



## A CRITICAL REVIEW OF BLOOM'S TAXONOMY IN CONTEMPORARY EDUCATIONAL PRACTICES

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### ABSTRACT

Bloom's Taxonomy has been a cornerstone of educational theory, providing a structured framework for defining learning objectives, designing curricula, and aligning assessments. This study offers a novel critical perspective by integrating contemporary pedagogical frameworks into the evaluation of Bloom's Taxonomy and applicability in contemporary educational practices. This study employs a critical literature review method to examine, including technology-enhanced, collaborative, and project-based learning environments. The analysis, based on thematic synthesis, identifies key strengths, such as clarity, systematic organization of cognitive skills, and adaptability for instructional design, alongside significant limitations, including insufficient attention to affective and socio-emotional domains and emerging 21st-century competencies like digital literacy, creativity, and collaborative problem-solving. Furthermore, gaps between theoretical revisions and practical classroom implementation are highlighted, particularly regarding empirical evidence of effectiveness in modern learning contexts. The study concludes that while Bloom's Taxonomy remains a foundational tool, its continued relevance depends on adaptive, flexible, and context-sensitive applications that integrate cognitive, affective, and psychomotor domains while addressing contemporary educational needs. The study recommends integrating digital literacy, collaborative learning strategies, and affective assessment into taxonomy-based instructional design, fostering holistic student development, critical thinking, creativity, and digital competence. The findings underscore the necessity of bridging theory and practice to ensure the taxonomy's effectiveness in supporting 21st-century learning outcomes.

### INTRODUCTION

Bloom's Bloom's Taxonomy has long served as a foundational conceptual framework in education, guiding curriculum design, the formulation of learning objectives, and the assessment of student achievement since its introduction (Bloom et al., 1956). However, despite its widespread adoption and enduring influence, increasing concerns have emerged regarding its capacity to address the complex and evolving demands of contemporary education. In particular, the rapid advancement of digital technologies, the shift toward learner-centered pedagogies, and the growing emphasis on interdisciplinary and competency-based learning have exposed potential limitations in traditional

taxonomic frameworks. These developments necessitate a critical re-examination of Bloom's Taxonomy to determine whether it remains adequate for guiding educational practices in the 21st century. Since its original publication, the taxonomy's hierarchical organization of cognitive processes—from lower-order thinking skills such as remembering and understanding to higher-order skills such as analyzing and evaluating—has influenced instructional design globally (Anderson & Krathwohl, 2001). Its systematic structure offers educators a scaffold for sequencing pedagogical activities and aligning assessments with intended outcomes, which has underpinned educational practice for decades (Krathwohl, 2002). However, as educational contexts



evolve in response to rapid technological developments and the demands of the 21st century. As a result of these shifts, the applicability and sufficiency of the classical taxonomy have been increasingly scrutinized. This raises a fundamental research problem: to what extent does Bloom's Taxonomy adequately capture the complexity of learning processes and competencies required in contemporary educational contexts? Furthermore, how effectively can it support the design of instructional strategies and assessments in environments characterized by technological integration, collaboration, and innovation? Addressing these questions is critical for determining the continued relevance of the taxonomy in modern education. Contemporary education increasingly emphasizes not only cognitive mastery but also a broader set of competencies, including creative thinking, collaboration, communication, and digital literacy. These competencies are widely recognized in global educational frameworks, such as those proposed by the OECD and UNESCO, as essential for preparing learners to thrive in complex, rapidly changing, and technology-driven societies. The integration of these skills reflects a paradigm shift from content-based instruction to competency-based education, where learners are expected to apply knowledge in authentic, real-world contexts. Consequently, educational frameworks must evolve to accommodate these multidimensional learning outcomes, raising important questions about the adequacy of traditional models such as Bloom's Taxonomy (Voogt et al., 2015).

Critically, although Bloom's Taxonomy remains prevalent in teacher preparation programs and institutional policies, its linear representation of cognitive domains has been challenged for inadequately capturing the nonlinear and dynamic nature of learning processes in contemporary educational settings. In modern pedagogical approaches such as project-based learning, inquiry-based learning, and technology-enhanced instruction, students frequently engage in multiple cognitive

processes simultaneously rather than sequentially. For example, learners in digital environments may analyze information, evaluate sources, and create original content within a single learning activity, thereby demonstrating the interconnectedness of cognitive skills. This simultaneity challenges the hierarchical assumptions of Bloom's Taxonomy and suggests the need for more flexible and integrative models of learning (Anderson & Krathwohl, 2001; Chan & Rao, 2010). For example, research on active and technology-enhanced learning environments suggests that critical and creative thinking often emerge in tandem rather than as sequential stages, which calls into question the strict hierarchical structure of traditional taxonomies (Dede, 2010). Moreover, while affective and psychomotor domains are acknowledged in educational theory, they are frequently marginalized in practical applications, resulting in a narrow interpretation of student competencies that undervalues motivation, collaboration, and socio-emotional skills (Krathwohl, 2002; Silver, 2013). This imbalance not only limits the holistic assessment of learners but also constrains pedagogical innovation that integrates emotional and embodied aspects of learning.

In recognition of these critiques, Anderson and Krathwohl (2001) revised Bloom's original taxonomy by reframing the cognitive dimension into a two-dimensional matrix of cognitive processes and knowledge types. This revision introduced greater flexibility and supported active learning pedagogies by replacing static categories with dynamic verbs that better align with instructional design and assessment practices (Anderson & Krathwohl, 2001). Despite the advancements introduced in the revised taxonomy, empirical evidence on its effectiveness within contemporary educational settings remains limited and fragmented. In particular, there is a lack of robust empirical studies examining how the revised taxonomy functions in technology-enhanced learning environments, collaborative classrooms, and competency-based education systems. Moreover, existing research often focuses on theoretical



alignment rather than measurable learning outcomes, leaving unanswered questions regarding the actual impact of taxonomy-based instructional design on student performance, engagement, and skill development. This gap highlights the need for more comprehensive and context-sensitive investigations. Several studies indicate that educators continue to default to traditional interpretations, revealing a gap between theoretical refinement and classroom implementation (Brown et al., 2016). Furthermore, there is insufficient research examining the impact of integrating the revised taxonomy with emerging pedagogical frameworks such as blended learning, maker education, and competency-based education.

This article's novelty lies in its critical interrogation of Bloom's Taxonomy not only as a theoretical framework but also as a practical tool within contemporary educational contexts. Unlike previous studies that primarily focus on theoretical revisions or isolated applications, this review adopts an integrative perspective that simultaneously examines cognitive, affective, and psychomotor dimensions while situating the taxonomy within modern pedagogical approaches, including digital learning, collaborative environments, and competency-based education. By doing so, the study offers a more comprehensive and contextually grounded understanding of the taxonomy's relevance and limitations. To address these issues, this study aims to achieve several key objectives. First, it seeks to critically analyze the theoretical foundations and historical evolution of Bloom's Taxonomy, including its original and revised versions. Second, it aims to evaluate the applicability of the taxonomy in contemporary educational practices, particularly in technology-enhanced, collaborative, and student-centered learning environments. Third, the study intends to identify key limitations and gaps in addressing 21st-century competencies, such as digital literacy, creativity, and collaborative problem-solving. Finally, it aims to propose directions for adapting and extending the taxonomy to better align with the demands of modern education. By clearly articulating

these objectives, the study provides a structured and focused framework for analysis. It also proposes an integrative perspective that foregrounds the interplay of cognitive, affective, and psychomotor dimensions within modern educational practices (Adhikari, 2024). In doing so, the article contributes to scholarly discourse by calling for expanded conceptual models capable of accommodating digital literacy, creativity, and collaborative problem-solving—competencies that extend beyond traditional cognitive hierarchies (Ananiadou & Claro, 2009).

Moreover, this study highlights the research gap related to empirical investigations on taxonomy adaptations that effectively support the design and assessment of complex learning environments. It suggests directions for future research that empirically evaluate the coherence between taxonomy-based instructional design and actual student outcomes in diverse educational contexts, including technology-rich and inclusive classrooms. By integrating theoretical critique with practical implications, the review underscores the urgency of reimagining educational taxonomies to better align with the multifaceted demands of contemporary learning.

## METHODS

This study adopts a critical literature review approach to examine the evolution, application, and limitations of Bloom's Taxonomy in contemporary educational contexts. The critical review methodology is selected due to its suitability for synthesizing diverse theoretical perspectives and identifying conceptual gaps across a broad body of literature. Unlike systematic reviews, which prioritize exhaustive retrieval and strict inclusion criteria, this approach allows for interpretative analysis and theoretical integration. Nevertheless, to enhance methodological rigor and transparency, this study incorporates systematic elements, including a structured search strategy, explicit inclusion and exclusion criteria, and a transparent analytical framework. By combining critical interpretation with systematic procedures, the study aims to achieve both



depth of analysis and methodological credibility. A critical review methodology enables researchers to evaluate existing theoretical frameworks, identify gaps, and propose novel perspectives for future research (Hart, 2018; Torraco, 2005). Unlike systematic reviews, which follow rigid inclusion and exclusion criteria, critical reviews emphasize conceptual analysis and synthesis, allowing a deeper exploration of theoretical, methodological, and practical issues (Grant & Booth, 2009). This approach is particularly suitable for investigating Bloom's Taxonomy, as it has undergone multiple revisions and interpretations, and its application varies widely across educational settings (Chavda et al, 2025).

#### Data Sources and Search Strategy

Relevant literature was retrieved from multiple academic databases, including Scopus, Web of Science, ERIC, and Google Scholar, to ensure comprehensive coverage of both seminal and contemporary studies. The search process employed a structured strategy using predefined keywords such as "Bloom's Taxonomy," "revised Bloom's Taxonomy," "21st-century skills," "digital learning," and "critical thinking," combined using Boolean operators (AND, OR). For example, search strings included combinations such as ("Bloom's Taxonomy" AND "digital learning") and ("revised taxonomy" AND "collaborative learning"). The initial search yielded a large pool of studies, which were subsequently screened based on relevance, title, and abstract. A detailed record of the search process, including the number of retrieved, screened, and included articles, was maintained to enhance transparency and reproducibility. Keywords used in the search included "Bloom's Taxonomy," "Anderson & Krathwohl revision," "educational practices," "21st century skills," "digital learning," and "critical thinking." Boolean operators (AND, OR) were employed to refine the search. Only peer-reviewed journal articles, books, and authoritative reports were included,

ensuring the credibility and relevance of the sources (Booth et al., 2021; Hart, 2018).

#### Inclusion and Exclusion Criteria

Publications were included based on clearly defined and operationalized criteria to ensure consistency and minimize selection bias. Specifically, studies were included if they: (1) explicitly examined Bloom's Taxonomy or its revised version; (2) addressed its application within contemporary educational contexts, including digital, collaborative, or competency-based learning environments; and (3) provided either empirical evidence (quantitative, qualitative, or mixed methods) or substantial theoretical analysis. Exclusion criteria were also systematically applied, including: (1) non-English publications due to language constraints; (2) non-peer-reviewed sources such as opinion articles or unpublished manuscripts; and (3) studies focusing solely on assessment techniques without broader pedagogical implications. To further enhance rigor, the selection process involved iterative screening and cross-checking to ensure alignment with the study's objectives (Torraco, 2005).

#### Data Extraction and Analysis

A rigorous thematic analysis was conducted to synthesize findings from the selected literature. The analysis followed a structured process involving several stages: (1) familiarization with the data through repeated reading of selected studies; (2) initial coding to identify key concepts, patterns, and recurring issues; (3) categorization of codes into broader themes, such as historical development, conceptual revisions, applicability in modern contexts, and identified limitations; and (4) refinement and interpretation of themes to develop coherent analytical insights. The coding process was iterative, allowing themes to evolve as new insights emerged. This systematic approach ensured that the analysis was both comprehensive and analytically



robust, and (5) emerging approaches for taxonomy integration (Nurmatova & Altun, 2023). Each article was critically examined for methodological rigor, theoretical contributions, and relevance to contemporary education. The analysis also considered the alignment between the taxonomy and active, collaborative, and technology-mediated learning strategies (Voogt et al., 2015).

### Reliability and Validity

To ensure the reliability and validity of the findings, several strategies were employed. First, data triangulation was conducted by incorporating a diverse range of sources, including seminal theoretical works, recent empirical studies, and authoritative reports, thereby reducing the risk of bias (Devassy et al, 2025). Second, an audit trail was maintained throughout the research process, documenting decisions related to article selection, coding, and theme development. Third, peer debriefing was conducted to critically evaluate the interpretation of findings and enhance analytical rigor (Sisson et al, 2019). Additionally, consistency in coding was ensured through iterative comparison and refinement of themes, thereby strengthening the trustworthiness and credibility of the analysis. The review included seminal works, recent empirical studies, and authoritative reports, ensuring a balanced perspective (Grant & Booth, 2009). Validity was enhanced through peer debriefing and cross-checking of extracted data, ensuring that interpretations accurately reflected the source material (Hart, 2018).

### Ethical Considerations

As this study involved only secondary data from published literature, no ethical approval was required. Nevertheless, all sources were properly cited to ensure intellectual property rights and academic integrity (APA, 2020).

## RESULTS AND DISCUSSIONS

The findings of this critical review indicate that Bloom's Taxonomy has remained a foundational framework in education for over six decades, widely used to structure learning objectives and guide assessment practices. The analysis reveals that its hierarchical organization of cognitive processes continues to provide a useful scaffold for instructional design (West, 2023). However, from an analytical perspective, this enduring relevance must be critically examined in light of contemporary educational demands, particularly the increasing complexity of learning environments shaped by digital technologies and collaborative practices. Therefore, this section distinguishes between synthesized findings derived from the literature and interpretative discussions that evaluate their implications for modern pedagogy (Bloom et al., 1956; Anderson & Krathwohl, 2001). The original taxonomy categorized cognitive processes hierarchically from Knowledge and Comprehension to Application, Analysis, Synthesis, and Evaluation—allowing educators to align instructional activities with progressively complex cognitive skills (Krathwohl, 2002). Despite its long-standing influence, the classical taxonomy has been criticized for its rigid hierarchy and limited attention to affective and psychomotor domains, which are essential for holistic student development (Silver, 2013; Anderson & Krathwohl, 2001). The 2001 revision by Anderson and Krathwohl addressed these limitations by introducing a two-dimensional framework distinguishing cognitive processes from knowledge types and using action-oriented verbs Remember, Understand, Apply, Analyze, Evaluate, and Create thus facilitating active learning and pedagogical flexibility (Voogt et al., 2015). However, empirical studies reveal that even the revised taxonomy has limited application in contemporary classrooms, particularly in technology-enhanced, collaborative, and project-based learning environments (Brown et al., 2016; Saifi et al., 2024).

The review further highlights that modern educational practices increasingly require



competencies not explicitly addressed by either the original or revised taxonomy. A deeper thematic synthesis reveals three major gaps across the literature: (1) the underrepresentation of digital and technological competencies, (2) the limited integration of collaborative and socio-constructivist learning processes, and (3) the insufficient emphasis on creativity as a core learning outcome. Comparative analysis across studies indicates that while some adaptations attempt to incorporate these competencies, they often remain fragmented and lack theoretical coherence. This suggests the need for a more integrative framework that systematically embeds these competencies within the taxonomy. Skills such as critical thinking, creativity, digital literacy, and collaborative problem-solving are central to 21st-century learning (Arievitch, 2020). However, empirical studies indicate that these competencies are often insufficiently operationalized within taxonomy-based instructional design (Nehru et al, 2025). For instance, research on digital learning environments shows that learners frequently engage in multimodal knowledge construction, integrating analysis, evaluation, and creation simultaneously processes that are not easily accommodated within a strictly hierarchical framework. Additionally, studies on collaborative learning highlight the importance of social interaction and co-construction of knowledge, which extend beyond individual cognitive processes emphasized in the taxonomy (Mulcare & Shwedel, 2017)). Moreover, the hierarchical nature of the taxonomy does not fully capture the nonlinear, iterative, and interconnected processes of contemporary learning (Gonsalves, 2026). From a constructivist and socio-cultural perspective, learning is understood as an active, recursive process in which knowledge is continuously constructed, deconstructed, and reconstructed through interaction with content, peers, and contexts. In such environments, cognitive processes do not occur in a fixed sequence but are dynamically interwoven. For example, learners engaged in problem-based learning simultaneously analyze problems, evaluate potential

solutions, and create new knowledge artifacts. This conceptual mismatch highlights the need to reconceptualize taxonomic models as flexible and networked rather than strictly hierarchical (Verywell Mind, 2023). The affective and socio-emotional dimensions, critical for engagement, motivation, and collaboration, also remain inadequately addressed in conventional taxonomy applications. This gap underscores the need for holistic frameworks that integrate cognitive, affective, and psychomotor domains and can accommodate modern pedagogical approaches (Baktybayev & Tussubayeva, 2020) .

In terms of pedagogical implications, the findings suggest that Bloom's Taxonomy should be employed flexibly as a reflective guide rather than a prescriptive hierarchy. In practical terms, this requires educators to design learning experiences that integrate multiple cognitive levels within a single activity, rather than sequencing them rigidly. For example, instructors can develop project-based assignments that simultaneously engage students in analyzing real-world problems, evaluating alternative solutions, and creating innovative outputs. Additionally, the integration of digital tools—such as collaborative platforms, simulation software, and multimedia production tools—can facilitate the development of higher-order thinking skills in authentic contexts. Such approaches enable the taxonomy to function as a dynamic framework aligned with contemporary pedagogical practices. Educators can adapt the taxonomy to design learning objectives, instructional strategies, and assessments that foster critical thinking, creativity, and digital competencies (Saifi et al., 2024). Emerging adaptations, such as Bloom's Digital Taxonomy, provide practical mechanisms for integrating technology-enhanced learning with cognitive development objectives. This adaptation reinterprets traditional cognitive categories through digital activities, such as “remembering” through bookmarking or searching, “analyzing” through data visualization, and “creating” through multimedia production. However, while this model offers practical



relevance, it also raises critical questions regarding its theoretical coherence and empirical validation. Further research is needed to evaluate whether these digital adaptations genuinely enhance learning outcomes or merely re-label existing practices without substantial pedagogical (Saifi et al., 2024). From a theoretical perspective, this review confirms the importance of continuously evaluating and adapting educational frameworks to maintain their relevance in rapidly changing learning contexts. Integrating dimensions such as collaboration, creativity, and digital literacy can bridge existing gaps, thereby enhancing the taxonomy's utility for contemporary pedagogy

Overall, the literature indicates that while Bloom's Taxonomy remains a valuable conceptual foundation, significant limitations persist in its application to contemporary educational contexts. These findings directly address the objectives of this study by demonstrating the taxonomy's strengths in structuring cognitive processes, while also highlighting its limitations in accommodating 21st-century competencies and dynamic learning environments. Furthermore, the analysis underscores the need for adaptive frameworks that align theoretical constructs with practical pedagogical demands, thereby reinforcing the study's aim to bridge the gap between traditional educational theory and modern learning practices. These include limited coverage of modern competencies, insufficient attention to affective and socio-emotional domains, and a lack of empirical evidence regarding implementation in digitally mediated and collaborative learning contexts (Hart, 2018; Torraco, 2005; Voogt et al., 2015). Addressing these gaps provides opportunities for developing adaptive, flexible, and context-sensitive taxonomic models. Building on the findings of this review, a potential direction involves the development of an integrative taxonomy that incorporates three interrelated dimensions: (1) cognitive processes, (2) affective and socio-emotional engagement, and (3) digital and collaborative competencies. Such a model would

move beyond hierarchical categorization toward a multidimensional framework that reflects the complexity of contemporary learning. By conceptualizing learning as an interaction among these dimensions, educators can design more holistic and context-responsive instructional strategies (Zapalska et al, 2018). Such models would ensure that Bloom's Taxonomy continues to serve as a relevant and effective framework for guiding learning and assessment in contemporary educational practice.

## CONCLUSIONS

This critical review demonstrates that while Bloom's Taxonomy remains influential, its application in contemporary education reveals significant conceptual and practical limitations. Consistent with the findings, both the original and revised models exhibit limitations in addressing nonlinear learning processes and 21st-century competencies. These limitations highlight the need to reconceptualize the taxonomy as a flexible and multidimensional framework. Additionally, affective and socio-emotional domains, as well as emerging competencies such as digital literacy, creativity, and collaborative problem-solving, are insufficiently addressed within traditional taxonomy frameworks.

The review also highlights a gap between theoretical revisions and practical implementation in modern classrooms. Although adaptations like the revised cognitive framework and digital taxonomies offer promising ways to integrate active and technology-enhanced learning strategies, empirical evidence on their effectiveness remains limited. This study contributes by proposing the integration of cognitive, affective, and psychomotor dimensions into adaptive taxonomic models that integrate cognitive, affective, and psychomotor domains while supporting the development of 21st-century competencies.

In conclusion, Bloom's Taxonomy remains a foundational tool in education, but its continued relevance depends on ongoing refinement and contextual adaptation. Educators should integrate project-based, collaborative, and technology-



enhanced learning strategies within taxonomy-based instructional design, using it to guide learning objectives, instructional strategies, and assessment practices in ways that foster creativity, critical thinking, collaboration, and digital literacy. Future research should employ empirical and mixed-method designs to evaluate the effectiveness of taxonomy-based approaches in digital and collaborative learning contexts to ensure alignment between theoretical frameworks and contemporary educational needs. By bridging the gap between theory and practice, educational taxonomies can continue to support holistic learner development in modern education.

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