

From Teacher Tutelage to AI Assistance Rethinking Algerian Learner Autonomy in the Digital Age

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ABSTRACT:

The growing integration of artificial intelligence (AI) in education is reshaping traditional teaching roles and prompting renewed debates on learner autonomy. Whereas teachers were historically positioned as the primary source of knowledge and pedagogical authority, AI-driven systems now offer personalized learning trajectories, immediate feedback, and adaptive resources. Although these technologies appear to enhance flexibility and learner independence, they also introduce subtle forms of algorithmic regulation that influence learning through opaque design mechanisms. This study employed a qualitative, scoping review–informed design complemented by critical theoretical reflection to examine the transition from teacher-centered instruction to AI-assisted learning and its implications for student autonomy. Drawing on humanistic, constructivist, and socio-technical perspectives, it argues for a reconceptualization of autonomy in the digital age. Learner autonomy should extend beyond mere independence from teachers to include reflective awareness and critical engagement with both human and AI-mediated forms of support. The discussion identified possibilities for increased learner agency, noted the risks of illusory autonomy and reaffirmed the changing role of teachers as ethical guides. The article concluded that true learner autonomy is interconnected, hybrid, and requires critical literacy, necessitating not just self-management but also an understanding of algorithms awareness in order to navigate the complexities of AI-mediated education.

KEYWORDS: Learner Autonomy, AI- Assisted Education, Algorithmic Mediation, Critical Digital Literacy, Teacher–Student Relationships.

إعادة بناء مفهوم استقلالية المتعلم الجزائري في ظل الانتقال من التوجيه البشري إلى الدعم الذكي

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ملخص البحث

يُغيّر دمج الذكاء الاصطناعي في التعليم أدوار التدريس التقليدية، وي طرح تساؤلات هامة حول استقلالية الطالب. ففي السابق، كان يُنظر إلى المعلمين على أنهم المصدر الرئيسي للمعرفة والسلطة، حيث يوجهون الطلاب خلال عملية التعلم المنظم. أما الآن، فتُوفّر أدوات الذكاء الاصطناعي مسارات تعليمية مُخصصة، وموارد قابلة للتكيف. وبينما تُتيح هذه الميزات مزيدًا من المرونة والاستقلالية، فإنها تؤدي أيضًا إلى أنواع جديدة من التحكم الخوارزمي، الذي يؤثر بشكل غير مباشر على المتعلمين من خلال خيارات تصميم خفية. استخدمت هذه الدراسة تصميمًا نوعيًا قائمًا على مراجعة نطاقية، مدعومًا بتأمل نظري نقدي لفحص التحول من التعليم الذي يقوده المعلم إلى التعلم بمساعدة الذكاء الاصطناعي، مُسلطة الضوء على تأثيره على استقلالية الطالب. وتستند إلى منظورات إنسانية وبنائية واجتماعية تقنية لتُجادل بأنه في العصر الرقمي، ينبغي إعادة صياغة مفهوم استقلالية المتعلم. فبدلاً من أن تُفهم الاستقلالية على أنها مجرد استقلال عن توجيهات المعلمين، ينبغي أن تشمل وعي المتعلمين التأملي وفهمهم النقدي لأشكال الدعم التي يتلقونها، بما في ذلك تلك التي يُقدمها كل من الفاعلين البشريين والأنظمة الرقمية أو الذكية. حددت المناقشة إمكانات تعزيز دور المتعلم، وأشارت إلى مخاطر الاستقلالية الوهمية، وأكدت مجدداً على الدور المتغير للمعلمين كمرشدين أخلاقيين. وخلصت المقالة إلى أن الاستقلالية الحقيقية للمتعلم مترابطة ومتداخلة، وتتطلب معرفة نقدية، لا تقتصر على الإدارة الذاتية فحسب، بل تشمل أيضاً فهماً للخوارزميات للتغلب على تعقيدات التعليم المدعوم بالذكاء الاصطناعي.

الكلمات المفتاحية: استقلالية المتعلم، التعليم المدعوم بالذكاء الاصطناعي، الوساطة الخوارزمية، المعرفة الرقمية النقدية، العلاقات بين المعلم والمتعلم.

1. INTRODUCTION

The education sector is currently experiencing a profound transformation. For centuries, the relationship between teachers and learners has been characterized by a clear imbalance, in which teachers functioned as primary sources of knowledge, authority figures, and moral guides. Within conventional classroom environments, this dynamic often limited learners' autonomy, as teachers controlled curricular content, regulated the pace of learning, and determined assessment practices. Although such traditional models provided structure and stability, they generally left little room for self-directed exploration beyond the instructor's authority. With the rise of digital technologies and the recent integration of artificial intelligence (AI) into educational practices, however, the dynamics of knowledge production, mediation, and teacher–student relations are undergoing significant change.

The growing influence of artificial intelligence in education has generated both enthusiasm and concern. On the one hand, AI-driven technologies promise to empower learners by providing immediate feedback, personalizing learning resources, and reducing time and space constraints commonly associated with traditional classrooms. These developments suggest the emergence of a new phase in learner autonomy, in which students are increasingly able to navigate their own learning pathways and engage with complex bodies of knowledge in more flexible ways. From this perspective, AI appears to support greater independence, responsiveness, and learner control within educational environments. On the other hand, autonomy in AI-mediated learning contexts, introduces a range of conceptual and ethical challenges. The same systems designed to expand access and flexibility may, also, constrain learners through opaque algorithms and pedagogical assumptions that remain largely invisible. Consequently, learner autonomy in the digital age becomes paradoxical. While learners may gain distance from direct teacher control, they simultaneously become subject to algorithmic forms of guidance and monitoring. This tension calls for a redefinition of autonomy, not as mere independence from authority, but as a reflective, relational, and critically informed process developed through practice and interaction.

Against this backdrop, the present reflective study examines the evolving notion of learner autonomy in AI-driven educational contexts through three explicit research questions. First, how does the shift from traditional human tutelage to AI-assisted learning redefine the meaning and practice of learner autonomy in educational settings? Second, to what extent do AI technologies create genuine opportunities for self-directed learning, and what risks do they pose in fostering forms of pseudo-autonomy, where learner independence is shaped or constrained by algorithmic guidance and surveillance? Third, how are the roles and responsibilities of educators transformed in digital learning environments, and how can teachers ensure that learner autonomy remains authentic, ethical, and critically informed? Addressing these questions foregrounds the continued importance of educators as mentors, facilitators, and ethical guides within learning ecosystems increasingly mediated by artificial intelligence.

The article is structured around three main sections, each grounded in a critical review of the literature. The first section establishes the theoretical foundations of learner autonomy by tracing its historical development and situating it within contemporary pedagogical debates. The second section examines transformations in pedagogical guidance, contrasting traditional teacher-led models with the growing influence of AI-supported learning systems. The third section focuses on learner autonomy in AI-driven educational environments, critically assessing whether such technologies foster genuine self-directed learning or produce forms of pseudo-autonomy shaped by algorithmic governance. This discussion is complemented by a review of Algerian studies on digital literacy, student agency, and technology use in higher education, with particular attention to the

changing role of teachers and the importance of critical digital literacy as a prerequisite for sustainable autonomy.

In summary, this article explores the shift from traditional teacher-centred education toward AI-mediated learning, contributing to ongoing debates about the future of education in the digital age. Its objective is not merely to describe this transformation, but to critically examine its ethical and pedagogical implications. Rather than portraying AI as either a purely empowering force or a threat to educational integrity, the study adopts a balanced perspective that recognizes both its potential benefits—such as personalization and flexibility—and its risks, including algorithmic control and surveillance. Ultimately, the article redefines learner autonomy as a critical, relational competence developed through continuous interaction with both human and technological guidance, arguing that such autonomy is essential for effective learning and ethical participation in twenty-first-century, algorithm-driven societies.

2. Theoretical framework

This study examines how the shift from teacher-led guidance to AI-mediated learning reshapes the concept of learner autonomy by drawing on humanistic, constructivist, socio-technical, and post-humanist perspectives. Although these frameworks define autonomy in different ways, their intersections and tensions help explain how digital technologies transform learners' relationships with knowledge, authority, and support.

From a humanistic viewpoint, autonomy is understood as the learner's capacity for self-direction, responsibility, and personal growth (Holec, 1981; Little, 1991). This perspective emphasizes individual choice, intrinsic motivation, and reflective learning, positioning the learner as an independent agent. However, such an individual-centred view becomes limited in digitally mediated environments, where learning is increasingly shaped by networks and technological tools.

Constructivist theory addresses this limitation by conceptualizing autonomy as socially constructed through interaction, dialogue, and scaffolding (Piaget, 1952; Vygotsky, 1978). Rather than locating autonomy solely within the individual, constructivism highlights interdependence and collective meaning-making, raising questions about the balance between personal choice and social negotiation.

Socio-technical perspectives further extend autonomy into digital ecosystems. Connectivist approaches (Siemens, 2005) frame autonomy as the ability to navigate, evaluate, and connect information across distributed networks of people and technologies. Finally, post-humanist theories challenge human-centred assumptions by viewing autonomy as co-produced by learners, algorithms, and infrastructures (Bayne, 2015; Braidotti, 2019; Knox, 2020). Together, these perspectives position autonomy as a dynamic, relational, and technologically entangled practice in the digital age.

3. Literature Review

The present section takes a closer look at the concept of learner autonomy, relating it to the significant shifts happening in education in the digital age. It particularly emphasizes the move from traditional, teacher-centred approaches to more dynamic, AI-assisted learning environments. By blending insights from educational theory, technology studies, and contemporary debates about digital instruction, the review explores how the idea of autonomy is, actually, evolving. It begins with an examination of the historical foundations of autonomy within humanistic and constructivist frameworks, then transitions to socio-technical and post humanist perspectives that highlight the role of digital mediation and algorithms. Additionally, it looks into emerging research on *Generation Alpha*, whose formative learning experiences are heavily shaped by the omnipresence of technology and artificial intelligence. This review connects various aspects of literature to create a strong conceptual and empirical foundation for understanding how autonomy is formed, expanded, or limited in modern educational AI-enhanced environments.

3.1 Learner Autonomy Defined

The concept of learner autonomy has occupied a central position in educational theory, though its meaning and scope have evolved in response to broader cultural and technological transformations. Two overarching perspectives frame the development of the concept: classical perspectives on autonomy in education and autonomy in digital and networked.

From a traditional perspective, autonomy has been closely linked to humanistic and constructivist ideas that highlight the learner's ability to direct themselves, take personal responsibility, and engage reflectively in learning. In this context, autonomy is more than just the ability to learn on one's own; it is a developed attitude that enables learners to take charge of their objectives, methods, and assessments within organized educational environments. Holec (1981), in his seminal report for the Council of Europe, defines autonomy as “the ability to take charge of one’s own learning” (p. 3). This definition laid the foundation for many subsequent debates in pedagogy and theory. Initially, autonomy was seen mainly as an individual responsibility, closely tied to self-directed learning and independent study

During the 1990s, the concept of autonomy started to be viewed more broadly as a pedagogical principle rather than just a personal characteristic. Little (1991) points out that autonomy encompasses not only the learner’s ability to make choices but also the recognition from institutions that learners are active participants in their education. He argues, “the promotion of autonomy is not a method of language teaching but an educational goal that presupposes a particular view of learning and of learners” (p. 2). This shift placed autonomy at the heart of learner-centred education, aligning it with wider constructivist theories. In the 2000s, the concept continued to expand, thanks to the work of Benson (2011), who stresses that learner autonomy is not synonymous with isolation; rather, it is often realized through interaction. He notes, “Autonomy should be understood not only in terms of individual freedom, but also in relation to the social and cultural contexts of learning” (p. 34). In this sense, autonomy is shaped by cultural, institutional, and technological environments, aligning with contemporary views of education in the digital age.

By contrast, the contemporary digital age has reconfigured autonomy within contexts of digital and networked learning. Learners in digital spaces must not only regulate their own progress but also negotiate identities, relationships, and knowledge construction in technologically mediated environments. Oxford (2017) highlights the connection between autonomy and self-regulation, noting that “autonomy requires learners to manage their cognitive, motivational, and affective resources, especially in complex and technology-rich environments” (p. 28). This contemporary perspective recognizes the increasing importance of digital tools, online platforms, and artificial intelligence in the learning process.

In combination, these perspectives illustrate the dynamic evolution of learner autonomy: from a classical pedagogical principle rooted in individual responsibility to a socio-technical competence shaped by digital connectivity and global interaction. This dual framing provides a foundation for exploring how autonomy has been conceptualized, practiced, and challenged across different educational paradigms.

3.2. Autonomy V.s. Pseudo-Autonomy

The concept of autonomy in educational settings has been widely recognized as essential for effective learning. It allows students to take control of their own progress, make informed decisions, and critically reflect on their educational journey. These meanings emphasize autonomy as a substantial capacity that empowers learners to navigate their educational paths within and beyond the classroom. Despite the importance of autonomy, scholars have raised concerns about pseudo-autonomy, which refers to learners appearing independent but actually being constrained by external

influences. Hurd (1998) highlights this issue in distance education, warning that simply providing resources does not guarantee genuine autonomy if learners lack the reflective and metacognitive skills to engage critically. Littlewood (1999) further emphasizes that learners may have apparent responsibility but within rigid frameworks that limit their actual freedom of choice. Benson (2011) deepens this critique by distinguishing between technical autonomy and critical autonomy. Emphasizing the need for learners to question and reshape their learning conditions, he cautions against prioritizing technical skills without fostering critical reflection. Palfreyman (2003) views autonomy as ‘regulated freedom’, where institutional and curricular frameworks may restrict learners’ independence, even if autonomy is encouraged. In digital learning environments, the challenges of pseudo-autonomy are intensified by predefined engagement ways set in within technology. Autonomy under such conditions “may, in fact, be a regulated freedom, where choices are framed and constrained by the institutional or technological structures within which learning takes place” (Palfreyman 2003, p. 263).

Understanding the difference between autonomy and pseudo-autonomy is crucial in today’s educational debates. True autonomy involves practices that encourage thoughtful decision-making and the negotiation of learning goals. On the other hand, pseudo-autonomy represents a surface sense of independence, constrained by structural, curricular, or technological limitations. Recognizing this distinction is key to ensuring that autonomy is not just viewed as a symbolic freedom, but rather as a genuine educational practice that empowers learners to take charge of their own learning experiences.

3.3. Bridging Generation Alpha and Theoretical Perspectives on Autonomy

Understanding the educational experiences of Generation Alpha goes beyond just demographic details; it requires a theoretical framework that explains how autonomy is influenced in AI-driven learning settings. The humanistic viewpoint highlights the significance of personal development and accountability (Holec, 1981; Little, 1991), which aligns with Generation Alpha’s desire for self-expression in more personalized learning environments. From a constructivist view, autonomy is fostered through interactive meaning-making and guided interactions (Piaget, 1952; Vygotsky, 1978), which corresponds to how digital natives learn together in online contexts. The socio-technical viewpoint, especially through connectivism (Siemens, 2005), places autonomy within complex networks of human and machine participants, reflecting how Generation Alpha interacts with adaptive AI tutors, gamified tools, and algorithmic responses. Lastly, post humanist perspectives (Bayne, 2015; Braidotti, 2019; Knox, 2020) broaden this discussion by considering autonomy as shared and hybrid—no longer just an individual trait but a collective outcome of human-machine interactions. Together, these viewpoints provide a detailed understanding of how Generation Alpha’s autonomy is both supported and limited by AI involvement, indicating that their educational experiences represent a significant change in the concept of learning and self-direction.

3.4. Generation Alpha: Redefining Learner Autonomy in the AI Era

Generation Alpha, a term coined by Mark McCrindle in 2008, refers to those born roughly between 2010 and the mid-2020s, making them the first cohort entirely born in the 21st century (Wikipedia, 2025). McCrindle and Fell (2020) describe them as “the most materially endowed, technologically literate, and formally educated generation ever” (p. 12). Scholars describe them as “the most technologically infused generation yet” (dos Reis, 2018, p. 220). Recent research highlights that Alpha children demonstrate distinctive traits: curiosity, mobility, emotional expressiveness, alongside tendencies to be self-focused and less verbally communicative than Gen Z (Apaydin & Kaya, 2024, p. 123). They strongly prefer visual and interactive environments, responding more effectively to touchscreens, gamification, and short-form media, compared to traditional auditory or lecture-based methods (Ziatdinov & Cilliers, 2022). This has significant implications for education, as Alpha learners prosper in gamified and digital environments that support motivation, emotional engagement, and collaborative skills (The Free Library, 2021). A

further challenge lies in their evolving digital language, heavily influenced by gaming, memes, and AI references, which frequently escapes traditional moderation systems; a 2025 study showed that large language models like GPT-4 and Claude struggled to detect masked harassment within Alpha online discourse (Mehta & Giunchiglia, 2025, pp. 5–7).

At the societal level, Generation Alpha is described as materially endowed, with longer projected lifespans, and expected to value empathy, sustainability, and lifelong learning as they begin entering the workforce in the late 2020s (News.com.au, 2024; The Times, 2024). Culturally, their identity is shaped by fragmented yet meaningful micro-communities on platforms like TikTok, YouTube, Roblox, and Minecraft, curating experiences often opaque to adults (Pérez-Torres, 2024).

In sum, Generation Alpha is a group whose independence is closely linked to digital tools. Their ability to learn develops through the digital environment, which includes AI, multimedia, and online platforms from a young age. This leads us to rethink independence as an important but shared skill, shaped by human, technological, and developmental factors.

3.5. Teachers' Evolving Roles in the Digital Age

The teacher's role has undergone a significant transformation in recent years, evolving from the traditional model of being a mere "*transmitter of knowledge*" (Freire, 1970, p. 72) to that of a mentor, facilitator, and critical guide. Early perspectives in constructivism and humanism have highlighted this shift: Vygotsky (1978) introduced the concept of the zone of proximal development, emphasizing the teacher as a scaffold who mediates tools, language, and interactions to facilitate higher levels of learning (p. 86). Similarly, Bruner (1996) points out that "teaching is not solely about the transfer of knowledge, but about empowering students to construct new modes of understanding" (p. 21).

In digital learning contexts, this transformation is even more evident. Redecker (2017) envisions the teacher as a "curator, facilitator, and co-learner in technology-enhanced contexts" (p. 54). According to Sorbara (2025), teachers need to be able to create learning paths that incorporate digital technologies, tailored to meet the unique needs of their students and align with the goals of the curriculum. This shift aligns with constructivist and socio-technical perspectives, where educators work to create engaging learning environments that make the most of both human and technological capabilities (Siemens, 2005). Researchers emphasize the changing nature of the teacher's role, which now includes tasks such as curating content, mediating interactions, and learning alongside students (Laurillard, 2012; Redecker, 2017). Giroux (2011) portrays teachers as "public intellectuals who inspire students to engage critically with their surroundings" (p. 8), promoting democratic participation and agency. Scholars underscore that effective digital pedagogy demands not only technical proficiency but also pedagogical adaptability; as Paniagua and Istance (2018) argue, "effective teaching in a digital context involves the ability to rethink classroom dynamics, evaluation methods, and the concept of knowledge itself" (p. 47).

Additionally, educators need to cultivate reflective digital personas (Kelentrić, Helland, & Arstorp, 2017) and address ethical dilemmas in AI-supported environments, such as privacy and responsible engagement (Williamson & Piattoeva, 2021). Professional learning communities are also pivotal: Darling-Hammond and Hyler (2020) emphasize the significance of collaborative professionalism, echoing Wenger's (1998) notion of learning as participation in communities of practice. Ultimately, scholars caution against reducing teaching to technical efficiency alone. Biesta (2013) warns against reducing education to purely technical efficiency, as it may lead to a loss of meaning and ethical responsibility. Teachers are encouraged to uphold their role in promoting meaningful dialogue and ethical conduct while designing digitally enhanced learning environments.

Collectively, the literature illustrates that the teacher's role, today, encompasses not only pedagogical duties but also cultural, ethical, and epistemological dimensions—demanding a delicate balance between technological advancement and the enduring obligation to cultivate critical, autonomous, and ethically conscious learners.

3.6. Autonomy in AI-Supported Learning Environments

The digital transformation of education has significantly reshaped how learner autonomy is conceptualized and enacted. Siemens (2005), through his theory of connectivism, argues that learning in connected environments relies less on individual knowledge acquisition and more on the ability to “identify and move through patterns in distributed networks” (p. 5). This perspective redefines autonomy as the skill to navigate complex knowledge streams increasingly mediated by technological systems. Bayne (2015) extends this line of thought, notifying that digital technologies should not be seen as neutral tools that simply extend human capacity. Rather, she argues that “digital technologies do not simply extend human agency but actively reconfigure it” (p. 15). In this sense, autonomy in digital learning environments is not only about independence from the teacher but also about negotiating agency in contexts where systems shape choices and interactions.

Building on this, Garrison and Anderson (2003) highlight in their Community of Inquiry model that autonomy in online learning arises from the interplay of cognitive presence, teaching presence, and social presence. They contend that “educational experience is sustained when these presences are in balance” (p. 41). Here, technology is framed as an enabler of collaborative meaning-making rather than as a replacement for learner agency. This emphasis on balance anticipates later discussions of AI, where the design of adaptive systems becomes central to whether autonomy is supported or constrained.

Artificial intelligence introduces new dimensions to the autonomy debate. Luckin et al. (2016) highlight the potential of intelligent tutoring systems that provide “adaptive scaffolding that adjusts in real time to learners’ needs” (p. 27), enabling personalized pacing and greater control over learning trajectories. Similarly, Luckin (2018) underscores the potential of “real-time personalization, adapting dynamically to the learner’s needs” (p. 45). These innovations suggest that AI can enhance autonomy by supporting learners in goal-setting, self-monitoring, and strategy adjustment with instant feedback.

Yet, digital autonomy is not unproblematic. Veletsianos and Houlden (2019) note that while online learners value the “flexibility and freedom” of digital platforms, they often encounter “isolation, over-responsibility, and decision fatigue” (p. 90). Such outcomes reveal the paradox of digital autonomy: while technology offers learners greater control, it simultaneously burdens them with intensified demands for self-regulation. AI-driven platforms amplify these dynamics, making autonomy contingent on learners’ digital literacies, socio-economic access, and ability to critically interpret algorithmic nudges. As Selwyn (2019) cautions, “to suggest that students are becoming more autonomous simply because they are using digital technologies is both naïve and misleading” (p. 146).

Concerns about over-scaffolding further complicate the picture. Holmes, et al. (2019) notifies that excessive reliance on AI systems may “undermine the development of independent learning skills” (p. 63) if learners depend too heavily on algorithmically prescribed pathways. When platforms disguise their decision-making processes, autonomy may be replaced by the authority of algorithms. As Selwyn (2019) emphasizes, autonomy in AI-mediated education is not a fixed attribute but a negotiated process, shaped both by technological affordances and by learners’ capacity to critically engage with them.

In sum, autonomy in AI-assisted learning settings is not automatically improved or reduced. Rather, it is a dynamic and negotiated idea. AI can support self-directed learning by assisting with planning, monitoring, and reflection, but it may also restrict learner choices if the systems are

ambiguous or overly strict. The on-going challenge in education is to develop AI systems that encourage agency, transparency, and learner options, ensuring that autonomy is strengthened instead of diminished in digital settings...

3.7. Negotiating Autonomy in Algorithmic Contexts

In AI-driven education, the independence of learners is more and more influenced by the interaction between human choice and algorithmic systems. Autonomy is not a fixed quality; instead, it is a dynamic process where learners need to understand, adjust to, and occasionally push back against the advice of smart technologies. Knox (2019) points out that algorithms are not neutral: "algorithmic systems actively shape educational experiences, frequently guiding learners towards specific types of engagement" (p. 25). Therefore, autonomy requires a critical understanding of how algorithmic suggestions shape learning opportunities.

AI-driven systems can improve autonomy by clarifying learning paths and giving learners more control over their pace and order (Luckin et al., 2016). However, if the criteria behind these suggestions are unclear, learners may face what Williamson and Eynon (2020) call "algorithmic dependence" (p. 97), where reliance on system results replaces personal judgment. This situation highlights that autonomy involves not just freedom but also, and critical involvement.

Additionally, negotiating autonomy in algorithmic settings relates to digital skills. Selwyn (2019) informs that a learner's ability to act autonomously relies on their skill to critically assess digital systems, pointing out that "the rhetoric of student empowerment often obscures the asymmetries of power embedded in educational technologies" (p. 149). Students who possess better digital skills might gain from AI-supported frameworks, whereas others may become mere passive followers of algorithmic instructions. Therefore, autonomy is not evenly shared and depends on wider socio-technical factors. In practice, negotiating autonomy in algorithmic contexts requires learners to develop meta-autonomy—the ability to regulate not only their own learning but also their relationship with algorithmic interventions. As Knox (2020) argues, such negotiation is integral to maintaining meaningful agency in environments where "automation increasingly mediates the terms of participation" (p. 42). In sum, having autonomy in algorithmic learning settings is not just about self-direction; it involves a back-and-forth relationship between human judgment and machine intelligence. Thus, creating AI systems that promote transparency, allow learner choice, and foster critical thinking is crucial to making sure that autonomy is strengthened instead of diminished in education that uses algorithms.

3.8 Critical Digital Literacy as Autonomy in Education

The concept of critical digital literacy has redefined our understanding of autonomy. Instead of simply being seen as the ability to make independent choices; autonomy now includes a focus on critical awareness, agency, and the challenging of power dynamics within digital environments. As the OECD (2023) notes, literacy in the twenty-first century requires "triangulating different sources, navigating through ambiguity, distinguishing between fact and opinion, and constructing knowledge" (p. 83). This framing positions autonomy not simply as functional independence, but as the ability to critically engage with complex information landscapes.

In the digital setting, critical literacy is closely linked to autonomy as it emphasizes the ability to question, resist, and reinterpret the socio-technological structures that impact participation. According to Lankshear and Knobel (2008), critical digital literacy goes beyond just using digital tools proficiently; it also requires an interrogation of the social practices and power relations implanted in these tools. Similarly, Luke (2012) defines critical digital literacy as "the capacity to critique and use digital texts and technologies in ways that recognize their embedded power relations and ideological underpinnings" (p. 22). This underscores the link between autonomy and critical

awareness, as learners must navigate systems that are not neutral. The theoretical foundation for this view can be traced to Foucault's (1991) insight that freedom exists within systems of regulation, rather than as the opposite of discipline. Applied to digital literacy, this suggests that autonomy can be viewed as a "regulated freedom" where learners both participate in and challenge the mechanisms of digital governance.

Recent scholarship in critical pedagogy has further emphasized the connection between autonomy in digital spaces and civic engagement and resistance. Giroux (2011) argues that critical literacy involves not only understanding words, but also reading the world in a way that allows learners to question dominant narratives in digital culture. This perspective reinforces the idea that critical digital literacy expands autonomy beyond individual self-regulation to include collective empowerment and democratic agency.

Overall, the literature suggests that critical digital literacy, when understood as autonomy, extends well beyond basic technical competence. In this sense, autonomy is not reducible to mere self-regulation; it also encompasses algorithmic awareness—the ability to recognize, question, and strategically engage with digital systems, including AI-driven tools, rather than passively accepting their operations and outputs.

4. Methodology

This study employs a qualitative, scoping review–informed design complemented by critical theoretical reflection. The scoping review approach was chosen for its suitability in exploratory and conceptual research, aiming to map, synthesize, and critically examine scholarship on learner autonomy in AI-mediated education, with a focus on the Algerian higher education context. The study does not test hypotheses or collect primary data; rather, it seeks to identify dominant themes, theoretical trends, contextual gaps, and emerging concerns within the literature.

A structured and transparent search procedure identified relevant sources through major academic databases and institutional archives hosting Algerian theses, journal articles, and policy documents. Search terms included *learner autonomy*, *higher education*, *artificial intelligence*, *digital learning*, *pedagogical guidance*, *critical digital literacy*, and *Algerian higher education*. Inclusion criteria prioritized peer-reviewed publications, scholarly books, doctoral research, and official reports, with emphasis on Algerian studies to ensure contextual relevance. Selected literature was thematically mapped and analytically synthesized along three axes: (1) theoretical conceptualizations of learner autonomy, (2) transformations of pedagogical guidance from human-centered to AI-assisted mediation, and (3) promises and risks of autonomy in digitally governed learning environments.

Analysis drew on humanistic, constructivist, and socio-technical perspectives, framing autonomy as both an individual capability and a socially, institutionally, and technologically mediated practice. Consistent with scoping review principles, methodological quality was not formally assessed; the focus was on producing a comprehensive, critical overview. This approach enhances transparency, rigor, and replicability while supporting the reconceptualization of learner autonomy in AI-enhanced higher education, particularly within the Algerian context.

4.1 Algerian Empirical Insights on Learner Autonomy: Rethinking Algerian Learner Autonomy in the Digital Age

Although global academic literature offers a comprehensive theoretical framework for comprehending the evolution of learner autonomy, it is imperative to incorporate contextual data from specific national contexts to fully grasp the practical implications of these concepts. In this regard, Algeria presents an instructive case study: the nation has experienced a rapid digital transformation in its educational sector, particularly marked by the impact of the COVID-19 pandemic. This transformation has occurred in parallel with structural challenges, notably in

strengthening infrastructure, updating curricula, and expanding opportunities for educators to further develop their digital pedagogy skills.

An examination of empirical studies conducted in Algeria sheds light on how the transition from traditional teacher-centred instruction to technology-facilitated and AI-driven autonomy is navigated within the constraints and opportunities unique to the local context. By delving into key research findings from Algeria, we gain insights into the preparedness of learners, the beliefs held by educators, and the obstacles encountered in the realm of digital and blended learning. In doing so, we situate broader theoretical discussions within the tangible socio-educational landscape of Algeria.

4.2 Algeria's Digital Turn: Infrastructure, Policy, and Momentum

Algeria's trajectory towards digital modernization has gained impetus through national strategies that prioritize connectivity, e-governance, and education. The government's National Digital Strategy 2020 demonstrates a strong dedication to utilizing ICTs as promoters for socio-economic change (Ministry of Post, Information Technology and Communication, 2020, p. 4). Significant investments in infrastructure, particularly in expanding broadband and fibre optic networks, have led to a considerable increase in internet access, which has risen from 18% in 2013 to nearly 60% in 2021 (International Telecommunication Union, 2022, p. 112). Scholars highlight that this expansion signifies more than just technical advancements, but also reflects a political commitment to integrating Algeria into the knowledge-based economy. Dey (2025) observes that "Digital transformation represents a strategic lever for advancing economic diversification in Algeria " (p. 104). Educational reforms are in alignment with these advancements, particularly through initiatives that promote digital education. The Ministry of Higher Education's Digital University project has played a central role in introducing online platforms, virtual classrooms, and open educational resources. According to Benhabib (2019), "these reforms indicate a dual aim: to modernize teaching practices and prepare Algerian youth for the demands of a digitized job market" (p. 213). Challenges remain, such as unequal access across regions and inconsistencies between urban and rural learners. Still, the overall pattern reflects careful and resolute progress. Moussaoui (2023) states that "Algeria's digital transformation is marked by gradual but consistent reforms, balancing modernization with structural realities" (p. 145). Despite some disparities, Algeria is positioning itself within the global trend towards digitalization. By focusing on infrastructure, policy frameworks, and educational advancements simultaneously, Algeria is shaping a digital transformation that is specific to its context, taking into account both its opportunities and limitations.

The Algerian experience offers valuable insights into how national policies in developing countries are influencing the digital landscape, where autonomy, education, and identity are being redefined.

4.3 Algerian Empirical Literature: Autonomy, E-Learning, and Blended Context

Research on learner autonomy in Algeria has expanded markedly in recent years, largely driven by the rapid shift to online and blended education during the COVID-19 pandemic. Prior to this period, autonomy was often addressed in abstract pedagogical terms; however, the sudden reliance on digital platforms gave the concept immediate practical relevance. Algerian universities were compelled to adapt quickly, prompting scholars to examine how students managed increased responsibility for their learning. While digital tools enabled greater self-regulation and flexibility, studies also highlighted persistent challenges, including uneven digital literacy and unequal access to resources. Consequently, this growing body of research reflects both new opportunities for autonomy and enduring structural and pedagogical constraints.

There are three main themes that are central to current debates: the beliefs held by teachers, the preparedness of students, and the structural constraints that influence both. These themes intersect with various important issues including teacher beliefs, systemic obstacles, the difficulties faced in higher education as a result of the COVID-19 pandemic, the readiness of students and their attitudes towards independence, the impact of digital platforms on blended learning, as well as the incorporation of social media into innovative teaching methods.

- ***Teacher Beliefs on Student Autonomy and Systemic Barriers.***

The research conducted in Algeria has consistently explored how EFL teachers perceive and negotiate learner autonomy within their institutional settings. It emphasized the conflicting perspectives between teachers' positive perceptions of learner autonomy and the systemic barriers that hinder its implementation. In a descriptive and exploratory study by Belmekki and Baghzou (2022) examined teachers' perspectives on learner autonomy and shed light on the challenges they encounter. Using a sample of twenty (20) EFL teachers, the study found that although teachers expressed strong conceptual support for autonomy, their classroom practices often defaulted to teacher-centred methods due to institutional and curricular restrictions. The study recommended curriculum reforms that embed autonomy-oriented tasks, professional development for teachers to adopt more student-centred practices, and greater institutional support for student-led projects.

Further highlighting systemic challenges, Tebib and Labeled (2023) focused on barriers to promoting autonomy. Based on data from 16 teachers in the Department of English at both the Universities of Constantine and Setif, the findings emphasized how structural rigidity, hierarchical educational traditions, and the predominance of summative assessments work together to constrain learner independence. Teachers acknowledged the potential of autonomy but felt unable to practice it under the current system. The authors argued for a broader shift towards formative assessment practices, policy recognition of autonomy as a core educational objective, and the use of digital tools to provide students with opportunities for independent learning beyond the limitations of the classroom.

Boudouaia, et al. (2022) delved into the '*Learner Autonomy: Algerian EFL Teachers' Beliefs*' by surveying 120 university instructors. The results indicated that while teachers generally acknowledged the importance of autonomy, they encountered difficulties in applying it in their teaching due to various challenges, such as inflexible curricula, overcrowded classrooms, and exam-centric educational systems that limit opportunities for independent learning. This study brought to light a disparity between teachers' theoretical understanding of autonomy and the practical constraints they face in the classroom, ultimately suggesting the need for more adaptable curriculum structures, smaller class sizes, and continuous professional development to help educators bridge the gap between their beliefs and effective teaching practices.

In sum, these studies indicate that while teachers value learner autonomy, systemic and cultural barriers hinder its implementation. A comprehensive approach aligning teacher training, curriculum, and policies is necessary to address these challenges. Without systemic changes, teachers' support for autonomy will remain theoretical, restricting students' growth as independent learners.

- ***University Education during COVID-19 and the Shift to Digital Pedagogy***

The global outbreak of COVID-19 led universities all around the world, including those in Algeria, to quickly switch from traditional in-person classes to online teaching methods. This sudden change generated various research studies to explore how educators, students, and other stakeholders in higher education adapted to digital learning, focusing on their preparedness, obstacles faced, and adjustments made in their teaching practices. Khattala and Houichi (2021) conducted a study titled "*University E-learning during Covid-19 Pandemic, Perceived by Teachers and Students*" to examine the experiences of teachers and students during this emergency shift to online learning.

Their research involved 46 university students and 29 EFL teachers. The study uncovered that while e-learning platforms provided a sense of continuity, issues like unreliable internet connection, insufficient training, and limited access to digital resources impeded the effectiveness of online education. The authors suggested the implementation of structured institutional policies and investments in digital infrastructure to ensure sustainable online learning.

Similarly, Maouche (2021) conducted a study entitled "*The Impacts of the Covid 19 on the Algerian Higher Education System: Distance Teaching and Learning, A Critical Analysis*" to provide a critical analysis of the online education in the Algerian universities during the pandemic crisis. The results showed that education continuity through e-learning platforms remained a debatable concern especially during unexpected situations. Through surveys and interviews, the research revealed that many educators had little experience with online teaching tools, leading them to rely on social media platforms instead of the official learning management systems provided by their institutions. The study recommended the implementation of professional development programs to improve teachers' digital skills and to establish standardized practices for utilizing formal e-learning platforms

Moreover, Ameur, et al. (2022), in their study entitled: "*Digital Transformation and E-Learning Integration during the Post-Pandemic Era in the Algerian Higher Education Sector*", sought to raise awareness among educators and learners regarding using ICT and E-learning in education, fostering readiness for embracing digital transformation, particularly in the post-COVID-19 era where distance learning has become imperative for global wellbeing. To achieve this aim, an online questionnaire was conducted with a random sample comprising students and faculty members of the Computer Science Department at Laghouat University, spanning various academic levels. The study's findings underscored the efficacy of digitalization and E-learning as valuable tools in the learning process while revealing the opportunities and challenges associated with their implementation. The study called for sustained digital literacy programs and a national e-learning strategy to strengthen resilience in higher education

These Algerian studies have shown that the pandemic has increased the use of information and communication technologies and encouraged pedagogical innovation. However, progress has been hindered by insufficient infrastructure, a lack of teacher training, and policy gaps. It is widely recognized that universities need to strengthen their digital systems and adopt blended learning as a sustainable model.

- ***Student Readiness and Attitudes towards Autonomy***

In the Algerian context, research has shown that while students express positive attitudes towards autonomy, their readiness is uneven and shaped by systemic, cultural, and technological barriers. One illustrative study is Ghout Khenoune's (2015), *Learner Autonomy in an EFL Context: A Study of Undergraduate Learners' Readiness for Autonomous Learning at Bejaia University*, which investigated 68 third-year English majors at the University of Béjaïa. The findings revealed that students generally exhibited low intrinsic motivation, relied mainly on basic cognitive strategies, and showed little use of metacognitive strategies such as self-monitoring and self-evaluation. Moreover, while most learners perceived the teacher as primarily responsible for classroom tasks, they acknowledged some responsibility for learning outside the classroom. The study recommended enhancing student motivation, encouraging the use of metacognitive learning strategies, and gradually shifting responsibility from teachers to learners to foster greater autonomy.

Bellimane and bensafi (2021) conducted a study to estimate the relationship between readiness for autonomy and metacognitive knowledge variables with 125 undergraduate students at Algerian ENSB School to assess readiness for autonomy in traditional classrooms. The study found

that most students remained dependent on teachers for direction, with only a small group displaying proactive engagement in independent learning. Learners' attitudes in the direction of autonomy were strongly linked to task relevance and classroom dynamics. The study acclaimed that EFL teachers should raise their students' metacognitive knowledge base to enhance their readiness for autonomous learning.

In their study at the University of Jijel, Mohdeb and Kaouache (2022) examined EFL learners' inclinations towards autonomous language learning with a sample of 60 undergraduate students. The findings indicated that learners displayed a moderate level of readiness for autonomy, yet many showed limited confidence and a weak sense of responsibility in managing their learning. The authors recommended reinforcing learner autonomy through pedagogical strategies that foster metacognitive awareness, self-directed tasks, and reflective practices, thereby empowering students to take greater control over their learning process.

Overall, these empirical studies show that readiness for autonomy is not innate but must be developed through supportive structures. Positive attitudes exist, yet digital literacy, cultural norms, and assessment systems limit progress. Consistent with international research, fostering autonomy in Algeria requires building digital and self-regulation skills while balancing teacher support with learner independence.

- ***Digital Platforms and Blended Learning***

Research on blended learning in Algeria highlights both its pedagogical potential and the challenges hindering its adoption. A recent study conducted by Al-Qadri, et al. (2024) at Batna 2 University involving 549 students has indicated that the acceptance of blended learning is influenced by various factors such as performance expectancy, effort anticipation, social influence, and facilitating conditions. These factors were found to have a positive impact on students' behavioural intentions and actual use of blended learning platforms. Additionally, the study highlighted gender differences in the adoption of blended learning and emphasized the importance of improving infrastructure and implementing supportive institutional policies to enhance students' overall learning experience.

Likewise, Kazi-Tani and Kadaoui (2025) examined the experience of master students in Translation at the University of Mascara. Their findings confirmed the pedagogical benefits of blended learning but also pointed to socioeconomic disparities and infrastructural shortcomings that restrict equitable access. The authors recommend significant investment in digital infrastructure to ensure fairness and inclusivity. Similarly, Nawal (2024) evaluated the perceptions of 200 students in French Language and Literature programs towards hybrid learning. While 68% of participants expressed satisfaction due to flexibility and diverse resources, significant barriers were noted, including unstable internet connections and limited access to technological devices. The author stressed the need for infrastructural development and targeted training to support sustainable hybrid learning.

Finally, Boumaraf (2025) explored the perceptions of 15 master students of English at Khenchela University. Students valued the flexibility and interactivity of blended learning but also reported difficulties related to motivation and technological access. The author recommended the integration of advanced digital tools, including artificial intelligence, alongside supportive measures to sustain student engagement and ensure accessibility.

In all, Algerian scholarship indicates that blended learning in Algeria has great potential to enhance educational quality. Its success depends on more than just technology, including supportive policies, teacher training, and student readiness. Investing in infrastructure and professional development is crucial to bridge the gap between potential and actual results.

- ***Social Media and Creative Pedagogy***

The integration of social media into higher education in Algeria has been a growing focus of scholarly inquiry, particularly in relation to its potential to enhance creative pedagogy. Boumarafi (2015), for example, conducted a study at the University of Constantine 2 to investigate how social media platforms can foster student engagement, collaborative learning, and independent study. Based on a sample of 300 students, the research revealed that Facebook was the most widely used platform, not only as a tool for social interaction but also as a facilitator of academic collaboration. The study emphasized that social media, when intentionally integrated into instruction, enriches learning experiences by enabling cooperative knowledge-sharing and stimulating creative engagement. Boumarafi recommended that universities rethink instructional design to embrace the pedagogical affordances of social media, highlighting the need for its incorporation into curricula as a legitimate component of academic practice.

Herizi (2019) examined the impact of social media use on English as Foreign Language (EFL) students' writing skills at Ahmed Draia University in Adrar. Her research, which targeted both first-year undergraduate and Master students, aimed to understand how constant exposure to informal online communication influences learners' academic writing. The findings suggested that while social media improves fluency and spontaneity in written expression, it also introduces significant challenges. Students frequently transferred informal features such as abbreviations and acronyms into formal writing contexts, undermining academic standards. Herizi concluded that while social media may stimulate creative linguistic engagement, it risks weakening the boundaries between formal and informal registers. She recommended that educators implement explicit instruction to raise awareness of these differences and develop strategies to mitigate the negative effects of informal digital communication on academic writing.

In a more recent contribution, Bettahar and Zourgui (2024) investigated how Facebook functions as a platform for self-directed professional learning among EFL teachers in Algeria. Focusing on the "Hireche Middle School Teachers" Facebook group, which includes over 60,000 members, the study relied on a semi-structured online survey with 14 participants to explore teachers' perceptions of online professional learning. The findings revealed that teachers experienced Facebook as a highly interactive space for resource-sharing, collaborative problem-solving and mutual support. Beyond merely exchanging materials, the platform served as a community of practice where educators could engage in informal yet meaningful professional development. The authors argued that such digital communities can play a vital role in contexts where formal professional training is limited, and they recommended encouraging the use of social media groups as complementary avenues for teacher development and pedagogical innovation.

- ***Critical Digital Literacy and Autonomy***

A growing body of Algerian research has examined how digital literacy supports or constrains learner autonomy within local educational contexts. Kaouche and Naimi (2025) conducted a study to evaluate Algerian EFL students' digital literacy skills using a questionnaire adapted from the Cambridge Life Competencies Framework (2022), administered to a sample of 101 students. The descriptive analysis revealed that the participants demonstrated an overall average level of digital literacy, with slight variations between their technical and cognitive skills. The findings further indicated that students function more as digital consumers than as competent users of technology. Accordingly, the researchers recommended further studies to assess students' readiness for integrating technology into education and emphasized the crucial role of educators in enhancing students' digital literacy. **They argued that this could be achieved through practical**

training on the appropriate use of technology, rather than relying solely on theoretical instruction.

Focusing on Algerian university students' perceptions of mobile ict integration in higher education, Messis (2024) investigated how undergraduate students at Skikda University engaged with mobile technologies in their academic practices. The objective of the research was to explore both the perceived benefits of mobile ICT for learning and the extent to which such tools foster independent and critical engagement. Using a survey administered to a sample of EFL students, Messis provided examples of common practices, such as relying on smartphones for dictionary apps, grammar checks, and downloading lecture materials. The findings revealed that while students expressed overwhelmingly positive attitudes towards the integration of ICT, their usage patterns remained largely instrumental and consumption-based, focusing on immediate academic needs rather than reflective or critical engagement with information. Consequently, the study recommended that educators move beyond encouraging surface-level ICT adoption and instead design pedagogical interventions that integrate critical awareness, source evaluation, and reflective use of mobile technologies.

Sarnou (2024) examined Algerian students' digital dexterity in online learning through a survey of 150 students and interviews with 12 teachers. The study revealed that while learners access a wide range of online resources, they face persistent difficulties in evaluating source credibility and resisting algorithmic bias, which limits their autonomy. Teachers also reported challenges in guiding students beyond instrumental uses of technology. The research recommended embedding critical digital literacy (CDL) into university curricula and adopting a "pedagogy of abundance" that empowers students to critically curate and synthesize digital content rather than consume it passively.

Together, these Algerian studies converge on the point that while digital literacy is widely acknowledged as essential for autonomy, its pedagogical implementation remains constrained by structural, curricular, and ideological factors. They consistently highlight the need to shift from a narrow, functionalist understanding of digital literacy towards a broader, critical model that empowers learners to exercise informed agency in digital and

Discussion

The body of research on blended learning in the Algerian higher education context reveals a nuanced landscape in which pedagogical potential coexists with persistent systemic constraints. Across the reviewed studies, blended learning emerges as a promising instructional model that aligns with contemporary learner-centred paradigms, yet its implementation remains uneven and often fragile. This tension underscores the need to interpret blended learning not merely as a technological innovation, but as a complex socio-pedagogical transformation embedded within specific institutional and cultural conditions.

Empirical findings consistently indicate that Algerian students respond positively to blended learning environments, particularly valuing their flexibility, interactivity, and expanded access to learning resources. Studies conducted within language and literature programs demonstrate that platforms such as Google Classroom and Moodle can enhance learner motivation, engagement, and overall satisfaction when thoughtfully integrated into course design (Al-Qadri, et al. (2024; Boumaraf, 2025; Kazi-Tani & Kadaoui,2025). These outcomes suggest that hybrid models are perceived by students as adaptable and responsive to diverse learning needs. Such results support the argument that blended learning can foster more autonomous and participatory learning practices, especially when aligned with constructivist pedagogies.

However, the literature also reveals that these pedagogical gains are frequently constrained by structural and infrastructural limitations. Inadequate internet connectivity, unequal access to digital devices, and limited technical support continue to hinder the effective adoption of blended

learning across institutions (Belmekki & Baghzou, 2022; Boudouaia, et al.,2022; Tebib & Labeled ,2023). These constraints increase existing educational inequalities and make it difficult to maintain integrated initiative. Moreover, teachers' difficulties in transitioning from traditional face-to-face instruction to digitally mediated practices represent a critical challenge. many instructors lack sufficient training in both the technical and pedagogical dimensions of blended learning, which often results in superficial or inefficient platform use. This finding highlights the central role of institutional commitment and continuous professional development in ensuring meaningful integration.

Another salient dimension emerging from the literature concerns student acceptance and continued use of blended learning systems. Drawing on technology acceptance frameworks, students' behavioural intention is shaped not only by technological usability but also by social influence, perceived usefulness, and effort expectancy. These factors suggest that blended learning adoption is deeply embedded in social and motivational contexts. Complementary research further indicates that when blended learning is grounded in interactive and constructivist approaches, students demonstrate deeper engagement and more sustained learning (Ghout, 2015; Bellimane & bensafi, 2021; Mohdeb & Kaouache, 2022). Nevertheless, socioeconomic constraints and fluctuating motivation remain significant obstacles, even among students who express favourable attitudes towards blended models.

Taken together, these findings indicate that although blended learning offers significant potential to enhance educational quality in Algerian higher education, its successful implementation depends on a complex interplay of interrelated factors. Adequate technological infrastructure, supportive institutional policies, comprehensive teacher preparation, and sustained student readiness must be developed within a coherent and integrated framework. Without sustained investment and strategic planning, the gap between the theoretical potential of blended learning and its practical realization is likely to persist.

Despite the increasing number of studies, important research gaps remain in Algeria. There is a need for long-term studies that examine how specific AI-supported learning designs help students develop lasting autonomy. More comparative research is also required to understand differences in equity and access across regions and universities. In addition, few studies address ethical issues in real classroom settings, such as data privacy, student consent, and algorithmic bias. Finally, future research should focus on developing and validating measures of learner autonomy that are adapted to Algeria's linguistic and cultural context.

5. CONCLUSION

This article has examined the state of blended learning in Algerian higher education through a critical synthesis of recent empirical studies. The discussion has shown that blended learning holds considerable pedagogical promise, particularly in supporting learner-centred, flexible, and interactive modes of instruction. Algerian students generally report positive perceptions of blended environments, especially in language-related disciplines, where digital platforms have been shown to enhance motivation, engagement, and access to learning resources. These findings confirm that, when grounded in constructivist principles, blended learning can contribute to more autonomous and participatory learning practices.

At the same time, the review highlighted that the effectiveness of blended learning in Algeria remains constrained by persistent systemic challenges. Infrastructural limitations, unequal access to digital tools, and insufficient technical support continue to undermine both equity and sustainability. Without adequate professional development and institutional backing, blended learning will be reduced to a superficial use of digital platforms rather than a meaningful pedagogical transformation.

The analysis further indicated that student acceptance of blended learning is shaped by a combination of technological, social, and motivational factors. While positive attitudes are common, socioeconomic pressures and inconsistent learning conditions often limit students' ability to fully benefit from blended models. These dynamics underscore the importance of situating blended learning within its broader social and institutional context rather than treating it as a purely technical solution.

Overall, the article concludes that blended learning in Algerian higher education should be approached as an integrated, long-term strategy rather than an isolated innovation. Its success depends on coordinated investments in infrastructure, coherent institutional policies, continuous teacher training, and sustained support for students. Finally, addressing existing research gaps—particularly through longitudinal, comparative, ethical, and culturally grounded studies—will be essential for advancing both theory and practice and for ensuring that blended learning contributes meaningfully to educational quality and equity in Algeria.

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