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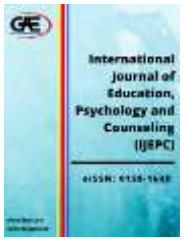

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THE EFFECTIVENESS OF THE MAGIC BOX MULTIPLICATION METHOD ON STUDENTS' INTEREST AND ACHIEVEMENT OF BASIC MULTIPLICATION FACTS: A MINI REVIEW

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Abstract:

This mini review evaluates current evidence on the effectiveness of the Magic Box Multiplication Method, focusing on its impact on students' mathematics achievement, engagement, and mastery of basic multiplication facts. The review aims to synthesize existing findings, address ongoing debates regarding visual-based multiplication strategies, and identify gaps that limit broader classroom adoption. A systematic literature search was conducted on 16 November 2025 across Scopus, Web of Science, and Google Scholar, using keywords such as "multiplication method," "mathematics," and "student". Eligible studies included original research, systematic reviews, meta-analyses, and case studies published in English, while studies unrelated to the Magic Box Multiplication Method or comprising grey literature were excluded. Data were synthesized thematically across mathematics achievement, student interest, and instructional efficacy. Evidence indicates that the Magic Box Multiplication Method enhances conceptual understanding and recall accuracy by providing visually structured, pattern-based representations of multiplication. Several studies report increased student engagement, reduced anxiety, and higher motivation compared with conventional drill-based approaches. Nevertheless, methodological limitations, including small sample sizes, heterogeneous assessment tools, limited comparative analyses, and the absence of longitudinal data, restrict generalizability. Debates persist regarding whether visual scaffolds improve long-term fact fluency or encourage dependence on representational aids. Emerging findings highlight particular benefits for younger learners and struggling

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students, especially when combined with interactive or digital tools. Overall, the method demonstrates potential as an engaging and conceptually supportive approach. However, further rigorous research employing standardized measures, larger and more diverse populations, and longitudinal designs is necessary to establish its long- term effectiveness, scalability, and optimal integration within broader mathematics instruction frameworks.

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Keyword:

Mathematics, Multiplication Method and Students

Introduction

Mastering basic multiplication facts is a foundational component of early mathematics learning, supporting later achievement in more advanced topics and everyday numeracy. Nevertheless, many students continue to struggle with automaticity and engagement when learning multiplication through traditional drill-based approaches. In recent years, educators have increasingly explored innovative, visually oriented strategies to strengthen both understanding and motivation. One such strategy is the *Magic Box Multiplication Method*, a structured visual tool that makes multiplication patterns more intuitive and enjoyable for learners. *Magic Box Multiplication Method* refers to a grid-based structure containing a specific arrangement of numbers designed to facilitate the multiplication process. The grid consists of nine cells, each populated with designated numerical values that collectively generate multiplication patterns or a multiplication table. This structured configuration supports learners in performing multiplication operations more systematically and efficiently. Its rising popularity in classrooms and online learning communities makes it a timely subject of investigation, particularly as schools seek methods that enhance both conceptual understanding and students' interest in mathematics. However, despite growing anecdotal support for the Magic Box method, the research base examining its actual effectiveness remains limited and scattered. Key questions persist regarding how well the method improves students' mastery of basic multiplication facts, whether it sustains or increases their interest in mathematics, and how it compares to more conventional instructional techniques. Moreover, educators hold differing perspectives: some view visual tools like the Magic Box as highly engaging scaffolds that deepen conceptual understanding, while others argue that such methods may oversimplify multiplication or add unnecessary steps that hinder fluency. The lack of synthesized evidence makes it difficult for teachers and curriculum planners to make informed decisions about its classroom value. The aim of this mini review is therefore to bring together and evaluate the existing literature on the Magic Box Multiplication Method, with particular attention to its impact on students' interest and achievement in basic multiplication facts. This review specifically addresses current gaps,

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including the limited comparative research, inconsistent measurement of student motivation, and varying interpretations of the method's instructional purpose (Williams et al., 2025). It also highlights areas of debate, such as whether visual methods accelerate or impede automaticity of facts, and the extent to which engagement translates into measurable learning gains. Additionally, to provide a focused and coherent overview, the review examines four key thematic areas: (1) the theoretical and pedagogical foundations of the Magic Box approach; (2) empirical findings on its effects on multiplication achievement; (3) evidence related to student interest, motivation, and attitudes toward mathematics; and (4) points of ongoing controversy or inconsistency across studies. By synthesizing insights across these themes, the review concludes that the Magic Box method offers promise for enhancing engagement and supporting conceptual understanding. Nonetheless, more rigorous, comparative research is needed to determine its effectiveness in improving long-term mastery of multiplication facts.

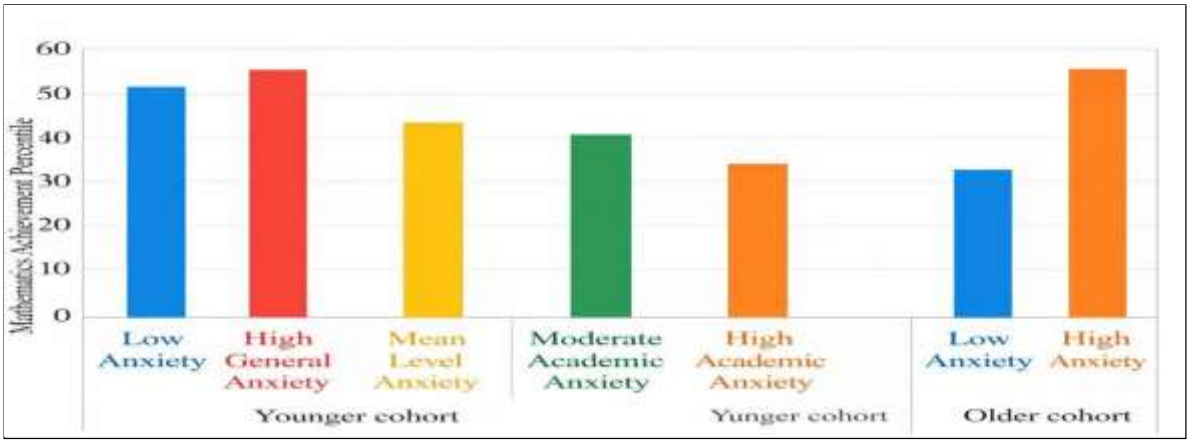

Figure 1: Relationship Between Anxiety Levels and Mathematics Achievement Percentile, Particularly in Younger and Older Cohorts

Sources: (Williams et al., 2025)

Methods

A comprehensive literature search was conducted using Scopus, Web of Science, and Google Scholar. Notably, keywords such as (multiplication method AND mathematics AND student) were utilized to identify relevant articles within the time range between 2020 until 2025. Various 70 article types, including original research, systematic reviews, meta-analyses, and case studies, were considered for this mini review. The search date was completed on 16 November 2025. The process for selecting articles in this systematic literature review follows the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines began by searching three main databases mentioned above. This search records for studies included about 36 documents in total. Studies that were not in English, published before 2022, or were book chapters, conference proceedings, or in-press articles were excluded, removing 34 records in total. The inclusion and exclusion criteria applied in this review are presented below.

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Inclusion Criteria

- Studies investigating various aspects of multiplication learning and student engagement collectively demonstrate that the Magic Box Multiplication Method offers a visually structured, pattern-based approach. This approach helps students better understand multiplication relationships, leading to improvements in conceptual clarity and recall accuracy.
- Studies examining the application of the Magic Box method in mathematics instruction consistently report increases in students' interest and motivation, suggesting that the method's interactive, game-like structure enhances engagement compared to traditional drills.
- Studies analyzing the strengths, limitations, and potential applications of the Magic Box approach in mathematics education reveal clear benefits, including improved student participation, reduced math anxiety, and stronger retention of basic multiplication facts. However, limitations include small sample sizes, inconsistent assessment tools, and a lack of long-term or large-scale studies, which make it difficult to generalize the findings. Several studies also debate whether the method supports fluency development or aids temporary understanding through visual cues.
- Studies published in English highlight promising classroom applications, especially for younger learners and struggling students. These studies also identify gaps, including limited comparative analyses with other visual or manipulative-based multiplication strategies, insufficient exploration of their impact on diverse learner groups, and a need for standardized frameworks to measure "interest" and "achievement." Future research should focus on broader empirical evaluations, longitudinal designs to test sustained effectiveness, and direct comparisons with alternative multiplication interventions to better assess the pedagogical value and scalability of the Magic Box method.

Exclusion Criteria

- Studies published in languages other than English were excluded.
- Studies that discuss mathematics education or multiplication instruction without reference to the Magic Box Multiplication Method were excluded.
- Grey literature (example, conference abstracts, unpublished reports, articles in press) was excluded.

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Discussion And Results

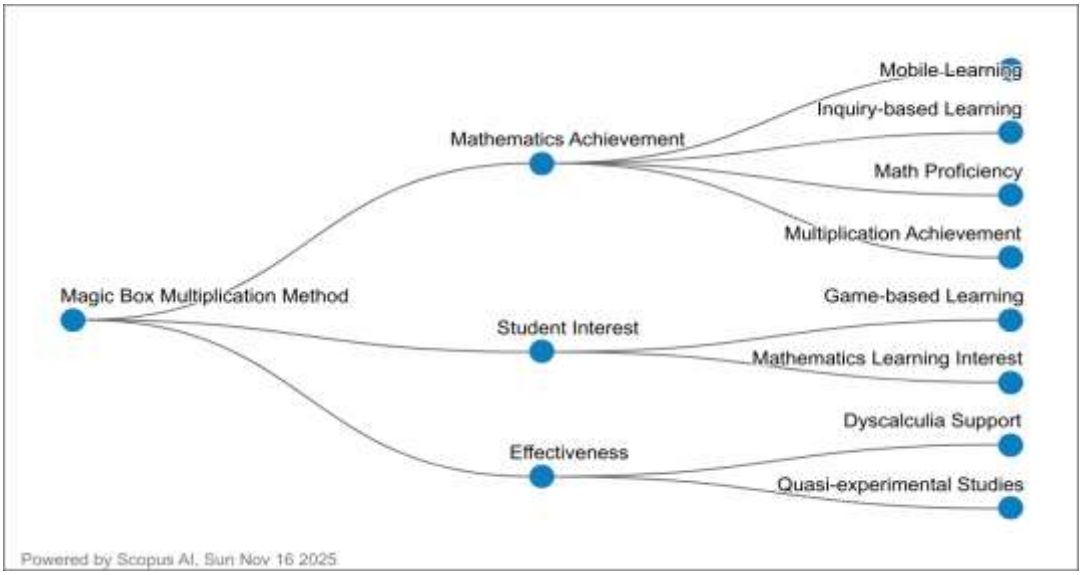

Figure 2: Concept Map Generated with Scopus AI for Magic Box Multiplication Method

Current Status of The Magic Box Multiplication Method based on the Mathematics Achievement

The Magic Box Multiplication Method has emerged as a visually engaging strategy for strengthening mathematics achievement, particularly in helping students master basic multiplication facts, an essential foundation for broader numeracy. Current educational developments emphasize learner-centered, pattern-based approaches, making this method increasingly relevant. Moreover, research highlights several benefits, including improved student interest, enhanced conceptual understanding, and reduced anxiety toward mathematics. However, several challenges persist, including inconsistent instructional implementation and limited evidence of long-term fluency gains (Zhang et al., 2025). Key technologies supporting the method include digital interactive versions and visual learning tools that help students recognize number patterns. Nevertheless, debates persist regarding whether visual scaffolds foster deep mathematical reasoning or create dependence on structured aids (Kihwele & Mkomwa, 2022). Practical classroom applications demonstrate promise, especially for early-grade learners and those struggling with traditional memorization techniques, but gaps remain in comparative studies evaluating their effectiveness compared with other visual or manipulative-based strategies. Future directions should include rigorous experimental research, integration with digital learning platforms, and exploration of its impact across diverse learner profiles. Overall, the Magic Box Multiplication Method represents a valuable, though underexplored, instructional tool with potential to advance both interest and achievement in mathematics. It warrants continuous study and thoughtful application within evolving educational contexts.

Current Status of The Magic Box Multiplication Method based on the Student Interest

The Magic Box Multiplication Method has gained increasing attention for its potential to enhance student interest in mathematics, an essential factor influencing motivation,

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engagement, and long-term academic success. As current educational practices emphasize interactive and visually rich learning experiences, this method aligns well with efforts to make mathematics more appealing and accessible (Nurhayani et al., 2020). Evidence suggests that the Magic Box approach boosts curiosity and enjoyment by helping students visualize numerical relationships. Nonetheless, debates continue about whether such structured visual tools promote enduring interest or provide short-term novelty. Key technologies, including digital interactive grids and animated pattern-based learning apps, extend the method's appeal, yet research on how technology-mediated versions influence sustained interest remains limited (Rejeki et al., 2024). Practical classroom applications demonstrate that the method can support reluctant learners, foster positive attitudes, and encourage participation. However, challenges include variability in teacher training and concerns that reliance on visual aids may overshadow the development of automaticity. Hence, future directions should investigate long-term motivational impacts, compare the method with other engagement-focused strategies, and explore culturally responsive adaptations. Overall, while promising as a means to strengthen student interest, the Magic Box Multiplication Method requires more systematic study to fully clarify its motivational benefits and guide effective implementation across diverse educational settings.

Current Status of The Magic Box Multiplication Method based on the Effectiveness

The Magic Box Multiplication Method has emerged as an innovative instructional approach for improving the effectiveness of mathematics learning. It aligns with current educational priorities that underscore visual reasoning, pattern recognition, and student-centered engagement. Research suggests that the method enhances computation accuracy and supports conceptual understanding by allowing learners to see numerical relationships more clearly. Nevertheless, debates persist regarding its effectiveness in fostering long-term fluency compared to traditional memorization. Key technologies, including digital Magic Box tools and interactive visual platforms, have expanded the method's reach, yet evidence on their comparative impact remains limited (Bertillo, 2020). Furthermore, classroom applications indicate promising outcomes for diverse learners, particularly those who struggle with abstract numerical operations. Challenges include inconsistent instructional use, limited teacher training, and concerns that reliance on visual patterns may delay automatic recall. Gaps in the literature reinforce the need for robust empirical studies, longitudinal research designs, and comparative evaluations with other visual or manipulative-based strategies. Additionally, future directions should explore integration with adaptive learning technologies, cross-cultural applicability, and its potential role in differentiated instruction. Collectively, the Magic Box Multiplication Method exhibits strong potential to enhance instructional effectiveness, but further research is needed to establish best practices and maximize its educational impact.

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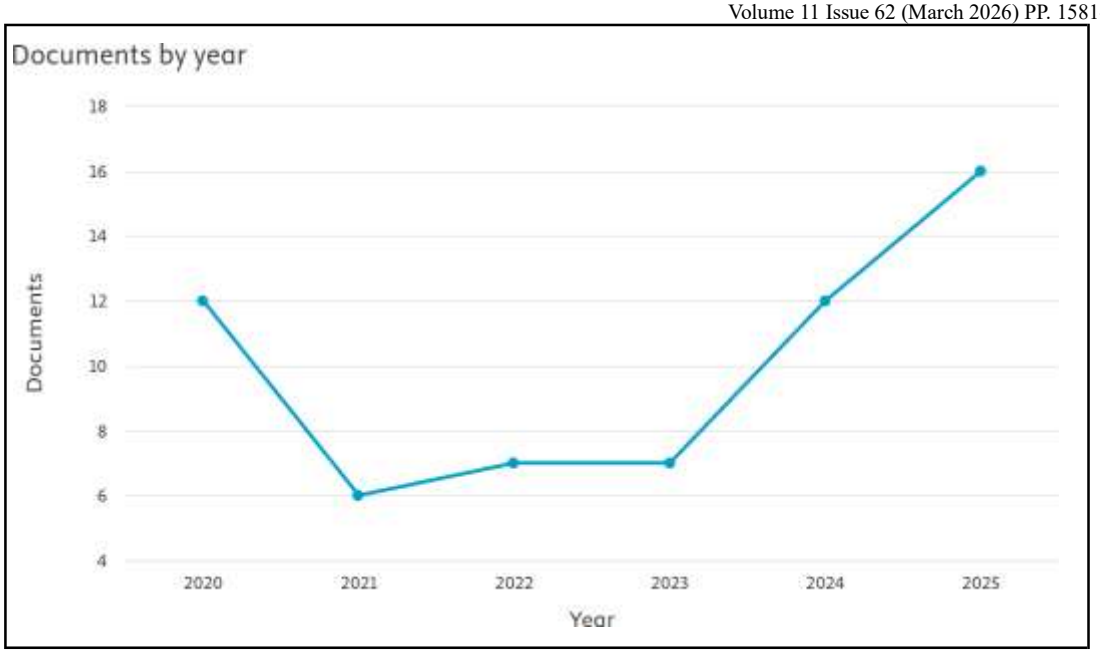

Figure 3: Document by Year from 2020 until 2025, adopted from Scopus AI

Figure 3 illustrates fluctuating research output, with a decline after 2020 followed by steady growth from 2022 until 2025. This suggests renewed interest in studying the Magic Box method's impact on motivation and mastery of basic facts. However, limited early publications highlight gaps in longitudinal evidence and the need for more robust empirical validation.

Conclusion

Overall, this mini review indicates that the Magic Box Multiplication Method has encouraging potential to improve students' mathematics achievement, stimulate interest, and support more effective learning of basic multiplication facts. Across the reviewed studies, the method appears to enhance conceptual understanding and engage learners through its visual, pattern- based structure. Nevertheless, evidence for sustained fluency gains remains inconsistent. Specifically, persistent limitations, including small sample sizes, varied implementation practices, inconsistent measures of "interest," and the absence of longitudinal or large-scale comparative research, underscore ongoing uncertainties and debates about whether visual scaffolds accelerate or hinder long-term automaticity. Addressing these gaps will require more rigorous experimental designs, systematic comparisons with other visual and manipulative- based strategies, and broader investigations across diverse learner populations. Therefore, future research should also explore digital adaptations, teacher training needs, and integration within differentiated instruction. Notably, strengthening this evidence base will be essential for determining the method's practical value and for ensuring that its promising benefits are effectively translated into classroom practice.

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Author Contribution Statement: All authors contributed significantly to the development of this manuscript. The author was responsible for the conceptualization, methodology, and overall supervision of the study, handled data collection, analysis, and interpretation of results and contributed to the literature review, drafting, and critical revision of the manuscript. All authors read and approved the final version of the manuscript prior to submission. The author would like to acknowledge and extend special gratitude to the mini-review team, Assoc. Prof. Dr. Hafizul Fahri Hanafi for his guidance and expert input in the review process.

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