributors were invited based on their expertise and publication records in educational technology research. Each was asked to provide a brief working definition of educational technology, along with their interpretation of technology more broadly, the definitions they frequently draw on, and the scholarly references that most inform their thinking. A total of 26 participants responded. Their contributions were subjected to thematic analysis, identifying convergent and divergent patterns across definitions and surfacing the areas of consensus and productive disagreement that ultimately shaped the proposed definition.

In a (multi-)discipline as consequential as educational technology, one that influences how millions of learners engage with knowledge and institutions, the responsibility to set a principled and inclusive agenda is imperative. This necessity arises because the field no longer operates within a simple relationship of use between humans and tools, but within entangled human-technological systems that exert significant influence over the learning experience. This paper embraces that responsibility by grounding its proposed definition in the collective wisdom of experts across the field, rather than in the authority of any single voice. Before arriving at that definition, the paper moves through two preparatory stages: a theoretical framework that establishes how technology and educational practice are understood, and a critical historical review of how the field has defined itself across six decades. Readers may find it useful to know that these two sections are deliberately sequenced to build on one another; the historical record both motivates and tests the theoretical claims.

At a moment when the definition of educational technology, and especially its edtech subset, is being shaped largely by external forces, the deliberate act of bringing together a community of scholars to co-construct meaning is both a methodological and a political decision. This approach also aligns with the paper's theoretical stance: a study of distributed agency is methodologically strengthened through distributed authorship.

THE MULTI-DIMENSIONAL NATURE OF TECHNOLOGY

The theoretical framework developed in this section lays that groundwork; it is best read alongside the critical historical review that follows, as the history both illustrates and complicates the theoretical claims made here.

A credible redefinition of educational technology requires first establishing what we mean by *technology* itself: a term whose default association with digital devices obscures a far broader and more consequential reality (Dron, 2022). Hughes (2004), for instance, argued more than two decades ago that "technology is messy and complex. It is difficult to define and to understand. In its variety, it is full of contradictions, laden with human folly, saved by occasional benign deeds, and rich with unintended consequences" (p. 1). It is particularly these unintended consequences that create the need for evolving definitions.

Philosophy of technology has two main traditions: a humanistic tradition which critically examines technology's impact on society and culture, and an analytic tradition which focuses on the nature of design, artifacts, and engineering practice. Key debates include whether technology is value-neutral or inherently value-laden (Feenberg, 1991; Winner, 1980), how responsibility should be attributed when technologies cause harm (Jonas, 1984), and how ethical considerations can be built into the design process (Vallor, 2016). Technology thus reflects the tendency of our species to reshape the world according to human interests (Franklin, 1999).

Rather than being just a collection of tools, platforms and gadgets, technology can be understood as the "orchestration of phenomena for some purpose" (Arthur, 2009, p. 51). Mesthene (1970), for instance, viewed technology as the organization of knowledge for the achievement of practical purposes. Kelly (2010) has further suggested that technology is not merely a thing but also a verb, a process of intentionally organizing mental or physical 'stuff' to achieve specific ends. In this view, technology is the way we do things, encompassing any regularized structuring of objects and concepts to fulfil human intent (Dron, 2022).

TECHNOLOGICAL EVOLUTION AND CONFIGURATION

No technology exists in isolation from the others that made it possible. Each functions as part of a broader system of mutually constitutive layers; built upon prior technologies, embedded in social and institutional contexts, and meaningful only in relation to the human practices and purposes that animate it (Dron, 2022; Fawns, 2022). Most modern technologies are built upon and from others, creating an unbroken chain of evolution that extends from primitive tools to the dawn of language and into the digital age (Bozkurt, 2020; Dron, 2022). This evolutionary process is both combinatorial and dialectical: new technologies emerge from the adjacent possible enabled by existing systems (Kauffman, 2019), while simultaneously transforming the conditions that made them possible. The printing press, for instance, did not merely add a new tool to an existing landscape; it reorganized literacy, authorship, and institutional knowledge in ways that made entirely new technologies, practices, and social formations thinkable. Similarly, the internet did not simply extend the reach of existing educational resources; it restructured the relationships between learner, teacher, and knowledge that earlier technologies had stabilized.

In all, any given technology is more than the sum of its parts, representing a situated combination of relations embedded within broader cultural and institutional infrastructures (Fawns, 2022). Every invention serves as a cultural artifact that reflects the specific social priorities and historical context of its era (Selwyn, 2010). This historical depth is critical to acknowledge, as educational technology predates the digital computer by millennia, originating in the long-standing relations between materials, media, and the act of learning (Bozkurt, 2020; Goodyear, 2023).

THE DICHOTOMY OF HARD AND SOFT TECHNOLOGIES

A useful, if provisional, distinction in the nature of technology lies between *hard* and *soft* forms (Bozkurt, 2020; Dron, 2022). These are not fixed binary categories but situated ones: the same technology may function as hard for one person and soft for another, depending on their role, expertise, and context. They are better understood as poles of a continuum than as mutually exclusive types, and in practice, most educational technologies combine elements of both.

- Soft Technologies: These encompass intangible processes, practices, methods, conceptual frameworks, and theories (Bozkurt, 2020). Their defining trait is not immateriality but malleability; the absence of a fixed, pre-determined output that must be reproduced exactly. This openness may invite creativity and idiosyncratic enactment, but it does not guarantee it: methods can be followed slavishly, and frameworks applied without adaptation or critical thought (Dron, 2022). Soft technologies can also generate hard ones; semiotics and linguistic theory, themselves soft technologies, provided the conceptual foundations from which large language models were eventually constructed (Dron, 2022; Fawns, 2022).
- Hard Technologies: These are characterized not primarily by their materiality but by the degree to which they pre-orchestrate human behavior; constraining the range of actions available to participants and requiring conformity to a predetermined sequence or structure in order to function as intended (Dron, 2022). A computer operating system, an exam rubric, and a factory production line are all hard technologies in this sense, despite differing enormously in their physical form. Hardness, however, is no less situated than softness: a production line is hard for the worker constrained by its rhythm but soft for the engineer who designs and reconfigures it; a legal framework is experienced as hard by those subject to it and soft by the legislators who draft it (Dron, 2022).

Historical examples illustrate not the divide between these categories but the complexity of their relationship: language and alphabets are foundational soft technologies that enabled the hard technologies of print, standardized orthography, and eventually digital encoding (Bozkurt, 2020; Dron, 2022). The printing press, often cited as a paradigmatic hard technology, itself depended on and transformed the soft technologies of literacy, authorship, and scholarly convention. Flexible norms solidify into laws; pedagogical intuitions crystallize into curricula; and in each case, what began as soft becomes progressively harder as it is institutionalized, standardized, and enforced (Dron, 2022).

ENTANGLEMENT AND COPARTICIPATION

The relationship between humans and technology is one of profound entanglement rather than simple usage (Barad, 2007; Fawns, 2022). This is not a new condition. Humans have always been constitutively shaped by the technologies they make and use; language, writing, pedagogy, and print are no less technological than the digital systems that tend to dominate contemporary discussion (McLuhan, 1964). From this perspective, technology is not something external to human experience but fundamental to it: humans are not merely users of technologies but co-participants in their orchestration, and intelligence itself is distributed across the tools, practices, and social arrangements through which we act in the world (Dron, 2022; Salomon, 1997).

This view is not without its critics, and their concerns deserve acknowledgment rather than dismissal. Thinkers in the humanist tradition, including Hans Jonas, Jaron Lanier, and advocates of Digital Humanism, argue that maintaining meaningful distinctions between human agency and technological systems is both possible and ethically necessary, and that collapsing those distinctions risks obscuring human responsibility and dignity (Fuchs, 2022; Hayles, 1999; Jonas, 1984; Lanier, 2010). These are legitimate concerns, and this paper does not dismiss them. What the entanglement perspective offers, however, is not a dissolution of human responsibility but a more precise account of where it is located: not in a human subject who stands apart from technology and manages it, but in the ongoing, relational process through which humans and technologies co-constitute the conditions of learning and meaning-making (Dron, 2022; Fawns, 2022).

What is distinctive about the present moment is not entanglement itself but its character and scale. The emergence of generative and agentic AI systems, capable of generating, evaluating, and adapting content with a degree of autonomy that earlier tools did not possess, represents a qualitative shift that earlier complexivist accounts (Davis & Sumara, 2006), from Communities of Practice (Lave & Wenger, 1991) to Distributed Cognition (Salomon, 1997) to Heutagogy (Hase & Kenyon, 2000) to Connectivism (Siemens, 2005) and Rhizomatic Learning (Cormier, 2008), anticipated in structural terms but could not have fully foreseen in their specific manifestations. This is especially consequential in today's postdigital reality, a condition in which digital technologies are so deeply embedded in everyday life that the distinction between *digital* and *non-digital* has become effectively meaningless (Jandrić et al., 2018), and in which the boundaries between human agency and algorithmic influence are becoming increasingly difficult to distinguish, let alone govern.

It is essential to recognize that technology is never morally or value-neutral (Dron, 2022), and every technology has its potential virtues as well as its flaws. All technologies embody the beliefs, power structures, and biases of their creators and the social systems in which they are embedded (Fawns, 2022; Winner, 1980), yet any of them can become components of others that subvert or extend their designers' intent. The number of possible uses for a screwdriver, from a weapon to a paint stirrer, is, as Kauffman (2019) puts it, unprestatable and indefinitely large, meaning we cannot in principle enumerate all the possible uses in advance. Thus, technology holds the potential to either reinforce or challenge existing power structures and inequities (Feenberg, 1991). As we move toward more agentic and smart systems, the vast potential of groundbreaking technology demands greater vigilance and prudence from humans (Bozkurt, 2023). Understanding these ethical entanglements is as vital as understanding their technical functionality (Fawns, 2022), bearing in mind that should any mishaps transpire, the responsibility ultimately lies with us, the creators. After all, "if to err is human, so too is it inherent in machines, as we create technology in our own image" (Bozkurt, 2023, p. 201).

THE DEFINITION OF EDUCATIONAL TECHNOLOGY: A CRITICAL HISTORICAL REVIEW

This review focuses primarily on formal definitions produced by the Association for Educational Communications and Technology (AECT), which represent the most widely cited and institutionally endorsed attempts to define the field. We acknowledge that this focus reflects a North American institutional bias, and that other national, regional, and non-institutional definitions exist. This limitation is taken up in the conclusion.

As documented in the related literature (Ely, 1963; Januszewski, 2001; Reiser, 2001a; Reiser, 2001b; Reiser & Ely, 1997), the shifting vocabulary of formal definitions has historically mirrored the technological and intellectual climate of each era, with each successive definition marking a genuine shift in how the field understood its own purpose and boundaries.

THE EARLY ERA: VISUAL INSTRUCTION AND INSTRUCTIONAL MEDIA (1920s–1950s)

The earliest formal roots of the field lie in the visual instruction movement of the early twentieth century, in which media such as slides, photographs, and motion pictures served as supplementary delivery vehicles alongside the teacher and the textbook (Reiser, 2001a). By the 1920s and 1930s, radio broadcasting and sound recordings added momentum to the audiovisual instruction movement, though technology remained strictly product-oriented; what you could see, hold, and point to (Januszewski & Persichitte, 2008; Reiser, 2001a). This paradigmatic commitment would overshadow the field for decades, eerily anticipating the device-fetishism of contemporary edtech markets.

THE FIRST FORMAL DEFINITIONS: FROM TOOLS TO SYSTEMS (1960s–1970s)

> *Audiovisual communications is the branch of educational theory and practice concerned with the design and use of messages which control the learning process* (Ely, 1963).

> *Educational technology is a field involved in the facilitation of human learning through the systematic identification, development, organization and utilization of a full range of learning resources and through the management of these processes* (Ely, 1972).

> *Educational technology is a complex, integrated process involving people, procedures, ideas, devices and organization for analyzing problems and devising, implementing, evaluating and managing solutions to those problems involved in all aspects of human learning* (AECT, 1977).

A pivotal shift occurred in 1963 when the Department of Audiovisual Instruction's (DAVI) first official definition departed from 'things' toward the design and use of messages to shape learning; the first time learning, rather than teaching, became the focus (Reiser & Ely, 1997). Yet, its behavioral emphasis, most visible in the word 'control,' generated immediate discomfort; many practitioners quietly substituted 'facilitate,' a small lexical adjustment signaling a profound philosophical unease (Ely, 1983). The Commission on Instructional Technology (1970) produced two definitions simultaneously: one media-oriented, one process-oriented, an awkward necessity that revealed how fractured the field's self-understanding had become. The 1977 AECT definition did not resolve definitional tensions so much as document their complexity, describing educational technology as a multi-faceted, integrated process involving people, procedures, ideas, devices, and organization across all aspects of human learning (AECT, 1977; Richey et al., 2008). Systems thinking had arrived, but, as Ely (1983) observed, the 1977 AECT definition required readers to hold together sixteen distinct component elements before any coherent meaning emerged; a formulation of considerable analytical ambition, though one that proved difficult to translate into professional practice.

THE MOVE TO INSTRUCTIONAL TECHNOLOGY (1990s)

> *Instructional technology is the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning* (Seels & Richey, 1994).

The 1994 AECT definition (Seels & Richey, 1994) favored the term instructional technology over educational technology; a shift that narrowed the field's scope toward designed instruction and away from broader educational purposes (Januszewski & Persichitte, 2008). Notably, the term 'systematic' which had featured in the 1977 AECT definition (AECT, 1977) to emphasize step-by-step, linear instructional design processes, was deliberately excluded. As Januszewski and Persichitte (2008) document, this omission signaled an epistemological turn toward constructivism, which resisted the implication that learning follows predictable, predetermined sequences. Nevertheless, the era was still criticized for being too prescriptive and insufficiently attentive to the social and cultural contexts of technology use (Januszewski & Persichitte, 2008; Luppicini, 2005). Reiser and Ely (1997) offered the enduring reminder that definitions are neither true nor false; they are conventions whose utility is tied to the contexts in which they operate. Luppicini (2005) pushed this further, arguing for a systems definition that explicitly situated the field within broader social, cultural, and environmental contexts, positioning educational technology not as a service profession for instruction but as a change-making enterprise with social and political responsibilities.

ETHICAL PRACTICE AND PERFORMANCE (2008–2017-2023)

The 2008 Definition

> *Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources* (AECT, 2008).

The 2008 AECT definition (AECT, 2008), described and critically assessed in Richey et al. (2008), returned to the term 'educational technology', defining it as the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources. Two elements distinguished it from its predecessors: the explicit inclusion of ethics and the phrase 'improving performance.' The former was long overdue, a formal acknowledgment that technology does not operate in a value-neutral space

and that practitioners bear responsibilities extending beyond effectiveness (Richey et al., 2008). The latter, however, introduced a tension that the definition never fully resolved: performance improvement carries a behaviorist and human performance technology heritage that sits uneasily alongside the facilitation language elsewhere in the same sentence. As Luppicini (2005) has argued, the inclusion of performance improvement as a goal of educational technology reflects a broader tendency within the field to privilege measurable, externally defined outcomes; a tendency that critics have read as subordinating learning to accountability frameworks rather than treating it as an end in itself (Januszewski & Persichitte, 2008; Reiser & Ely, 1997). Richey et al., (2008) welcomed the definition's openness as an invitation for diverse instructional philosophies to coexist within a shared professional identity, and meanwhile, they offered measured historical perspective, noting that each successive definition had been appropriate for its time. Richey et al. (2008), however, raised a pointed concern: by substituting "creating" for the more established language of design, development, and evaluation, the definition risked erasing the field's core competencies under the cover of philosophical inclusivity. Most critically, the 2008 definition remained firmly within a paradigm in which technology is a resource managed by human agents; a paradigm that could not anticipate the distributed agency of modern artificial intelligence or the postdigital reality (Bozkurt, 2024; Jandrić et al., 2018) in which technology is no longer an external instrument but an entangled dimension of the human condition (Luppicini, 2005).

The 2017 Definition

> *Educational technology is the study and ethical application of theory, research, and best practices to advance knowledge as well as mediate and improve learning and performance through the strategic design, management and implementation of learning and instructional processes and resources* (AECT, 2017).

The 2017 AECT definition (AECT, 2017) served as a transitional refinement rather than a paradigmatic departure, describing educational technology as the study and ethical application of theory, research, and best practices to advance knowledge and improve learning through the strategic design and management of educational resources. Its most meaningful contribution was the shift from 'ethical practice' to 'ethical study and application', a subtle, however, significant move that positioned ethics as relevant not only to professional conduct but to the research and theoretical dimensions of the field as well (Heggart et al., 2025). The addition of 'theory, research, and best practices' also broadened the epistemological base of the definition, acknowledging that the field draws on a body of knowledge rather than merely a set of professional competencies. Nevertheless, the 2017 definition remained anchored to the same underlying assumption as its predecessor: that technology is something human practitioners select, deploy, and control in the service of learning; a view we refer to throughout this paper as the instrumental-facilitative paradigm. The phrase 'strategic design and management of educational resources' preserved the assumption that technology is something human practitioners deploy and control; an assumption that was already becoming difficult to sustain in a landscape of adaptive learning systems, algorithmic recommendation engines, and data-driven instructional platforms (Bozkurt, 2020). Like the 2008 definition, it treated the pedagogy-technology relationship as a purposeful human application rather than a mutual entanglement, and it did not attempt to account for the sociocultural embeddedness of technological practice or the structural inequities that technology routinely reproduces in educational contexts (Fawns, 2022; Luppicini, 2005).

The 2023 Definition

> *Educational technology is the ethical study and application of theory, research, and practices to advance knowledge, improve learning and performance, and empower learners through strategic design, management, implementation, and evaluation of learning experiences and environments using appropriate processes and resources* (AECT, 2023; Heggart et al., 2025).

The most recent attempt to formally redefine the field, documented by Heggart et al. (2025), culminated in a definition approved by the AECT Board of Directors in October 2023. The process through which this definition was developed, a structured survey of 140 AECT members,

qualitative coding, and iterative committee deliberation, was methodologically transparent and represents a genuine effort to ground definitional work in the perspectives of practitioners and researchers across the field (Heggart et al., 2025).

The definition contains several notable advances over its predecessors. The addition of 'empower learners' as an explicit goal marks a meaningful philosophical shift, moving the field's stated aims beyond the facilitation of pre-specified outcomes toward a conception of education as a practice oriented toward learner agency and self-determination (Heggart et al., 2025). The expansion of scope to encompass learning experiences and environments, rather than merely processes and resources, edges the definition toward the concerns of Learning Experience Design (LXD) (Schmidt et al., 2024; West & Allman, 2021) and acknowledges that what matters is not only cognitive outcome but the phenomenological texture of the learning encounter. The explicit foregrounding of 'implementation and evaluation' alongside design and management also addresses a longstanding gap, since earlier definitions had consistently privileged the design phase at the expense of deployment and iterative assessment.

Nevertheless, the 2023 definition reproduces a tension it inherits from 2008. Since at least the 1990s, formal definitions of educational technology have operated within what this paper terms the instrumental-facilitative paradigm; the assumption that technology is something human practitioners select, deploy, and control in the service of learning, with the field's role being to optimize that process (Januszewski & Persichitte, 2008; Luppicini, 2005). Within this paradigm, 'improving performance' and 'empowering learners' can coexist as aspirations, but the epistemological gap between them is never resolved: the former presupposes externally measurable standards against which performance can be assessed, while the latter implies learner-defined purposes that may resist institutional metrics entirely (Luppicini, 2005; Richey et al., 2008).

More consequentially, the 2023 definition is silent on artificial intelligence. Heggart et al. (2025) acknowledge generative AI as a significant new influence on the field, yet the approved definition contains no reference to it, nor to algorithmic mediation, agentic systems, or automated decision-making in educational contexts. This is not a minor omission. The definition was approved in October 2023, nearly a year after generative AI had entered widespread educational use, and at a moment when agentic AI systems were beginning to function not as tools deployed by human practitioners but as active participants in the learning process, sequencing content, generating feedback, and shaping learner pathways with a degree of autonomy that no prior definition had been designed to accommodate. A field that defines technology as 'appropriate processes and resources' to be studied and applied by human agents cannot, within that framework, adequately account for systems that increasingly study, apply, and adapt themselves.

JUSTIFYING THE NEED FOR AN UPDATED DEFINITION

Taken together, the historical evolution and contemporary critiques reveal a field in persistent, productive tension; between technology as tool and technology as process, between learning and performance, between efficiency and ethics, and between institutional definition and lived practice. The historical trajectory reveals a field characterized by a persistent conceptual lag, in which formal definitions have consistently functioned as reactive attempts to theorize technological developments that had already altered the educational landscape. This is evidenced by the field's shifting focus, moving from a medium-centric focus on media in the 1920s to the systems thinking of the 1970s and the performance improvement frameworks of the early 2000s, each marking a retroactive effort to align the field's purpose with the prevailing tools of the era. The historical record above demonstrates this pattern of conceptual lag: definitions consistently arriving behind the realities they seek to describe. What remains to be specified is why the present moment demands not reinterpretation of existing definitions but full redefinition, and on what grounds.

The 2008 framework was established before the rise of generative and agentic artificial intelligence, before widespread acceptance of the inextricable interdependence of pedagogy and technology, and at a nascent stage in the digital transformation of society. Even the most recent 2023 definition, while successfully capturing the spirit of learner empowerment and the

complexity of modern learning environments, still treats technology primarily as "appropriate processes and resources" to be "applied". As we move further into this decade, existing definitions are increasingly insufficient for at least three reasons:

- **Agency:** Traditional definitions assume a human-centric 'management' of tools, ignoring that modern technologies exercise what scholars have termed 'algorithmic agency' (Baker & Hawn, 2022); the capacity of algorithmic systems to make consequential decisions about content, pacing, feedback, and access without moment-to-moment human direction. We use this term not to suggest machines possess intentionality in the philosophical sense, but to name the functional capacity that their outputs shape learning in ways that are not fully transparent or controlled by any single human actor.
- **Entanglement:** Influential strands of current scholarship argue that legacy frameworks, which treat technology as an external resource selected and deployed by human practitioners, may no longer adequately capture how pedagogy and technology operate in practice. The concept of 'entangled pedagogy' (Fawns, 2022) proposes that pedagogical methods are deeply interdependent with the tools, media, and surrounding social, organizational, and operational systems with which they are embedded — a view that has gained considerable traction in the field (Barad, 2007; Dron, 2022), though one that not all researchers find equally compelling (Hayles, 1999; Jonas, 1984). What is broadly agreed, however, is that the relationships between human practitioners and technological systems are more complex, reciprocal, and consequential than earlier definitions have tended to acknowledge.
- **Societal Impact:** Earlier definitions focused heavily on efficiency and effectiveness, often neglecting the profound environmental, political, social, and ethical implications inherent in automated and data-driven educational systems.

As we stand in the first quarter of new millenium, contemporary definitions struggle to account for the distribution of cognitive work across human and machine participants; the moment at which generative and agentic AI ceases to function as a mere resource and becomes an active co-participant in shaping what and how learners encounter knowledge. The field now requires a definition that does not just empower learners to use appropriate resources but one that re-evaluates the very nature of learning in a state of postdigital symbiosis between humans and AI. It must fundamentally reconceive the relationship between technology, learning, and the human condition. It is reasonable to ask whether the developments described here require a full new definition, rather than a broader reading of existing ones, especially the 2023 AECT formulation. We argue that reinterpretation alone is not enough. Recent definitions can accommodate new examples, but they are ultimately organized around an instrumental logic in which educational technology is something human actors design and apply toward educational ends. What they do not fully capture is a sociotechnical reality in which technologies increasingly mediate, shape, generate, evaluate, and sometimes co-constitute educational activity. The issue is not simply that new technologies have appeared, but that existing definitions still view technology primarily as an object of human application rather than as part of an entangled and distributed field of educational action. For that reason, what is needed is not only reinterpretation, but redefinition. This is the task the present paper aims to undertake.

TOWARD A NEW DEFINITION: EXPERT VOICES AND EMERGING CONSENSUS

Before proposing a revised definition, it is necessary to examine the landscape of contemporary expert understanding, not as a set of competing claims to be adjudicated, but as a collective diagnostic that reveals where the field's definitional centre of gravity currently lies. The definitions contributed through this collective writing process represent a spectrum of epistemological commitments, disciplinary orientations, and contextual priorities, and it is from this productive plurality that a more adequate formulation must be distilled.

Several convergent themes emerge across the contributed definitions that are not adequately captured by any single existing formulation. First, and most consistently, contributors resist the conflation of educational technology with digital technology alone. As one contributor observed, the field encompasses "an entire technological spectrum, from foundational analog tools like books, pens, protractors, abacuses, and chalkboards to emerging digital

advancements like the LMS, adaptive learning systems, virtual reality, and artificial intelligence." This insistence on technological breadth reflects not nostalgia but principled resistance to the kind of device-fetishism that, as the historical review demonstrated, has repeatedly distorted both definitions and practices within the field (Reiser, 2001a). Another contributor similarly cautioned that "radio may be scalable edtech in low online connectivity settings," a reminder that technological appropriateness is always contextually determined rather than inherently indexed to novelty or complexity.

Second, multiple contributors articulate a conception of technology that aligns closely with Kelly's (2010) formulation of technology as orchestration; as process rather than product, verb rather than noun. One contributor proposed that educational technology is "more than a tool (digital or non-digital), it is a systematic practice of thinking and doing to support the fulfilment of an educational intent," while another framed it as "the purposeful use of tools, strategies, techniques, systems, or knowledge to enable and improve human learning." These formulations resonate with the theoretical groundwork established earlier in this paper: that technology is not a thing but a doing, and that educational technology is not a category of objects but a category of intentional, purposive relationships between humans, tools, and learning (Fawns, 2022). Particularly noteworthy is the inclusion of knowledge itself as a form of technology — consistent with the understanding of pedagogical frameworks as soft technologies developed earlier in this paper — suggesting that many contributors implicitly share the view that the pedagogy-technology dichotomy, as discussed above, may be less analytically useful than educational technology's formal definitions have assumed (Dron, 2022; Fawns, 2022). By categorizing pedagogical frameworks as 'soft technologies,' the field moves away from device-fetishism toward a holistic view where the 'orchestration' of mental processes is as much a technological act as the deployment of hardware.

Third, and perhaps most consequential for the present argument, several contributors explicitly foreground the problem of agency, both human and algorithmic. One contributor proposed classifying educational technologies according to "their interaction and human involvement level to achieve the intended goal," distinguishing passive technologies that "directly provide the solution" from active ones in which "the process is shared between the technology and the human." In this context, Huang et al. (2023) proposed four levels of interaction and complexity for human-machine collaboration in education. This taxonomy, while preliminary, begins to address what existing AECT definitions entirely fail to capture: that modern educational technologies are not simply resources that humans manage but systems that exert their own forms of influence, guidance, and constraint on the learner. Another contributor acknowledged this directly, noting that recent AI technologies "require careful (re-)consideration and clarity of what we are trying to achieve in the educational context and how the technologies used might serve that purpose"; a concern that resonates with broader critiques of the instrumental-facilitative model's adequacy for describing contemporary human-technology relationships (Fawns, 2022).

Fourth, contributors consistently emphasize the sociocultural embeddedness of educational technology, its inextricability from relationships, contexts, and power structures. One definition captures this with particular precision: "educational technologies are not defined by the artifacts themselves, but by how technologies are situated within educational purposes, relationships, and contexts. Any technology becomes an educational technology when it is used to mediate learning by extending cognition, supporting inquiry, fostering creativity, or shaping interactions among learners, educators, and knowledge within particular social and cultural settings." This sociocultural framing shifts the definitional question from what educational technology *is* to when technology *becomes* educational, a reorientation from ontology to praxis that has significant implications for how the field understands its own boundaries and responsibilities (Fawns, 2022; Luppicini, 2005). Put differently, educational technology is constituted not only by design or function, but by the social processes through which meaning, value, and purpose are negotiated in practice.

Fifth, the ethical dimension receives sustained attention across contributions, extending well beyond the procedural ethics of the 2008, 2017, and 2023 AECT definitions. One contributor explicitly positions educational technology as a force for social good, arguing that it should

"outwit contextual constraints, such as inequity, access, or engagement, by fostering more inclusive, participatory, and adaptive learning ecosystems." Another frames ethical grounding not as an external professional obligation but as constitutive of the field itself: without ethical considerations, the claim to educational purpose becomes hollow. These formulations suggest that the field is moving, however unevenly, toward a conception of ethics as structural rather than supplementary; as something that must be built into the definition of what educational technology *is*, not merely into codes of what educational technologists *must do*.

Finally, and directly relevant to the paper's central argument, several contributors register, explicitly or implicitly, the inadequacy of any definition that treats technology as a passive resource in the age of agentic artificial intelligence. One definition acknowledges AI as a tool "for adaptive learning" that "facilitates feedback-seeking" while also noting that algorithms "optimize problem-solving strategies", a description that already hints at an agency extending beyond passive resource management. Another contributor, offering what is perhaps the most syntactically compressed but conceptually rich formulation in the dataset, proposed that educational technology is "the organization of stuff, including pedagogical methods, to support learning," justifying this formulation on the grounds that it "acknowledges the massively distributed, co-participative nature of educational technology in which many, many individuals contribute to the overall assembly, most notably the learner who is the ultimate organizer of the stuff that has been organized to support their learning." This conception of distributed, co-participative organization, in which the learner is not a recipient but an active co-organizer of the technological system, anticipates precisely the post-humanist and entanglement-oriented framework that a contemporary definition must embrace (Bozkurt, 2024; Fawns, 2022).

A PROPOSED DEFINITION

Drawing on the critical historical review, the theoretical framework established in the earlier sections of this paper, and the convergent insights produced through collective expert engagement, we propose the following definition:

> *Educational technology, as a field of inquiry and practice, encompasses the research, understanding, design, orchestration, and evaluation of entangled human-technological systems — spanning analog, digital, organizational, social, and agentic dimensions — through which learning and meaning-making are enabled, mediated, supported, and transformed.*
>
> *The field brings together researchers, practitioners, educators, communities, and institutions in ongoing efforts to study and improve educational experiences across formal, non-formal, and informal contexts.*
>
> *The field holds as a core commitment that its theory, research and practice should be ethically grounded and critically reflexive — attending to the societal implications of technological integration, with particular concern for equity and the distribution of agency among all participants in educational processes. These commitments describe what the field aspires to, not a guarantee of how all its practice is enacted.*

This definition departs from its predecessors in several substantive ways that warrant explicit articulation. First of all, the phrase *entangled human-technological systems* replaces the instrumental language of 'processes and resources' that has persisted from the 1994 through the 2023 AECT definitions. It draws directly on Fawns' (2022) conception of entangled pedagogy, which argues that the human and the technological can no longer be meaningfully separated in contemporary educational practice (Barad, 2007; Fawns, 2022), and on Dron's (2022) framing of technology as a system of co-constitutive layers rather than a discrete set of tools. By foregrounding entanglement rather than management, the definition positions educational technology not as a domain in which human agents deploy tools toward pre-specified ends, but as a field concerned with the complex, mutually constitutive relationships between humans, technologies, and learning that characterise postdigital educational environments (Jandrić et al., 2018).

The inclusion of *agentic dimensions* alongside analog and digital technologies represents one of the more consequential departures from previous definitions. We use agentic systems as a working term to encompass AI and algorithmic systems that make autonomous or semi-autonomous decisions consequential for learning: including generative AI, adaptive learning platforms, discriminative AI, and social media algorithms. We acknowledge that the term is contested: critics note that current AI systems lack intentionality in any philosophically robust sense, and that describing them as agentic risks anthropomorphising what are ultimately statistical processes (Selwyn, 2022; Watson, 2019). The term is adopted here not as a settled theoretical claim but as a provisional and practical descriptor for systems whose influence on learning is consequential enough to demand definitional recognition, whatever label ultimately proves most accurate. The inclusion of agentic systems is intended to address that gap: to acknowledge that contemporary educational technology operates within a sociotechnical landscape in which algorithms, large language models, and adaptive systems function not only as instruments but increasingly as participants; co-shapers of learning experiences whose influence is neither neutral nor fully transparent (Dron, 2022; Fawns, 2022). It bears emphasis, however, that this inclusion does not redefine educational technology as primarily an AI concern. Analog, digital, organizational, and social dimensions remain central to the field; agentic systems are named because their omission from existing definitions creates a specific and consequential blind spot, not because they displace all other forms of educational technology.

The phrase *distribution of agency* addresses what the expert contributions identified as a fundamental tension in existing frameworks: the relationship between learner empowerment and institutional performance accountability. Rather than attempting to resolve this tension through inclusive language, as the 2023 definition does by juxtaposing 'improve learning and performance' with 'empower learners' yet without theoretical reconciliation, the proposed definition reframes it as a distributional question. Agency in contemporary educational technology is not located solely in the learner, the instructor, or the system, but is distributed unevenly across human and non-human participants in the learning systems (Dron, 2022; Fawns, 2022). Acknowledging this distribution does not dissolve the tension between empowerment and performance; it names the structural condition within which that tension plays out, which is a necessary precondition for addressing it responsibly.

The inclusion of *critically reflexive* practice responds to a persistent gap in existing definitions: the absence of any mechanism for the field to critique its own embeddedness in commercial platform logics and surveillance capitalism. Luppicini (2005) already argued, two decades ago, that the field must account for its value-laden, socially embedded character; this argument has become considerably more urgent in a landscape where the dominant platforms of educational technology are owned by corporations whose interests are not aligned with those of learners or educational institutions. A definition that positions the field as capable of critical reflexivity, not merely ethical practice, but active, ongoing critique of its own conditions of possibility, is a definition adequate to this challenge.

Finally, the definition's scope, *formal, non-formal, and informal contexts*, extends the field's reach beyond the institutional boundaries that have implicitly constrained most previous definitions, whose sampling from professional organizational membership has, as Heggart et al. (2025) acknowledged, tended to reflect the priorities of academic and formal educational communities. This extension is not merely a gesture toward inclusivity; it is a recognition that consequential learning mediated by technology in the contemporary world often occurs outside formal educational institutions, in contexts that existing definitions cannot adequately address. This expansion acknowledges that in a postdigital era, the most consequential technological mediations often occur in open, networked spaces that bypass traditional institutional gatekeeping.

It should, however, be noted that the proposed definition does not claim to be permanent. Reiser and Ely (1997) were correct that definitions are conventions, not truths, and that their utility is tied to the contexts in which they operate. What the present definition claims is adequacy to its very moment: a moment characterized by postdigital entanglement, distributed algorithmic agency, and the urgent need for a field to responsibly develop the critical vocabulary necessary to account for the full implications of its own practice.

LIMITATIONS

The definition proposed here carries several limitations that must be acknowledged directly. First, it is primarily inductive; derived from the observed emergence of generative and agentic AI and also current postdigital conditions. Unlike a deductive definition, which might rely on a priori principles as stable as a geometric proof, this formulation is tethered to the specific sociotechnical entanglements of its time. While this inductive approach ensures immediate utility and relevance to the current 'algorithmic turn' in education, it remains inherently vulnerable to the same obsolescence that affected prior frameworks as the underlying technology continues to evolve. This vulnerability is stressed out by historical discourse; historical data reveals that the term 'educational technology' effectively crystallized in the 1940s and surged in the 1960s, mirroring the rapid expansion of information and communication technologies. This highlights the necessity of treating any such definition not as a permanent structure, but as a provisional tool for navigating the present moment.

A second limitation concerns the methodology itself. The collective writing methodology, while deliberately chosen as a counter to singular authoritative voices, produces its own forms of bias: the voices gathered here, however, diverse in disciplinary orientation, still represent a particular stratum of academic expertise. The perspectives of learners, classroom educators, community practitioners, and policymakers, those most directly affected by how the field defines itself, are largely absent from this process (Huijser et al., 2024; Jandrić et al., 2023). A definition of educational technology that fails to adequately account for the full global diversity of educational contexts risks reproducing, under the banner of inclusivity, the same parochialism it seeks to transcend. This is not a failure unique to the present paper. It is a systemic limitation of how the field has historically organized its definitional work, but it is a limitation that any future attempt must address more directly and structurally than this one has been able to do.

It is also worth acknowledging that the proposed definition's density and theoretical ambition may limit its practical utility for the very practitioners it aspires to serve. Future work might therefore focus on developing practitioner-facing articulations of this framework, as companion efforts in application and interpretation that support its reach without compromising its theoretical integrity. This challenge is not unique to the present work: the 1977 AECT definition encountered the same tension between theoretical ambition and professional usability (Ely, 1983; Reiser & Ely, 1997). A definition organized around entangled human-technological systems and distributed algorithmic agency risks a parallel failure: legibility to researchers while remaining opaque to teachers, designers, and policymakers. The field has always faced this tension between theoretical precision and professional usability (Reiser & Ely, 1997; Richey et al., 2008), and the present proposal does not fully resolve it.

CONCLUSION: TOWARD A LIVING DEFINITION

This paper has argued that the history of educational technology is, at its core, a history of definitions that were adequate to their moment, and therefore, inevitably outpaced by the moments that followed. This is not a failure of scholarship; it reflects the enduring reality that the field has consistently proven more dynamic than any single attempt to describe it. From the audiovisual instruction movement of the 1920s to the agentic AI systems of the 2020s, every formal definition has arrived, to some degree, already behind the reality it sought to capture, and this, as Reiser and Ely (1997) observed, may be the condition of definitional work in any living field. As Gibson (1999) has noted, the future is already here; it is simply unevenly distributed, and the perspectives of edtech researchers on what counts as current are not always shared, even across the field itself. Paradigm shifts, moreover, do not occur all at once (Kuhn, 1962). The 1963 definition was superseded by the systems thinking of the 1970s; the 1994 definition was overtaken by the constructivist and networked learning movements it could not fully accommodate; the 2008 definition, for all its principled attention to ethics and facilitation, could not anticipate the collapse of the pedagogy-technology dichotomy or the growing presence of algorithmic systems in educational processes; though both developments were already emerging in nascent form in at least some corners of the field. Connectivism, for instance, with its networked view of cognition and its acknowledgment of non-human actors, had a foot in both worlds (Siemens, 2005). The 2023 AECT definition (Heggart et al., 2025), the most recent institutional attempt, represents a genuine philosophical advance in its emphasis

on learner empowerment and ethical study, and each of its predecessors was, in its own time, a meaningful contribution to the field's self-understanding. That it was approved in the same year that generative AI and then agentic AI entered widespread educational use (Crompton et al., 2026a, 2026b), and does not address that development, is less a criticism of the committee than a reminder of how quickly the landscape continues to shift (Bozkurt et al., 2024; Heggart et al., 2025).

The definition proposed in this paper is offered with awareness of this trajectory, and with appropriate humility about its own longevity. It is not a final answer. It is a contribution at a specific historical moment; a moment characterized by postdigital entanglement, distributed and non-human agency, and the urgent need for critical reflexivity toward the sociotechnical conditions within which education increasingly operates (Bozkurt et al., 2024; Dron, 2022; Fawns, 2022). If it succeeds, it will do so not by providing a permanent formulation but by equipping the field with a conceptual vocabulary adequate to its present condition: one that names entanglement, acknowledges agentic systems, and positions critical practice as constitutive of the field rather than supplementary to it.

More fundamentally, this paper resolves the question of whether the field can afford to continue defining itself within the instrumental-facilitative paradigm that has governed its self-understanding since at least the 1990s. It cannot. The emergence of generative and then agentic artificial intelligence, the entanglement of human cognition with algorithmic systems, and the progressive erosion of any meaningful boundary between designed technological environments and both the learners and educators they were designed to serve have rendered that paradigm not merely incomplete but actively misleading (Dron, 2022; Fawns, 2022). A field that defines itself as the ethical management of tools and resources cannot adequately grapple with systems that manage learners, institutions, and knowledge in return; systems that are, increasingly, not tools at all in any conventional sense but participants, co-designers, and in some cases, co-authors of the educational encounter. The proposed definition's explicit commitments to equity, distributed agency, and critically reflexive practice are not decorative additions to this framework. Rather, they are a direct response to this condition. Assemblage-oriented thinking has been critiqued for the risk of political impasse, for describing entanglement so thoroughly that responsibility becomes diffuse and action becomes difficult (Perrotta & Selwyn, 2020). These commitments are the definition's answer to that critique: an insistence that acknowledging complexity does not require abandoning accountability.

Educational technology is, ultimately, a living definition, not in the metaphorical sense that fields are dynamic, but in the poststructural sense that its meaning is constitutively incomplete, perpetually renegotiated at the intersection of technological change, pedagogical theory, social context, and ethical commitment. No institutional definition, however carefully constructed, can fully arrest this movement; and any definition that presents itself as having done so should be viewed with principled suspicion. The appropriate response to this condition is not definitional resignation (the abandonment of the project of shared meaning) but definitional humility: the willingness to treat every formal definition as an evolving framework rather than a permanent structure, useful for the work it enables and transparent about what it cannot yet hold. A living definition is not a definition without meaning. It retains sufficient stability to enable professional communication, scholarly reference, and institutional practice, while remaining open to revision as the conditions it describes continue to evolve. The openness we advocate is not relativism but responsiveness.

The task of the field is not to fix the definition once and for all, but to keep it open, responsive, and evolving: an act of continual redefinition, pursued rigorously, collectively, and critically, with sustained attention to the realities that each successive formulation inevitably fails to capture. In this sense—that critical inquiry never rests on its conclusions but returns to interrogate its own premises—the ongoing effort to define educational technology is itself a form of critical practice, and perhaps the field's most honest contribution to its own development.

DATA ACCESSIBILITY STATEMENT

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

SUSTAINABLE DEVELOPMENT GOALS (SDGs)

This study is linked to the following SDG(s): Quality education (SDG 4), Industry, innovation and infrastructure (SDG 9), and Partnerships for the goals (SDG 17).

ETHICS AND CONSENT

Because the researchers in this study reported their own opinions and used their own intellectual inputs as the primary data sources and were involved as co-authors in this collective study, ethical review was waived in this collective study.

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The foundational perspectives of Richard Clark and Robert Kozma provide a crucial baseline for the conceptual trajectory of this inquiry. Their landmark debate over the agency and utility of instructional media highlights a long-standing tension between an instrumental view of technology as a neutral delivery vehicle and a more systemic view of cognitive and environmental reciprocity. Revisiting this classic dialectic in the context of contemporary agentic and algorithmic systems demonstrates that the field's current shift toward postdigital entanglement is an evolution of these foundational questions—manifested today in a reality where the technological medium does not merely deliver content but actively participates in its co-construction.

The enduring insights of Marshall McLuhan complement this historical foundation, particularly his assertion that "we shape our tools and thereafter our tools shape us." His legacy serves as a vital critique of technological somnambulism, urging a deeper examination of how media structure human experience. In a postdigital reality where agentic systems do not merely extend human faculties but actively curate, generate, and co-constitute the environments of learning, this perspective compels a departure from the comfort of the instrumental myth. Engaging with this lineage reinforces the realization that understanding educational technology requires confronting the ways sociotechnical systems actively shape the human experience of meaning-making.

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The authors have no competing interests to declare.

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2026), complementing the human editorial process. The human authors critically assessed and validated the content to maintain academic rigor. The authors also assessed and addressed potential biases inherent in the AI-generated content. The final version of the paper is the sole responsibility of the human authors.

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