



The Role of Instructional Scaffolding in Enhancing Learner Autonomy Based on the Philosophy of Pragmatic Education: A Systematic Literature Review

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Abstract

This study synthesizes the role of instructional scaffolding in enhancing learner autonomy grounded in pragmatic educational philosophy through a Systematic Literature Review. It examines scaffolding characteristics, models, and mechanisms; the conceptualization and operationalization of learner autonomy; and the integration of pragmatic educational principles in existing scholarship. Following the PRISMA 2020 framework, the review draws primarily on Scopus (2015–2025) and one additional source, yielding 31 studies analyzed through thematic-comparative synthesis. Findings show that scaffolding is commonly implemented through modeling, guided practice, structured reflection, cognitive load management, and the gradual release of support. Learner autonomy is operationalized through indicators such as self-regulation, metacognition, intrinsic motivation, self-efficacy, and learning responsibility. Pragmatic principles, particularly experiential learning, contextual adaptation, and reflective practice, consistently emerge across studies. The review concludes that instructional scaffolding serves as a strategic mediating mechanism in fostering the transition from dependence to autonomous learning within an integrated conceptual framework.

Keywords: Instructional Scaffolding; Learner Autonomy; Pragmatic Educational Philosophy; Systematic Literature Review

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Peran Scaffolding Pembelajaran dalam Meningkatkan Otonomi Peserta Didik Berdasarkan Filsafat Pendidikan Pragmatis: Systematic Literature Review

Abstrak

Penelitian ini mensintesis peran *instructional scaffolding* dalam meningkatkan *learner autonomy* yang berlandaskan filsafat pendidikan pragmatis melalui pendekatan *Systematic Literature Review*. Kajian ini menelaah karakteristik, model, dan mekanisme scaffolding; konseptualisasi serta operasionalisasi *learner autonomy*; serta integrasi prinsip-prinsip pendidikan pragmatis dalam kajian ilmiah yang ada. Dengan mengikuti kerangka PRISMA 2020, telaah ini terutama bersumber dari basis data Scopus (2015–2025) dan satu sumber tambahan, sehingga menghasilkan 31 studi yang dianalisis melalui sintesis tematik-komparatif. Temuan menunjukkan bahwa scaffolding umumnya diterapkan melalui modeling, praktik terbimbing, refleksi terstruktur, pengelolaan beban kognitif, serta pelepasan dukungan secara bertahap. *Learner autonomy* dioperasionalkan melalui indikator seperti regulasi diri, metakognisi, motivasi intrinsik, efikasi diri, dan tanggung jawab belajar. Prinsip-prinsip pragmatis, terutama pembelajaran berbasis pengalaman, adaptasi kontekstual, dan praktik reflektif muncul secara konsisten dalam berbagai studi. Tinjauan ini menyimpulkan bahwa *instructional scaffolding* berfungsi sebagai mekanisme mediasi strategis

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dalam mendorong transisi dari ketergantungan menuju kemandirian belajar dalam suatu kerangka konseptual yang terintegrasi.

Kata Kunci: Filsafat Pendidikan Pragmatis; Otonomi Peserta Didik; Scaffolding Instruksional; Tinjauan Literatur Sistematis

INTRODUCTION

The development of research on instructional scaffolding and learner autonomy over the past two decades indicates a paradigmatic shift in education from teacher-directed approaches toward more reflective, contextual, and progressive student-centered learning. Previous studies affirm that scaffolding is no longer understood merely as temporary technical assistance; rather, it is conceptualized as a systematic pedagogical strategy that enables learners to gradually develop self-regulation, metacognition, and responsibility for their own learning.

In the context of higher education, the transition toward student-centered learning is viewed as an epistemological transformation concerning how knowledge is constructed and internalized. Smagorinsky (2018), for example, demonstrates that systematically designed graduated support significantly contributes to the enhancement of students' self-regulation, allowing autonomy to develop progressively from dependence toward independence.

Similarly, Xiao et al. (2025) propose a "visual-linguistic-emotional scaffolding" model, emphasizing that scaffolding operates simultaneously across cognitive, linguistic, and affective domains in fostering children's expressive capacities. This finding suggests that scaffolding contributes to autonomy not only cognitively but also across emotional and social dimensions of learning.

Furthermore, Tai et al. (2021) indicate that scaffolding functions as a cognitive mediation mechanism that systematically manages cognitive load through structured task sequencing. Overall, the literature consistently demonstrates that the development of autonomy requires structured support, reflective processes, authentic experiences, and contextualized curriculum design.

Nevertheless, the literature also reveals that learner autonomy is conceptualized as a multidimensional construct influenced by individual, social, and contextual variations. G. W. Scott et al. (2015) argue that autonomy cannot be reduced to a single construct; rather, it evolves through the interaction between personal factors and the learning environment. This perspective implies that scaffolding design cannot be uniform but must be adaptive to learners' needs. Across various studies, autonomy is operationalized through diverse indicators, while scaffolding is often positioned implicitly as a supportive strategy rather than as a primary conceptual framework.

However, empirical findings consistently show that scaffolding mechanisms are highly relevant to the development of autonomy, whether through instructional differentiation, reflection, experiential learning, or authentic practice. Moreover, previous research indicates that learner autonomy does not emerge instantaneously but develops gradually through engagement, reflection, and structured authentic experiences. The integration of these findings suggests that scaffolding functions as a transitional mechanism from dependence to independent learning. Yet, the explicit relationship between scaffolding as a process and autonomy as an educational objective has not been systematically formulated within a coherent conceptual model. This gap constitutes one of the principal rationales for the present study.

From a philosophical perspective, the principles of pragmatic educational philosophy are implicitly embedded in many scaffolding practices and autonomy development initiatives, although

they are rarely articulated explicitly as an analytical framework. Tarnopolsky et al. (2021) conceptualize principled pragmatism as an educational approach emphasizing authentic experience, communication, and cultural context, while Guhin (2020) highlights the adaptive and gradual nature of educational pragmatism in responding to social contexts. Chikazinga (2025) further demonstrates that educational practices are shaped by actors' pragmatism and policy contexts, indicating that pedagogical decisions are inseparable from social and institutional considerations.

Research by de Oliveira & Athanases (2017) and Smith et al. (2015) underscores experiential and authentic learning as the core of meaningful learning, aligned with the principle of learning by doing. Farias et al. (2018) emphasize reflection as a mechanism for internalizing experience, a central element of educational pragmatism. Moreover, instructional scaffolding across numerous studies embodies principles of contextual adaptation, continuous reflection, and the gradual release of responsibility. Despite these conceptual convergences, the literature has seldom explicitly connected these practices to pragmatic educational philosophy as an integrated paradigm. Accordingly, there is a pressing need to construct a conceptual synthesis that links scaffolding as a pedagogical process, autonomy as an educational objective, and pragmatism as its philosophical foundation.

Based on this background, the present study is significant because it offers a conceptual integration that remains underexplored in the existing literature. The novelty of this research lies in positioning instructional scaffolding as a core pedagogical strategy for fostering learner autonomy within the framework of pragmatic educational philosophy. Rather than merely examining the effectiveness of scaffolding or measuring autonomy separately, this study integrates both constructs within a pragmatic paradigm emphasizing authentic experience, critical reflection, contextualization, and the gradual release of support. Drawing upon empirical findings from Xiao et al. (2025), Tai et al. (2021), and other synthesized studies, this research seeks to formulate a progressive scaffolding design oriented toward authentic praxis. The multidimensional framework of autonomy described in prior studies serves as the foundation for identifying more comprehensive indicators of autonomy development. Theoretically, this study contributes to enriching the literature on pragmatic education by proposing a coherent conceptual model. Practically, it offers guidance for designing adaptive, reflective, and independent-oriented learning environments. Therefore, integrating these three dimensions is both relevant and strategic in addressing the demands of contemporary educational development.

In alignment with these objectives, this study aims to synthesize the characteristics, models, and mechanisms of instructional scaffolding reported in the literature and to analyze their contributions to the development of learner autonomy across various educational contexts. It also seeks to identify how learner autonomy has been conceptualized and operationalized in previous research and to examine the extent to which scaffolding is positioned as a mediating mechanism in its development. Additionally, the study explores how the principles of pragmatic educational philosophy are reflected in the integration of scaffolding and autonomy, while identifying conceptual gaps that remain insufficiently systematized.

Employing a Systematic Literature Review approach, this study constructs a comprehensive and structured cross-study synthesis based on the full range of available references. The research questions are organized around three primary inquiries: (1) How do the characteristics, models, and mechanisms of instructional scaffolding contribute to the development of learner autonomy? (2) How

is autonomy conceptualized and operationalized, and how is scaffolding mediated within this process? and (3) How are the principles of pragmatic educational philosophy reflected in the integration of these constructs, and what conceptual gaps remain? By addressing these three questions, the study is expected to present an integrated conceptual framework that represents the convergence of scaffolding as process, autonomy as goal, and pragmatism as paradigm. This integration responds to the literature’s need for a more explicit and systematic synthesis. Consequently, the study occupies a strategic position in advancing a more comprehensive understanding of how pragmatic education can be realized through progressive scaffolding design oriented toward the development of learner autonomy.

RESEARCH METHOD

This study employs a Systematic Literature Review (SLR) design, following the PRISMA 2020 reporting guidelines as illustrated in the study selection flow diagram (Page et al., 2021). This design was chosen to systematically synthesize the relationships among instructional scaffolding, learner autonomy, and pragmatic educational philosophy based on previously published empirical and conceptual findings. The primary data source was the Scopus database, covering publications from 2015 to 2025, using a combination of the keywords “instructional scaffolding,” “learner autonomy development,” and “pragmatism in education.”

Result from Keyword Search

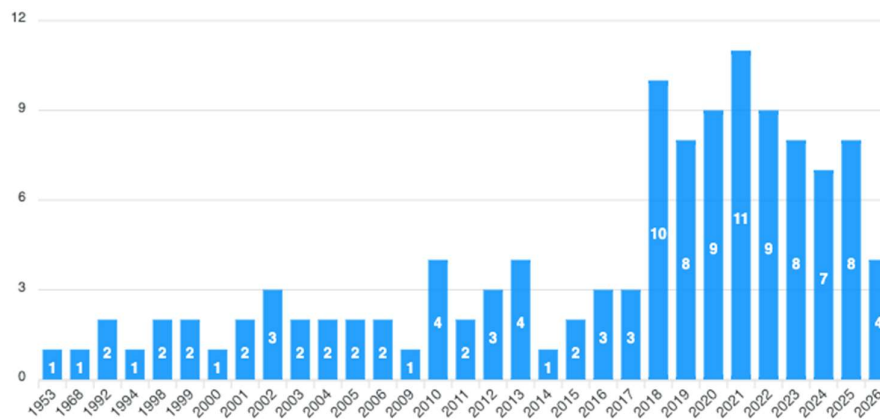


Figure 1

Publication Diagram

The identification stage yielded 120 articles. An automatic filtering process was then conducted based on the specified publication period and initial eligibility criteria, resulting in 66 articles proceeding to the screening stage. Articles without abstracts, those not published in reputable journals (Q1–Q4), or those deemed thematically irrelevant were excluded in accordance with the predefined inclusion and exclusion criteria.

The screening process resulted in 63 articles eligible for full-text review; however, 33 articles were inaccessible in full text, leaving 30 articles for comprehensive eligibility assessment. In addition, one relevant article was identified through other sources, bringing the total number of studies included in the analysis to 31 research reports.

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Prisma Reporting: Instructional Scaffolding And Learner Autonomy In Pragmatic Educational Philosophy: A Systematic Literature Review

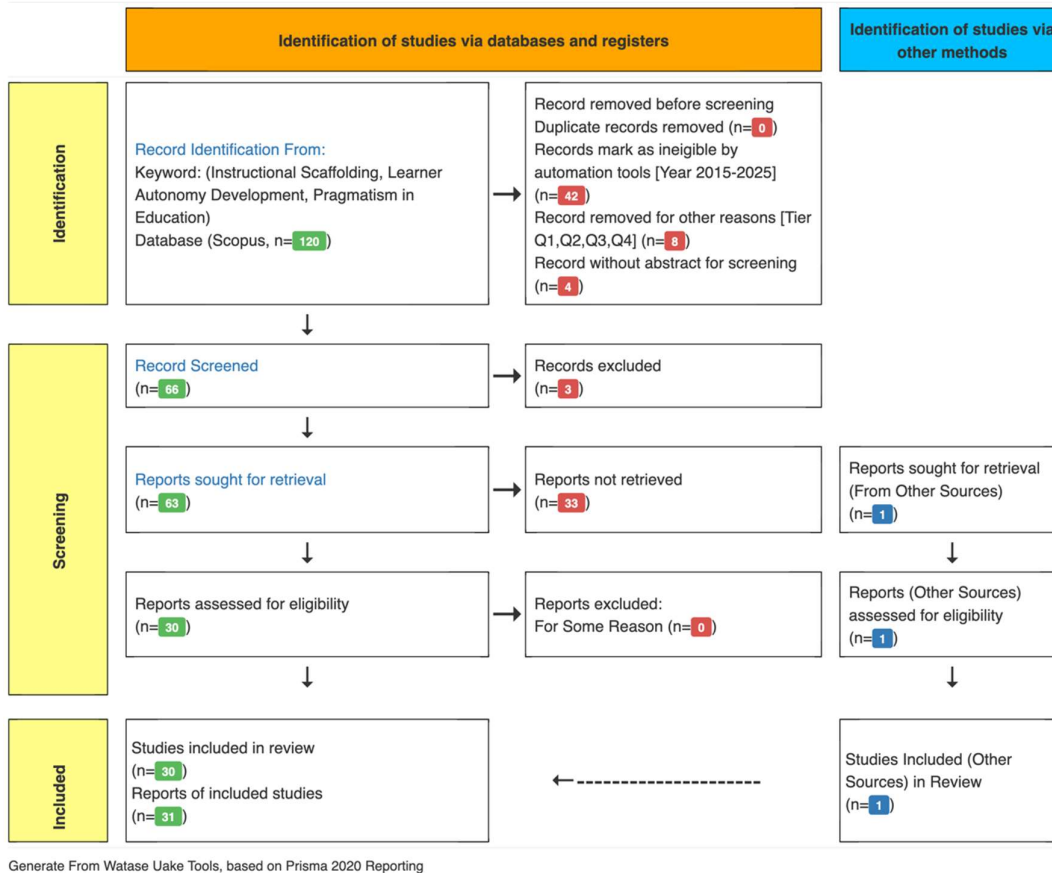


Figure 2
PRISMA Flow Diagram

The research instrument consisted of a data extraction form developed based on the following analytical categories: study characteristics (location, year, and design); theoretical frameworks (e.g., Scaffolding Theory, Sociocultural Theory, Learner Autonomy Theory, Constructivism); scaffolding models or mechanisms; the conceptualization and operationalization of autonomy; and indications of pragmatic principles such as experiential learning, reflection, authentic learning, and the gradual release of responsibility.

Data collection procedures were conducted through in-depth full-text review, systematic documentation of key findings, and iterative thematic coding to identify patterns in the contributions of scaffolding to learner autonomy, as reflected in the synthesized empirical and conceptual studies.

Data analysis employed a thematic-comparative synthesis technique by comparing progressive scaffolding models, mediation mechanisms, and autonomy indicators across educational contexts. In addition, a chronological mapping of publications was conducted to identify developmental trends in the field based on keyword search results.

The validity of the synthesis was ensured through category consistency checks, cross-study triangulation, and analysis of conceptual gaps. With this structured procedure, the study is replicable through the use of the same database, keywords, time span, and selection and analysis stages.

RESULTS AND DISCUSSION

1. Characteristics, Models, and Mechanisms of Instructional Scaffolding in Contributing to the Development of Learner Autonomy

The synthesis findings indicate that instructional scaffolding in the reviewed literature is characterized by gradual release of responsibility, contextual adaptation, socio-cognitive mediation, and the integration of reflection as part of the learning internalization process.

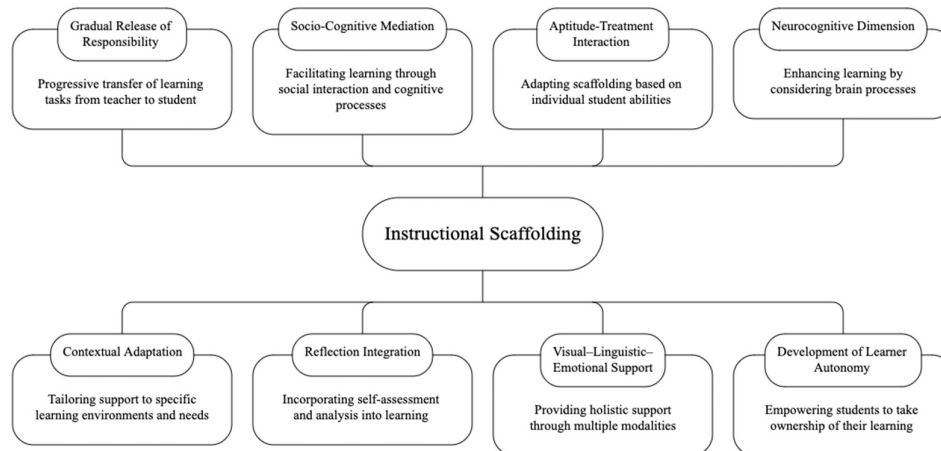


Figure 3

Comprehensive Overview of Instructional Scaffolding

This pattern is consistent with Smagorinsky (2018), who emphasizes a systematic transition from teacher-directed to student-centered learning through the progressive transfer of learning responsibility. The gradual release model is further reinforced by Manzano Vázquez (2018), who demonstrates that the structured withdrawal of support enhances autonomy through the strengthening of self-regulated learning.

In the context of differentiated initial abilities, Grimm et al. (2023) report that aptitude-treatment interaction-based scaffolding assists lower-achieving students in closing academic gaps. These findings indicate that scaffolding functions not merely as temporary support but as an adaptive mechanism that accounts for learner heterogeneity. Furthermore, Xiao et al. (2025) develop a visual-linguistic-emotional scaffolding model, demonstrating that cognitive, linguistic, and emotional supports operate simultaneously in fostering children's learning capacities. This model expands the conceptualization of scaffolding from purely academic assistance to holistic support. Tai et al. (2021) add a neurocognitive dimension by showing that scaffolding grounded in the Zone of Proximal Development (ZPD) and cognitive load management enhances performance while simultaneously reducing cognitive load. Collectively, the literature reveals that scaffolding integrates pedagogical, psychological, and cognitive dimensions.

When linked to the development of learner autonomy, the data indicate that scaffolding mechanisms contribute through several primary pathways. First, through the enhancement of self-regulation, as demonstrated by Smagorinsky (2018). Second, through the promotion of metacognition and reflection, as reported by Shih (2021), in the use of collaborative learning logs. Third, through increased intrinsic motivation and engagement, as identified by Almusharraf (2020) and Lange et al. (2023). Fourth, through the strengthening of academic readiness and future

orientation, as shown by Esfandiari & Hesani (2019). These empirical findings suggest that the contribution of scaffolding to autonomy is not unidirectional but multidimensional.

Within the context of authentic learning, Smith et al. (2015) demonstrate that scaffolding facilitates the transition from passive learning to authentic praxis. This transition reflects the gradual shift of learning responsibility from teacher to student. Therefore, in response to the first research question, the findings indicate that the characteristics and mechanisms of scaffolding contribute to autonomy through differentiation, reflective practice, motivational enhancement, cognitive regulation, and structured authentic experiences.

The significance of these findings lies in reinforcing the argument that autonomy does not develop spontaneously but emerges through deliberate and progressive pedagogical design. The reviewed literature consistently demonstrates that without an initial structure of support, the transfer of learning responsibility may be ineffective. Accordingly, this study contributes by positioning scaffolding as a strategic prerequisite for the development of learner autonomy within a pragmatic educational framework.

2. Conceptualization and Operationalization of Learner Autonomy and the Position of Scaffolding as a Mediating Mechanism

The synthesis findings indicate that learner autonomy in the literature is defined as the learner's capacity to regulate, reflect upon, and direct their own learning, encompassing cognitive, metacognitive, affective, and social dimensions.

Table 1

Key Findings on Learner Autonomy and Scaffolding

Concept	Findings	References
Learner Autonomy	Learners regulate and reflect on their learning (cognitive, metacognitive, social dimensions).	Li (2023), Shih (2021)
Self-Efficacy & Work Readiness	Autonomy strengthens self-efficacy and work readiness.	Flowers et al. (2019), Scott (2016)
Scaffolding	Mediates the transition from dependence to independence, enhancing engagement.	Ng & Cheung (2018), Andrews-Larson et al. (2019), Tran & Duong (2018)
Reflection	Structured reflection accelerates the internalization of learning.	Farias et al. (2018)

Li (2023) demonstrates that teachers' beliefs about autonomy influence instructional design and classroom practices. This finding suggests that autonomy is not merely an individual learner attribute but is also shaped by the broader pedagogical ecosystem.

Shih (2021) emphasizes the metacognitive dimension of autonomy through the implementation of learning logs that enhance reflective awareness. Flowers et al. (2019) show that autonomy strengthens self-efficacy within cross-cultural online exchange contexts. Scott (2016) further expands the concept of autonomy as a critical competence for work readiness. Accordingly, autonomy is operationalized across diverse indicators, including self-regulation, metacognition, intrinsic motivation, engagement, and academic readiness.

Within the context of mediation, scaffolding emerges as a transitional mechanism between dependence and independence. Ng & Cheung (2018) explicitly position scaffolding as a mediating

process within a socio-cognitive approach to writing. Andrews-Larson et al. (2019) demonstrate that mathematical argumentation becomes increasingly student-centered through social and analytical scaffolding. Tran & Duong (2018) report heightened engagement when learning responsibility is progressively transferred to students. Farias et al. (2018) show that structured reflection accelerates the internalization of learning. These findings indicate that scaffolding does not merely precede autonomy but functions as a bridge that gradually mediates the development of autonomy-related indicators.

The significance of these results lies in affirming that autonomy is not an initial condition but the outcome of a pedagogical mediation process. This study contributes by systematically articulating scaffolding as an explicit mediating mechanism rather than an implicitly supportive strategy. By integrating the diverse definitions and indicators of autonomy dispersed throughout the literature, this research provides conceptual clarification that strengthens the coherence of the field of autonomy studies in education.

3. Reflection on the Principles of Pragmatic Educational Philosophy and Conceptual Gaps

The third research question examines how the principles of pragmatic educational philosophy are reflected in the integration of scaffolding and autonomy, as well as the conceptual gaps that remain. Tarnopolsky et al. (2021) articulate principled pragmatism as the integration of language, culture, and communication within learning processes. Guhin (2020) demonstrates that educational pragmatism is inherently adaptive to social contexts and cultural values. Smith et al. (2015) conceptualize authentic learning as a form of praxis that deepens conceptual understanding through lived experience. De Oliveira & Athanases (2017) affirm that experiential tasks strengthen learners' sense of responsibility, while Farias et al. (2018) identify reflection as the core mechanism for internalizing experience. These findings indicate that experiential learning, contextual adaptation, and reflective practice are consistently embedded principles within the literature.

However, although these pragmatic principles are implicitly present, the literature rarely integrates them explicitly into a unified framework that connects scaffolding and autonomy. Policy-oriented studies such as Chikazinga (2025) highlight pragmatic dimensions in the responses of educational actors, yet they do not directly link these dimensions to classroom-level design. Consequently, the primary conceptual gap lies in the absence of a model that explicitly synthesizes scaffolding as a pedagogical strategy, autonomy as a developmental objective, and pragmatism as the underlying philosophical foundation. This study contributes by addressing this gap through a systematic synthesis of the literature.

The significance of this contribution lies in reinforcing the position of pragmatic educational philosophy as an operational paradigm rather than merely an abstract theoretical foundation. By mapping how experiential, reflective, and contextual learning are integrated through scaffolding to foster autonomy, this study expands the conceptual horizon of pragmatic education.

The theoretical implication of this research is the formulation of an integrated conceptual framework linking scaffolding, autonomy, and pragmatism within a literature-based synthesis model. Pedagogically, the findings underscore the necessity of instructional designs that explicitly incorporate stages of modeling, guided practice, reflection, and the gradual release of responsibility. Curricularly, the implications point to the need for embedding autonomy within curriculum design, as emphasized by Kleickmann et al. (2016).

The findings highlight that teachers' beliefs about autonomy constitute a critical factor in effective implementation. Moreover, the study reaffirms the importance of authentic experience as a medium for internalizing pragmatic values in education. Accordingly, the implications of this research are multidimensional—spanning theoretical, practical, and policy domains.

This study has several limitations. First, the primary data source was limited to a single database (Scopus), which may have excluded relevant studies beyond its scope. Second, variations in disciplinary contexts and research methodologies across studies resulted in data heterogeneity. Third, several studies involved small samples or context-specific settings, limiting generalizability. Fourth, some included works were conceptual in nature and lacked classroom-based empirical data. Nevertheless, through systematic synthesis, this study provides a comprehensive overview of the relationships among scaffolding, autonomy, and pragmatism within the available literature.

CONCLUSION

This study concludes that instructional scaffolding is consistently positioned in the literature as a strategic pedagogical mechanism that supports the development of learner autonomy through graduated support, contextual adaptation, structured reflection, and authentic learning experiences. The dominant characteristics of scaffolding identified across studies include modeling, guided practice, cognitive load management, reflective dialogue, and the structured withdrawal of support. The most frequently reported indicators of autonomy comprise self-regulation, metacognition, intrinsic motivation, self-efficacy, and responsibility for learning, all of which align with the principles of pragmatic educational philosophy, such as experiential learning, authentic praxis, contextual adaptation, and sustained reflective internalization. In contrast to prior literature that tends to treat scaffolding and autonomy as separate constructs, this study offers a conceptual integration that positions scaffolding as a strategic mediating mechanism facilitating the transition from learner dependence to independence within a pragmatic educational framework. The findings further affirm that autonomy is not an initial condition of learning but rather the outcome of a structured and progressive pedagogical process.

Theoretically, this synthesis enriches the educational literature by providing a systematic mapping of the relationship between instructional strategies and learners' developmental goals. Practically, it underscores the necessity of explicitly incorporating gradual release of responsibility and structured reflection as integral components of curriculum design. For future research, the study recommends longitudinal integrative investigations, expansion across diverse cultural and educational contexts, the development of more comprehensive and multidimensional measures of autonomy, experimental exploration of digitally mediated adaptive scaffolding, and examination of how teachers' beliefs and competencies in designing scaffolding influence the sustained development of learner autonomy.

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