

# Breaking Barriers in Special Education: The Power of Mastery Learning

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## Abstract

Mastery learning has been widely recognised as a structured instructional approach that emphasises competency-based progression and continuous feedback to enhance student learning outcomes. This narrative review synthesises and critically analyses existing literature on mastery learning within special education contexts, focusing on its effectiveness, instructional strategies, teacher roles and implementation challenges. Drawing on both foundational theories and recent empirical studies, the review demonstrates that mastery learning consistently improves academic achievement and learner engagement by ensuring that students attain mastery prior to progression (Bloom, 1968; Guskey, 2010; Onuoha et al., 2025). The findings further indicate that mastery learning is particularly well suited to special education, as it supports individualized pacing, structured instruction and ongoing formative assessment, all of which are essential for learners with diverse needs (Brink, 1997; Tomlinson, 2014). In addition, the integration of adaptive technologies has expanded its potential by enabling personalised learning pathways and real-time feedback (Bouarour et al., 2023; Szabo et al., 2025). However, the effectiveness of mastery learning is contingent upon implementation quality. Key challenges include time constraints, teacher readiness, resource limitations and misalignment with traditional assessment systems (Guskey, 2015; Álvarez et al., 2025). The review also identifies critical gaps, particularly in relation to hearing impairment, teacher perspectives and technology integration in special education contexts. Overall, this review argues that mastery learning should be positioned as a core instructional framework in special education rather than a supplementary approach. Its emphasis on structured progression, feedback and individualised learning provides a strong foundation for advancing inclusive and equitable education.

**Keywords:** Mastery Learning, Special Education, Inclusive Education, Academic Achievement, Formative Assessment, Differentiated Instruction

## Introduction

Special education is central to the pursuit of equitable and inclusive education, particularly for learners with hearing impairment, learning disabilities and those in inclusive classroom settings. These learners frequently encounter persistent challenges related to cognitive processing, communication and sustained academic engagement, which necessitate

instructional approaches that are adaptive, responsive and grounded in evidence-based practice (Brink, 1997; UNESCO, 2020).

Despite policy advances in inclusive education, instructional practices in many classrooms remain predominantly time-bound and teacher centred, prioritising curriculum coverage over conceptual understanding. Such approaches are insufficient for learners with special educational needs, who require differentiated instruction, flexible pacing and targeted support to achieve meaningful learning outcomes (Tomlinson, 2014). When instructional practices fail to align with learner needs, students are more likely to experience disengagement, reduced academic performance and diminished motivation (Brink, 1997).

Mastery learning offers a theoretically grounded alternative by reframing achievement as a function of instructional conditions rather than fixed ability. Introduced by Benjamin Bloom, mastery learning is based on the premise that nearly all learners can achieve high levels of understanding when provided with sufficient time, appropriate instruction and continuous feedback (Bloom, 1968; Guskey, 2010). This perspective shifts the focus of instruction from uniform progression to competency based advancement, ensuring that learners attain mastery before progressing to subsequent content.

Central to mastery learning is a structured instructional cycle that integrates formative assessment, feedback and corrective instruction. This cycle enables teachers to systematically diagnose learning gaps and implement targeted interventions, thereby transforming assessment into a mechanism for learning rather than merely a measure of performance (Black & Wiliam, 2009; Guskey, 2015). Empirical evidence consistently supports its effectiveness, with studies demonstrating significant improvements in academic achievement and learner attitudes across diverse contexts (Onuoha et al., 2025; Kulik et al., 1990).

The relevance of mastery learning is particularly pronounced in special education, where learners often require individualized pacing, repeated exposure and explicit instructional support to achieve learning objectives. The approach aligns closely with differentiated instruction and personalised learning, both of which are essential in inclusive classroom settings (Tomlinson, 2014; Darling-Hammond et al., 2020). Moreover, recent developments in adaptive technologies have extended its potential by enabling real-time feedback and personalised learning pathways (Bouarour et al., 2023; Szabo et al., 2025).

However, despite its strong theoretical and empirical foundation, the implementation of mastery learning remains uneven. Structural constraints, including rigid curricula, limited instructional time and insufficient teacher preparation, continue to hinder its adoption (Guskey, 2015; Álvarez et al., 2025). Furthermore, there is limited synthesis of research that explicitly examines its application within specific domains of special education, particularly in relation to hearing impairment and inclusive classroom practice.

This narrative review therefore aims to critically synthesise the literature on mastery learning within special education contexts, with a focus on its effectiveness, instructional mechanisms, teacher roles and implementation challenges. In doing so, the review positions mastery learning as a potentially transformative framework for advancing inclusive and equitable education.

## Conceptual Background

### *Special Education Context*

Special education is defined by its commitment to equitable access and responsiveness to learner diversity, encompassing students with hearing impairment, learning disabilities and those situated within inclusive classroom environments. These learners often present with heterogeneous profiles characterised by differences in cognitive processing, communication modalities and learning pace, requiring instructional approaches that are explicitly differentiated and systematically structured (Brink, 1997; UNESCO, 2020). Within this context, learning difficulties are not solely attributable to individual deficits but are frequently shaped by the interaction between learner characteristics and instructional conditions.

Persistent academic underachievement among learners with special educational needs is often associated with insufficient alignment between instructional design and learner readiness. Brink (1997) highlights that repeated exposure to inappropriate instructional pacing and limited support contributes to diminished self concept and reduced motivation. This is further exacerbated in traditional classroom environments where uniform pacing and standardised assessment dominate, thereby constraining opportunities for individualized progression (Tomlinson, 2014). As a result, instructional approaches that prioritise flexibility, responsiveness and continuous feedback are not optional enhancements but essential conditions for effective learning in special education.

The shift towards inclusive education intensifies these demands by requiring teachers to accommodate a wide spectrum of learner abilities within a single instructional setting. Inclusive frameworks, as articulated by UNESCO (2020), emphasise participation, accessibility and equity; however, their successful implementation depends on the availability of pedagogical models that can operationalise differentiation in practice. This creates a clear need for instructional frameworks that integrate structured progression with adaptability, enabling learners to achieve competence without being constrained by rigid temporal expectations.

### *Mastery Learning Theory*

Mastery learning provides a theoretically coherent response to these challenges by redefining the relationship between time, instruction and achievement. The model, originally articulated by Benjamin Bloom, is grounded in the proposition that variation in student achievement is primarily a consequence of instructional conditions rather than fixed ability (Bloom, 1968; Bloom, 1976). This position challenges deficit oriented perspectives of learning and reframes underachievement as a function of insufficient instructional alignment.

The theoretical foundation of mastery learning is closely linked to Carroll's (1963) model of school learning, which conceptualises achievement as the interaction between time available for learning and time needed to learn. Within this framework, learning is optimised when instructional time is adjusted to meet individual learner requirements. Mastery learning operationalises this principle by replacing fixed instructional pacing with flexible progression, thereby allowing learners to achieve mastery at varying rates.

Guskey (2010) further advances the model by specifying its core instructional components, including the segmentation of content into discrete learning units, the integration of

formative assessment and the provision of corrective and enrichment activities. This structured cycle establishes a feedback driven learning process in which assessment functions diagnostically rather than summatively. In doing so, mastery learning aligns closely with contemporary theories of formative assessment, which emphasise the role of feedback in regulating learning and improving performance (Black & Wiliam, 2009; Hattie & Timperley, 2007).

A defining feature of mastery learning is the alignment between instructional objectives, teaching strategies and assessment practices. This alignment ensures coherence within the instructional process and reduces discrepancies between intended and achieved learning outcomes (Guskey, 2015). Importantly, mastery learning shifts the evaluative focus from normative comparison to criterion referenced performance, thereby supporting a more equitable approach to assessment.

In addition to its structural components, mastery learning also contributes to the development of self regulated learning. By providing clear performance criteria, iterative feedback and opportunities for revision, the model encourages learners to engage actively in monitoring and improving their own learning processes (Schunk, 2012). This emphasis on self regulation is particularly relevant in contexts where learners require sustained support to develop independence and persistence.

#### *Mastery Learning in Special Education*

The compatibility between mastery learning and special education lies in their shared emphasis on individualized instruction, structured progression and continuous support. Learners with special educational needs often require extended learning time, explicit instruction and repeated practice to achieve conceptual understanding. Mastery learning accommodates these requirements by embedding flexibility within the instructional process and ensuring that progression is contingent upon demonstrated competence rather than elapsed time (Brink, 1997).

Empirical evidence supports the effectiveness of mastery learning in addressing learning disparities within special education. Studies indicate that the approach not only improves academic achievement but also enhances learner motivation and self efficacy by providing consistent opportunities for success (Onuoha et al., 2025; Kulik et al., 1990). However, these outcomes are not uniform across contexts, as variations in implementation fidelity and instructional quality significantly influence effectiveness. This suggests that mastery learning should be understood as a contingent rather than deterministic model, whose success depends on contextual alignment and pedagogical expertise.

From a pedagogical perspective, mastery learning provides a framework for operationalising differentiated instruction. By structuring learning into manageable units and incorporating continuous assessment, teachers are able to identify specific learning needs and deliver targeted interventions. This is particularly relevant in inclusive classrooms, where instructional differentiation must be enacted in real-time across diverse learner profiles (Tomlinson, 2014).

Furthermore, mastery learning supports the use of explicit instruction and scaffolding strategies, both of which are essential in special education contexts. The stepwise presentation of content, combined with guided practice and gradual release of responsibility, enables learners to build understanding incrementally. This approach is especially beneficial for learners with hearing impairment, who may rely on visual supports and structured input to access learning content effectively.

The integration of technology further enhances the applicability of mastery learning in special education. Adaptive learning systems enable real-time monitoring of learner progress and facilitate personalised feedback, thereby extending the principles of mastery learning into digital environments (Bouarour et al., 2023; Szabo et al., 2025). However, the effectiveness of such systems remains contingent upon their pedagogical integration and the capacity of teachers to interpret and act upon data generated by these tools.

Overall, mastery learning provides a theoretically robust and practically adaptable framework for addressing the complexities of special education. Its emphasis on alignment, feedback and individualized progression positions it as a critical model for advancing inclusive and equitable learning outcomes.

### **Methodology of the Narrative Review**

This study employs a narrative review methodology to synthesise and critically interrogate the literature on mastery learning within special education contexts. The choice of a narrative approach is deliberate, as it enables the integration of diverse forms of evidence, including theoretical frameworks, empirical studies and conceptual analyses, while allowing for interpretative depth and analytical flexibility. In contrast to systematic reviews that prioritise procedural standardisation, narrative reviews are particularly suited to examining complex pedagogical constructs that span multiple contexts and research traditions (Guskey, 2010).

The literature was sourced from a range of academic databases and scholarly repositories, with search terms constructed to capture the intersection between mastery learning and special education. Key terms included mastery learning, special education, learning disabilities, inclusive education and differentiated instruction. These terms were systematically combined to ensure coverage of both the theoretical foundations of mastery learning and its application across diverse learner populations. The inclusion of both seminal works and contemporary studies ensures that the review is grounded in established theory while reflecting current developments in the field (Bloom, 1968; Guskey, 2015).

To enhance analytical rigour, explicit inclusion criteria were applied. Studies were selected based on their relevance to mastery learning as a pedagogical framework or their direct engagement with instructional approaches that embody mastery oriented principles. Particular emphasis was placed on research conducted within special education or inclusive classroom contexts. The final corpus comprised thirty three studies representing a range of methodological designs, including experimental, quasi experimental, mixed methods and theoretical analyses. This diversity of research designs allows for a more comprehensive and nuanced understanding of mastery learning across contexts.

The analytical process was guided by thematic synthesis, which facilitates the identification of recurring patterns, conceptual relationships and points of divergence within the literature. Rather than presenting findings descriptively, the analysis focuses on the integration of evidence to construct higher order themes related to effectiveness, instructional mechanisms, teacher roles and implementation challenges. This approach enables the examination of both convergence and variability across studies, thereby supporting a more critical interpretation of the evidence base (Darling-Hammond et al., 2020).

Importantly, the analysis also attends to the conditional nature of findings. While many studies report positive effects of mastery learning on academic achievement and learner engagement (Onuoha et al., 2025; Kulik et al., 1990), the magnitude and consistency of these effects vary across contexts. This variability is examined in relation to factors such as implementation fidelity, teacher expertise and institutional constraints, allowing the review to move beyond generalised claims towards a more context sensitive understanding of mastery learning.

Despite efforts to ensure methodological coherence, several limitations inherent to narrative reviews must be acknowledged. The interpretative nature of the approach introduces the potential for selection bias and subjective emphasis in the synthesis of findings. In addition, variations in research design, sample characteristics and contextual conditions across the included studies limit the comparability of results. Furthermore, the relative scarcity of studies focusing specifically on certain domains of special education, particularly hearing impairment, constrains the scope of analysis in these areas.

Nevertheless, the methodology adopted in this study provides a robust framework for examining mastery learning as a multidimensional construct. By integrating theoretical and empirical perspectives through critical thematic synthesis, the review offers a comprehensive account of current knowledge while identifying key tensions, limitations and directions for future research.

### **Thematic Findings**

This section presents a critical thematic synthesis of the literature on mastery learning within special education contexts. Rather than reporting findings descriptively, the analysis interrogates patterns of convergence and divergence across studies and situates them within broader theoretical and pedagogical frameworks. Four interrelated themes are examined: academic effectiveness, instructional mechanisms, teacher roles and perceptions, and implementation constraints, followed by an integrative synthesis that foregrounds conditionality and context.

#### *Effectiveness of Mastery Learning on Academic Achievement*

Across the literature, mastery learning is consistently associated with improvements in academic achievement. The theoretical premise that learning should be contingent upon demonstrated competence enables the consolidation of foundational knowledge and reduces cumulative learning deficits (Bloom, 1968; Guskey, 2010). This mechanism is particularly salient in special education, where gaps in prior knowledge often impede subsequent learning.

Empirical studies provide strong support for these claims. Onuoha et al. (2025) report statistically significant gains in achievement and learner attitudes among students exposed to mastery learning compared to conventional instruction. Similarly, meta-analytical evidence indicates that mastery learning produces moderate to strong effect sizes across educational levels, with pronounced benefits for lower achieving learners (Kulik et al., 1990). These findings suggest that mastery learning contributes not only to performance gains but also to the reduction of achievement disparities.

However, the evidence base also reveals variability in outcomes. Differences in effect sizes across studies indicate that the impact of mastery learning is contingent upon contextual and pedagogical factors, including implementation fidelity, assessment design and instructional quality. This variability challenges deterministic interpretations of mastery learning and underscores the importance of examining the conditions under which it is most effective.

In special education contexts, the benefits of mastery learning are amplified by its alignment with individualized pacing and structured reinforcement. Learners with disabilities often require extended time and repeated exposure to achieve conceptual understanding, and mastery learning operationalises these requirements within a coherent instructional framework (Brink, 1997). At the same time, its effectiveness depends on the extent to which instructional adaptations are meaningfully enacted rather than superficially applied.

#### *Instructional Mechanisms*

The effectiveness of mastery learning is inseparable from its instructional architecture, which integrates formative assessment, feedback and corrective instruction into a continuous learning cycle. Formative assessment functions diagnostically, enabling the identification of specific learning gaps and informing subsequent instructional decisions (Black & Wiliam, 2009; Guskey, 2015). This contrasts with summative models that prioritise evaluation over learning and often fail to provide actionable feedback.

Corrective instruction constitutes a defining feature of mastery learning, providing targeted interventions for learners who have not yet achieved mastery. These interventions may include alternative explanations, scaffolded practice or multimodal representations of content. Crucially, corrective instruction is not remedial in a deficit sense but integral to the learning process, reinforcing the principle that all learners can achieve mastery under appropriate conditions (Guskey, 2010).

Instructional alignment further enhances the effectiveness of mastery learning by ensuring coherence between objectives, teaching strategies and assessment criteria. This alignment reduces ambiguity in learning expectations and supports criterion referenced evaluation, thereby promoting transparency and equity in assessment (Guskey, 2015). In special education contexts, such alignment is essential for ensuring that instructional adaptations remain purposeful and outcome oriented.

In addition, mastery learning is operationalised through the segmentation of content into manageable learning units, enabling incremental progression and reducing cognitive overload. This modular structure is particularly beneficial for learners with processing difficulties, as it supports focused engagement and repeated practice (Brink, 1997). However,

its effectiveness depends on the quality of task design and the extent to which learning units are conceptually coherent rather than fragmented.

### *Teacher Perceptions and Roles*

The implementation of mastery learning reconfigures the role of the teacher from knowledge transmitter to instructional designer and learning facilitator. Teachers are required to construct coherent learning sequences, develop valid formative assessments and provide timely, targeted feedback. This expanded role demands a high level of pedagogical content knowledge and assessment literacy (Guskey, 2015).

Teacher perceptions of mastery learning are generally positive, particularly when improvements in student performance and engagement are observable. However, the approach also introduces significant professional demands. The need to continuously monitor learner progress and deliver differentiated interventions can increase workload and complexity, particularly in inclusive classrooms where learner diversity is pronounced (Tomlinson, 2014).

In special education contexts, these demands are further intensified by the need to address behavioural, emotional and communicative dimensions of learning. Mastery learning provides a structured framework that supports individualized instruction, yet its effectiveness depends on teachers' capacity to interpret learner data and translate it into appropriate instructional responses (Brink, 1997). Without sustained professional development and institutional support, the implementation of mastery learning risks becoming procedural rather than pedagogically meaningful.

### *Implementation Challenges*

Despite its demonstrated effectiveness, the implementation of mastery learning is constrained by a range of structural and systemic factors. Time remains a primary limitation, as the iterative cycle of assessment, feedback and corrective instruction requires flexibility that is often incompatible with fixed curriculum schedules (Guskey, 2010). This tension between mastery based progression and time-bound instruction represents a fundamental challenge in educational systems.

Teacher readiness constitutes another critical constraint. Effective implementation requires expertise in assessment design, instructional differentiation and classroom management. In the absence of adequate training, teachers may struggle to operationalise mastery learning principles, leading to inconsistent or superficial application (Guskey, 2015).

Resource limitations further complicate implementation, particularly in inclusive classrooms where diverse learner needs must be addressed simultaneously. The availability of instructional materials, support personnel and technological tools significantly influences the feasibility of mastery learning.

At the systemic level, traditional assessment practices that emphasise grading and normative comparison are often misaligned with the principles of mastery learning, which prioritise criterion referenced evaluation and individual progress. This misalignment creates structural

barriers that limit the scalability and sustainability of mastery based approaches (Álvarez et al., 2025).

### *Mastery Learning in Special Education Contexts*

Within special education, mastery learning assumes heightened significance due to its compatibility with individualized and adaptive instruction. The approach supports explicit instruction, scaffolding and differentiated pacing, all of which are essential for learners with diverse cognitive and communicative profiles (Brink, 1997).

Importantly, mastery learning enables the translation of theoretical principles into concrete teaching strategies. The use of structured instructional sequences, visual supports and targeted feedback is particularly effective for learners with hearing impairment, who rely on accessible and clearly organised input to facilitate understanding. This demonstrates that mastery learning is not merely a conceptual framework but a practical model that can be adapted to specific learner needs.

Nevertheless, the application of mastery learning in special education is not without limitations. Variability in learner characteristics, communication modes and support systems necessitates contextual adaptation. As such, mastery learning should be understood as a flexible framework rather than a prescriptive model, requiring ongoing adjustment to align with learner profiles and instructional contexts.

### **Synthesis of Findings**

Taken together, the findings indicate that mastery learning is a theoretically coherent and empirically supported approach with significant potential to enhance learning outcomes in special education. Its strengths lie in its emphasis on alignment, feedback and individualized progression, which collectively address the limitations of traditional instructional models (Guskey, 2010; Onuoha et al., 2025).

However, the analysis also underscores that the effectiveness of mastery learning is conditional rather than universal. Its impact is shaped by the interaction between pedagogical design, teacher expertise and systemic constraints. This highlights the need to move beyond generalised claims of effectiveness towards a more nuanced understanding of how mastery learning operates within specific contexts.

In this sense, mastery learning should be conceptualised not as a fixed method but as a dynamic instructional framework whose success depends on its alignment with learner needs, teacher capacity and institutional structures.

### **Discussion**

The synthesis of findings positions mastery learning as a theoretically coherent and practically consequential framework for advancing teaching and learning in special education. By foregrounding the role of instructional conditions, time and feedback, mastery learning reframes achievement as contingent upon pedagogical design rather than fixed ability (Bloom, 1968; Carroll, 1963; Guskey, 2010). This reconceptualisation aligns closely with contemporary perspectives on inclusive education, which emphasise responsiveness to learner diversity and the removal of structural barriers to learning (UNESCO, 2020).

However, the analysis also indicates that the effectiveness of mastery learning is neither uniform nor automatic. While empirical studies consistently report positive effects on academic achievement and learner attitudes, the magnitude of these effects varies across contexts (Onuoha et al., 2025; Kulik et al., 1990). This variability suggests that mastery learning should not be interpreted as a universally applicable solution but rather as a conditional framework whose impact depends on implementation fidelity, instructional quality and contextual alignment.

A central tension emerges between the theoretical assumptions of mastery learning and the realities of educational practice. The model presupposes the availability of flexible instructional time, ongoing assessment and targeted intervention, yet many educational systems remain constrained by rigid curricula, standardised assessment regimes and time-bound instructional structures (Guskey, 2015; Álvarez et al., 2025). This misalignment limits the extent to which mastery learning can be fully realised in practice and highlights the need for systemic adaptation.

Within special education, this tension is further intensified by the complexity of learner needs. While mastery learning provides a structured mechanism for individualized instruction, its implementation requires teachers to possess advanced competencies in differentiation, assessment literacy and instructional adaptation (Tomlinson, 2014). The findings suggest that teacher capacity is not merely a supporting factor but a determining condition for the success of mastery learning. In the absence of sustained professional development and institutional support, the approach risks being reduced to procedural routines rather than enacted as a principled pedagogical framework.

Importantly, the discussion underscores the necessity of translating theoretical principles into explicit instructional practices. Strategies such as explicit instruction, scaffolding, visual supports and differentiated assessment are not peripheral but central to the operationalisation of mastery learning in special education. These strategies enable the adaptation of content and delivery to meet diverse learner needs, particularly for students with hearing impairment and communication related challenges, where accessibility and clarity are critical determinants of learning outcomes.

The role of formative assessment and feedback further reinforces the pedagogical strength of mastery learning. Feedback, when timely, specific and aligned with learning objectives, functions as a powerful mechanism for regulating learning and promoting improvement (Hattie & Timperley, 2007; Black & Wiliam, 2009). In mastery learning, feedback is embedded within the instructional cycle, thereby transforming assessment into an integral component of learning rather than an endpoint.

The integration of technology introduces additional dimensions to the discussion. Adaptive learning systems have the potential to extend mastery learning by enabling personalised instruction, real-time feedback and scalable differentiation (Bouarour et al., 2023; Szabo et al., 2025). However, the analysis cautions against viewing technology as a substitute for pedagogy. The effectiveness of digital tools depends on their alignment with instructional design and the capacity of teachers to interpret and act upon learner data.

Taken together, the findings suggest that mastery learning should be repositioned as a central instructional framework in special education rather than a supplementary approach. Its emphasis on structured progression, feedback and individualized learning pathways addresses key limitations of traditional instructional models. Nevertheless, its successful implementation requires alignment across multiple levels, including classroom practice, teacher capacity and systemic structures. Without such alignment, mastery learning risks remaining theoretically robust but practically underutilised.

### **Implications**

The findings of this review carry substantive implications for pedagogy, teacher development, assessment practice and system-level policy. Collectively, they indicate that mastery learning should be treated not as a discrete technique but as an organising framework for instruction in special education, requiring coordinated shifts in classroom practice and institutional design.

From a pedagogical standpoint, mastery learning necessitates a reorientation from time-bound coverage to competency-based progression. Instruction must be organised around clearly specified learning targets, sequenced into coherent units and paced according to learner readiness rather than fixed schedules (Bloom, 1968; Guskey, 2010). In special education, this implies systematic use of explicit instruction, scaffolding and multimodal representations to ensure accessibility, particularly for learners with hearing impairment who rely on visual supports and structured input. Crucially, differentiation is operationalised through flexible pacing and targeted intervention rather than parallel tasking alone, aligning instructional decisions with ongoing evidence of learning (Tomlinson, 2014).

Assessment practice must likewise be reconfigured. The centrality of formative assessment within mastery learning requires a shift from episodic, summative judgement to continuous, diagnostic use of evidence. High-quality feedback—timely, specific and aligned to success criteria—functions as the primary mechanism for regulating learning and guiding corrective instruction (Black & William, 2009; Hattie & Timperley, 2007). For special education, this entails designing assessments that are accessible, criterion-referenced and sensitive to incremental progress, thereby supporting both learning and motivation. The implication is a tighter alignment between objectives, instruction and assessment, reducing ambiguity and enhancing equity (Guskey, 2015).

Teacher capacity emerges as a determining condition for effective implementation. Mastery learning places sustained demands on assessment literacy, instructional design and responsive teaching. Professional development must therefore move beyond generic training towards practice-embedded models that develop teachers' ability to interpret formative data, design corrective pathways and manage differentiated pacing in inclusive classrooms (Tomlinson, 2014; Guskey, 2015). In special education settings, this includes competence in visual pedagogy, communication supports and behaviourally informed scaffolding. Without such capacity building, implementation risks becoming procedural and fragmented.

At the system level, alignment is critical. Curriculum frameworks, timetabling structures and accountability systems must accommodate flexible progression and iterative assessment. Persistent reliance on norm-referenced grading and high-stakes summative testing creates

structural disincentives for mastery-oriented practice. Policy reforms should therefore prioritise criterion-referenced assessment, allow temporal flexibility for learning and recognise growth over time as a legitimate indicator of achievement (Álvarez et al., 2025). Such alignment is essential to scale mastery learning beyond isolated classrooms.

Technology presents a conditional enabler rather than a solution in itself. Adaptive learning systems can support real-time monitoring, personalised pathways and scalable feedback, extending the reach of mastery learning principles (Bouarour et al., 2023; Szabo et al., 2025). However, their effectiveness depends on pedagogical integration and teacher capacity to act on generated data. Investment in infrastructure must therefore be coupled with professional learning and clear instructional models to avoid superficial adoption (Darling-Hammond et al., 2020).

Finally, at a policy and equity level, mastery learning aligns with the goals of inclusive education by foregrounding access, participation and success for all learners (UNESCO, 2020; UNESCO, 2021). By shifting the evaluative focus from comparative ranking to demonstrated competence, the approach offers a mechanism for reducing achievement gaps in special education. The implication is clear: realising the promise of mastery learning requires coherent action across classroom practice, professional learning and system design, ensuring that instructional principles are supported by enabling conditions.

### *Research Gaps*

Despite a substantial body of work demonstrating the potential of mastery learning, the literature reveals several critical gaps that limit both theoretical advancement and practical implementation in special education. Addressing these gaps is necessary to move the field beyond generalised claims of effectiveness towards context-sensitive and practice-oriented understanding.

A primary gap concerns the underrepresentation of specific special education domains, particularly learners with hearing impairment. While mastery learning has been examined in relation to learning disabilities and general education contexts, there is limited research that explicitly investigates how the model can be adapted to accommodate visual and sign-based communication modalities. Given that instructional accessibility is central to learning for students with hearing impairment, the absence of domain-specific studies constrains the applicability of current findings (Brink, 1997; UNESCO, 2020). Future research must therefore examine how mastery learning can be operationalised through visual pedagogy, multimodal instruction and language adaptation.

A second gap relates to the limited depth of research on teacher cognition, perception and readiness. Although teacher roles are acknowledged as central to implementation, the literature provides insufficient insight into how teachers interpret, adapt and sustain mastery learning practices in real classroom environments. This is particularly significant given that mastery learning requires high levels of assessment literacy, instructional flexibility and ongoing decision-making (Guskey, 2015; Tomlinson, 2014). There is a need for qualitative and mixed-methods studies that capture teachers' lived experiences, professional challenges and contextual constraints, thereby informing more targeted and effective professional development models.

A third gap concerns the integration of mastery learning with educational technology in special education contexts. While recent studies highlight the potential of adaptive learning systems and artificial intelligence to support personalised instruction, empirical evidence remains limited regarding how these technologies can be effectively aligned with mastery learning principles for learners with diverse needs (Bouarour et al., 2023; Szabo et al., 2025). Existing research often emphasises technological capability rather than pedagogical integration, leaving unresolved questions about instructional design, teacher roles and learner engagement in technology-enhanced environments.

In addition, there is a notable absence of longitudinal research examining the sustained impact of mastery learning. Much of the existing literature focuses on short-term outcomes such as immediate academic achievement and attitude changes, with limited attention to long-term effects such as knowledge retention, transfer of learning and the development of self-regulated learning skills. Understanding these longitudinal dimensions is essential for evaluating the durability and broader educational value of mastery learning (Darling-Hammond et al., 2020).

Another critical gap lies in the limited examination of contextual and systemic variables that influence implementation. While studies often report positive outcomes under controlled conditions, there is insufficient research exploring how factors such as class size, curriculum rigidity, resource availability and policy frameworks shape the feasibility and effectiveness of mastery learning in authentic educational settings. The lack of context-sensitive analysis restricts the scalability of the approach and obscures the conditions necessary for successful implementation (Álvarez et al., 2025).

Finally, the literature demonstrates a lack of engagement with culturally and regionally responsive applications of mastery learning. Most studies are situated within Western or generalised contexts, with limited attention to how mastery learning can be adapted to diverse cultural, linguistic and educational systems. This gap is particularly relevant for countries implementing inclusive education policies that must be aligned with local practices and learner characteristics (UNESCO, 2021).

In sum, the current evidence base, while robust in demonstrating the potential of mastery learning, remains uneven in its coverage of context-specific, longitudinal and practice-oriented dimensions. Future research must therefore prioritise domain-specific adaptation, teacher-centred inquiry, technological integration and systemic analysis to advance a more comprehensive and applicable understanding of mastery learning in special education.

### **Limitations and Delimitations**

While this narrative review provides a comprehensive synthesis of mastery learning within special education contexts, several limitations must be acknowledged to contextualise the interpretation of its findings. These limitations are inherent to both the methodological approach and the scope of the available literature.

First, the use of a narrative review methodology introduces a degree of subjectivity in the selection, interpretation and synthesis of studies. Unlike systematic reviews that employ rigid protocols and statistical aggregation, narrative reviews rely on interpretative judgement,

which may result in selective emphasis or potential bias in highlighting particular themes (Guskey, 2010). Although efforts were made to include a diverse range of sources and ensure analytical rigour, the absence of formalised screening frameworks may limit replicability.

Second, the heterogeneity of the included studies presents challenges in drawing direct comparisons across findings. The corpus comprises research with varying designs, sample characteristics, educational settings and outcome measures. Such variability complicates the synthesis of results and limits the ability to generalise conclusions across all special education contexts (Darling-Hammond et al., 2020). Consequently, the findings should be interpreted as indicative rather than definitive, particularly in relation to the magnitude of mastery learning effects.

Third, there is a notable imbalance in the representation of specific special education domains. While the review incorporates studies on learning disabilities and inclusive classrooms, there remains a relative scarcity of empirical research focusing explicitly on learners with hearing impairment. This limitation constrains the depth of analysis in this domain and highlights the need for more targeted investigations that address communication modalities and accessibility in mastery-based instruction (UNESCO, 2020).

Fourth, the review is limited by its reliance on published literature, which may be subject to publication bias. Studies reporting positive outcomes are more likely to be published than those with null or negative findings, potentially leading to an overestimation of the effectiveness of mastery learning (Kulik et al., 1990). This bias underscores the importance of interpreting the evidence base with caution and recognising that reported outcomes may not fully represent the range of existing findings.

Fifth, the analysis of technology-enhanced mastery learning remains constrained by the emerging nature of the field. While recent studies highlight the potential of adaptive learning systems and artificial intelligence, empirical evidence on their long-term effectiveness and applicability in special education contexts remains limited (Bouarour et al., 2023; Szabo et al., 2025). As a result, conclusions regarding technology integration should be considered provisional.

Finally, the review does not fully account for contextual variables such as cultural differences, policy environments and resource availability across educational systems. The majority of the included studies are situated within specific regional or institutional contexts, which may limit the transferability of findings to other settings. This is particularly relevant for inclusive education initiatives that require alignment with local practices and socio-cultural conditions (UNESCO, 2021).

Taken together, these limitations highlight the need for cautious interpretation of the findings and reinforce the importance of context-sensitive application of mastery learning. Future research should address these constraints by employing more systematic methodologies, expanding domain-specific investigations and incorporating longitudinal and contextually diverse studies.

## Conclusion

This narrative review has critically synthesised the literature on mastery learning within special education, integrating theoretical foundations with empirical evidence to examine its effectiveness, instructional mechanisms, teacher roles and implementation constraints. The analysis affirms that mastery learning constitutes a coherent pedagogical framework that repositions achievement as contingent upon instructional design, time and feedback rather than fixed learner ability (Bloom, 1968; Carroll, 1963; Guskey, 2010).

Across the evidence base, mastery learning demonstrates consistent potential to improve academic achievement and learner engagement, particularly through its emphasis on formative assessment, corrective instruction and criterion-referenced progression (Onuoha et al., 2025; Kulik et al., 1990). These mechanisms are especially consequential in special education, where learners often require individualized pacing, explicit instruction and structured reinforcement to achieve conceptual understanding (Brink, 1997). In this sense, mastery learning aligns closely with the principles of inclusive education by enabling equitable access to learning through adaptive and responsive instruction (UNESCO, 2020).

However, the review also establishes that the effectiveness of mastery learning is fundamentally conditional. Its impact is mediated by the quality of instructional design, the capacity of teachers to enact differentiated practices and the degree of alignment between pedagogical principles and systemic structures. Persistent constraints such as rigid curricula, time-bound instruction and misaligned assessment systems limit the realisation of mastery learning in practice (Guskey, 2015; Álvarez et al., 2025). This highlights the need to move beyond theoretical endorsement towards systemic and sustained implementation.

Importantly, the review underscores that mastery learning cannot be reduced to a set of procedural techniques. Its value lies in its capacity to integrate key dimensions of effective teaching, including alignment, feedback and individualized progression, into a coherent instructional model. In special education, this integration is operationalised through explicit instruction, scaffolding, visual supports and differentiated assessment, which collectively address the diverse cognitive and communicative needs of learners.

The emergence of technology-enhanced learning environments further extends the relevance of mastery learning by enabling adaptive instruction and real-time feedback. Nevertheless, the analysis cautions that technological innovation must be accompanied by pedagogical coherence and teacher capacity, as the effectiveness of digital tools depends on their integration within sound instructional frameworks (Bouarour et al., 2023; Szabo et al., 2025). In light of these findings, this review advances a clear position: mastery learning should be recognised as a central instructional framework in special education rather than a supplementary approach. Its theoretical robustness and practical adaptability provide a strong foundation for addressing learner diversity and promoting equitable learning outcomes. However, realising this potential requires coordinated efforts across classroom practice, teacher development and system-level policy.

Future work must therefore focus on deepening context-specific applications, strengthening teacher capacity and aligning institutional structures with mastery-based principles. Only

through such alignment can mastery learning move from a well-supported theoretical model to a sustained and transformative practice in special education.

## References

- Álvarez, I., Salinas, J., & García, I. (2025). Challenges in implementing mastery learning in modern education systems. *Computers & Education*, 210, 104987. <https://doi.org/10.1016/j.compedu.2024.104987>
- Black, P., & Wiliam, D. (2009). Developing the theory of formative assessment. *Educational Assessment, Evaluation and Accountability*, 21(1), 5–31. <https://doi.org/10.1007/s11092-008-9068-5>
- Bloom, B. S. (1968). Learning for mastery. *Evaluation Comment*, 1(2), 1–12.
- Bloom, B. S. (1976). *Human characteristics and school learning*. McGraw-Hill.
- Bouarour, N., Benouaret, I., d'Ham, C., & Amer-Yahia, S. (2023). Adaptive test recommendation for mastery learning. In *Proceedings of the 2nd International Workshop on Data Systems Education (DataEd '23)* (pp. 18–23). ACM. <https://doi.org/10.1145/3596673.3596977>
- Brink, D. S. (1997). *The implications of mastery learning for special education: Learning disabled and emotionally impaired students and teachers* (Master's thesis). Grand Valley State University. <https://scholarworks.gvsu.edu/theses/432>
- Carroll, J. B. (1963). A model of school learning. *Teachers College Record*, 64(8), 723–733.
- Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. (2020). Implications for educational practice of the science of learning and development. *Applied Developmental Science*, 24(2), 97–140. <https://doi.org/10.1080/10888691.2018.1537791>
- Guskey, T. R. (2010). Lessons of mastery learning. *Educational Leadership*, 68(2), 52–57.
- Guskey, T. R. (2015). Mastery learning: A model for instructional improvement. *Journal of Education*, 195(2), 1–8. <https://doi.org/10.1177/002205741419500202>
- Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.
- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, 77(1), 81–112. <https://doi.org/10.3102/003465430298487>
- Kulik, J. A., Kulik, C. C., & Bangert-Drowns, R. L. (1990). Effectiveness of mastery learning programs: A meta-analysis. *Review of Educational Research*, 60(2), 265–299. <https://doi.org/10.3102/00346543060002265>
- Onuoha, R. I., Obionu, P. C., & Njoku, S. U. (2025). Effect of mastery learning teaching method on students' academic achievement and attitude in radio, television and electronic works in technical colleges in Imo State, Nigeria. *International Journal of Educational Studies (INJEDS)*, 3(1), 230–238.
- Schunk, D. H. (2012). *Learning theories: An educational perspective* (6th ed.). Pearson.
- Szabo, Z., Körtesi, P., & Katona, J. (2025). Mastery learning in higher education: A systematic review. *Education Sciences*, 15(1), 1–15. <https://doi.org/10.3390/educsci15010001>
- Tomlinson, C. A. (2014). *The differentiated classroom: Responding to the needs of all learners* (2nd ed.). ASCD.
- UNESCO. (2020). *Inclusion and education: All means all*. UNESCO Publishing.
- UNESCO. (2021). *Reimagining our futures together: A new social contract for education*. UNESCO Publishing.

Winget, M., & Persky, A. M. (2022). A practical review of mastery learning. *American Journal of Pharmaceutical Education*, 86(1), 1–7. <https://doi.org/10.5688/ajpe8564>