THE ROLE OF EDUCATIONAL MEDIA IN INCREASING INTEREST IN LEARNING MATHEMATICS IN ELEMENTARY SCHOOL

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ABSTRACT

This study investigates the role of educational media in enhancing elementary students' interest in learning mathematics, a subject often perceived as abstract and disengaging at early educational levels. The primary objective is to explore which types of instructional media—such as digital games, interactive videos, and augmented reality—are most effective in fostering student interest and how contextual variables like teacher competence and infrastructure influence their effectiveness. Employing a library research method, this study systematically reviewed empirical studies from the last five years, utilizing thematic analysis to identify key patterns and gaps. The findings reveal that highly interactive media, particularly game-based and augmented reality tools, significantly increase students' enthusiasm and motivation toward mathematics when supported by relevant content and capable facilitation. A key novelty of this study lies in its emphasis on the affective outcomes of learning—specifically interest—rather than solely cognitive achievements, and in its integration of contextual factors often overlooked in previous studies. Additionally, the study contributes a conceptual framework connecting media types, classroom context, and sustained student interest. The results underscore the importance of aligning educational media with learners' developmental needs and school environments to optimize engagement. In conclusion, the study provides a comprehensive foundation for future research and practical implementation, especially for educators and policymakers aiming to revitalize mathematics learning in primary education through technology-enhanced instruction.

Keywords: Educational media, mathematics learning, student interest, elementary education, digital tools

INTRODUCTION

In contemporary elementary education, the integration of educational media into mathematics instruction is increasingly recognized as a pivotal strategy for enhancing student engagement and interest. Learning media serve as tools and materials that stimulate learners' senses, thoughts, and emotions, thereby fostering a more dynamic learning environment (Muhaimin et al., 2023). When thoughtfully selected and implemented, such media can transform abstract mathematical concepts into concrete, relatable experiences, thus aligning with the theoretical underpinnings of experiential learning and the "cone of experience" model. This supports the notion that students retain and appreciate information more when it is delivered through interactive or visual media rather than solely through abstract symbols (Muhaimin et al., 2023).

Furthermore, interest in mathematics among elementary school students is strongly correlated with motivational and affective factors; students who find

mathematics enjoyable and accessible are more likely to invest effort and persist through challenges. Recent empirical studies show that when instructional media are engaging, interactive, and aligned with students' prior knowledge and contexts, their interest in mathematics significantly increases (Senga, 2023; Sarifah et al., 2025). For example, media such as interactive videos, game-based applications, and web-based platforms offer feedback, immediate reinforcement, and student autonomy all of which are key elements in self-determination theory of motivation (Sarifah et al., 2025). Thus, deploying appropriate educational media has the potential not only to support conceptual understanding but also to cultivate positive attitudes and increased interest in mathematics among primary school learners.

Despite efforts to integrate instructional media into elementary mathematics education, significant barriers remain that hinder the effective enhancement of interest and engagement in the subject. Students at the primary level frequently demonstrate low motivation and reluctance toward mathematics, in part because many perceive it as abstract, difficult, or disconnected from real-life contexts. Moreover, teachers often rely on conventional, teacher-centred methods and lack access to or training in high-quality interactive media, which limits their ability to provide stimulating and student-centred learning experiences. Additionally, the availability, accessibility, and adaptability of educational media remain uneven across schools, contributing to a gap between potential pedagogical innovation and actual classroom practice. As a result, although media-rich instruction holds promise for improving attitudes toward mathematics, the research indicates that interest remains modest and inconsistent unless the media are well integrated, contextually relevant, and supported by teacher competence and institutional infrastructure.

Many studies have explored the effectiveness of educational media in enhancing mathematics learning outcomes among elementary school students; however, less attention has been given to how these media specifically influence students' interest in mathematics rather than just performance. For instance, while recent work discusses interactive and game-based media in school mathematics, it often focuses on achievement metrics and overlooks motivational and affective dimensions such as interest, enjoyment, or attitude toward mathematics. Moreover, much of the research has concentrated on digital media development and implementation but paid limited attention to contextual factors like teacher competence, infrastructure disparities, and integration into everyday classroom practice, which may moderate the impact of media on interest. Thus, there is a gap in understanding not only *if* media increase interest in mathematics, but *how* and under what conditions they succeed in doing so at the elementary level.

Furthermore, existing literature often lacks longitudinal evidence on whether increased interest sustained by educational media translates into long-term engagement and improvement in mathematics learning among primary students. Many interventions report immediate post-test results or short-term affective gains, but there is insufficient research tracking students over several months or across grade levels to see if initial interest persists. In addition, while media technologies are more accessible now, there is

a paucity of studies from varied socio-economic and infrastructure settings (especially in developing countries) examining how resource constraints, teacher training, and school environment affect the adoption and effectiveness of these media in enhancing interest. This indicates a clear gap in empirical evidence regarding the contextual and implementation-related factors that mediate the relationship between educational media and students' mathematical interest in diverse elementary school settings.

This research distinguishes itself by focusing explicitly on how specific types of educational media influence the *interest* in learning mathematics among elementary school students, rather than solely measuring conventional outcomes such as achievement or conceptual mastery. While prior studies have demonstrated that interactive digital media can enhance mathematical understanding and motivation, most fail to disaggregate the kinds of media (e.g., game-based vs video vs augmented reality) and the contextual conditions under which they effectively stimulate interest. For example, research on digital media in elementary mathematics learning summarizes broad trends but stops short of linking media type + classroom context to sustained interest. Moreover, this study incorporates a mixed-method design that captures both quantitative shifts in interest and qualitative insights into students' perceptions and classroom usage of media a methodological approach rarely found in existing literature. This enables the identification of nuanced mechanisms (such as media-teacher synergy, contextual fit, and engagement patterns) that mediate the relationship between educational media and students' interest in mathematics. In doing so, the research fills a gap by mapping *how* and *under what conditions* media can stimulate interest, thereby offering more actionable insight for practitioners and policymakers than studies focused solely on outcomes.

The primary objective of this study is to investigate the effect of selected educational media on elementary students' interest in learning mathematics, examining both the magnitude of the effect and the contextual factors that influence media effectiveness. Specifically, the study aims to identify which types of media (e.g., game-based, video-enhanced, augmented reality) produce the greatest increase in students' interest, measured through self-report scales, observation of engagement behaviours, and teacher reflections. In addition, the study seeks to explore the moderating role of classroom context, including teacher competence in media use, availability of infrastructure, and alignment with curriculum goals. Finally, the research intends to generate practical recommendations for designing and implementing educational media interventions that are sustainable and scalable within elementary school settings.

RESEARCH METHOD

In this research, a library research method will be adopted, which involves systematically collecting, analysing, and synthesising existing literature relevant to the role of educational media in elementary mathematics learning. The method begins with identifying key databases and sources (e.g., Scopus, Google Scholar, ERIC) to gather articles published in the past five years, and then applying inclusion and exclusion criteria to ensure the relevance and quality of each source (Chukwuere, 2023). Next, the literature

will be categorized according to themes such as types of media, student interest outcomes, and contextual moderating factors, enabling a structured narrative or integrative review framework (Snyder, 2024). This approach allows for mapping the current state of knowledge, identifying research gaps, and deriving theoretical and practical implications for our topic. Moreover, the review method will include critical appraisal of each study's methodology, sample, and findings to assess rigor and transferability to elementary school settings. The aim is to synthesise findings in a way that supports the development of a conceptual model and recommendations, rather than merely summarising studies. Given that this study does not involve new primary data collection, the library research method is especially suitable, offering a rigorous way to build on and extend existing knowledge in a transparent and replicable manner (Adeoye, 2024). The method will also emphasise transparency (e.g., documenting search strings, databases, years, screening flow) to enhance validity and reliability of the review process.

The data in this study will be collected from secondary sources, primarily consisting of peer-reviewed journal articles, conference proceedings, theses, and credible educational databases published within the last five years. A structured search strategy will be applied using databases such as Scopus, ERIC, Google Scholar, and DOAJ, with search terms like "educational media," "mathematics interest," and "elementary school." Inclusion criteria will focus on studies involving elementary-level mathematics and media interventions, while exclusion criteria will eliminate unrelated, outdated, or non-peer-reviewed sources (Adeoye, 2024). To ensure transparency and replicability, all selected articles will be documented in a review matrix including publication year, authors, methods, findings, and relevance to research objectives (Snyder, 2024). This matrix will serve as a tool to organize, categorize, and synthesize key findings across the collected literature. Priority will be given to studies that address motivational outcomes, interest enhancement, or contextual implementations of media in primary school environments. The data collection phase will conclude with thematic categorization of sources, grouping them by media type, context, and outcome to support the subsequent analysis. All literature included will undergo cross-verification by at least two researchers to ensure objectivity and comprehensiveness.

Data analysis in this study will follow a thematic content analysis approach, focusing on extracting recurring themes, patterns, and gaps across the selected literature. The review matrix developed during the data collection phase will support this process by grouping studies according to identified key themes such as media types (digital games, videos, AR), levels of student interest, and contextual factors (teacher readiness, infrastructure). Each theme will be analyzed qualitatively, comparing and contrasting findings from different studies to draw meaningful conclusions about how educational media impacts students' interest in mathematics (Chukwuere, 2023). In addition, coding will be applied to key excerpts or conclusions within the literature, allowing for synthesis of not only similarities but also contrasting viewpoints or contradictory evidence. This form of qualitative synthesis helps to build an integrative framework showing causal relationships, mediating variables, and implementation challenges. Findings will be

mapped visually in a table or diagram to show how various media types influence student interest under different conditions. Finally, limitations of the reviewed studies will also be analyzed to inform future research directions and reinforce the originality of the current study.

RESULTS AND DISCUSSION

The findings from this literature-based study reveal that educational media types significantly influence students' interest in learning mathematics at the elementary level. As shown in Table 1, digital games and augmented reality (AR) emerge as the most impactful media, especially among students in higher grades such as Grade 5 and Grade 6. These tools provide high levels of interactivity, autonomy, and contextual visualization, making abstract concepts more accessible and engaging (Rahman et al., 2024; Putri et al., 2023). Interactive videos also show a moderate influence, particularly in semi-urban settings where technology access is improving. On the other hand, more traditional forms of media, such as slide-based presentations, demonstrate lower impact due to their passive nature and limited feedback opportunities (Wijaya, 2024). Manipulative tools remain relevant in rural areas but require teacher mediation for optimal use (Syafitri, 2025). These findings affirm the importance of aligning media type with both student profile and classroom context.

Table 1. Media Types and Interest Levels

Class	Group	Pre-Test Score (%)	Post-Test Score (%)	(Points)
Media Type	Reported Interest Level	Student Age Group	Study Context	Source
Digital Games	High	Grade 4	Urban	Rahman et al. (2024)
Interactive Video	Moderate	Grade 5	Semi-Urban	Lestari & Huda (2025)
Augmented Reality	High	Grade 6	Urban	Putri et al. (2023)
Slide-based Presentation	Low	Grade 3	Rural	Wijaya (2024)
Manipulative Tools	Moderate	Grade 5	Rural	Syafitri (2025)

Further analysis highlights several key factors that mediate the effectiveness of educational media in fostering mathematics interest. As detailed in Table 2, teacher competence plays a critical role; even the most advanced media fail to engage students when teachers lack the training to implement them effectively (Utami, 2023). Media familiarity among students is also vital tools that are introduced gradually and intuitively

tend to produce better results (Hamzah, 2025). Infrastructure gaps, particularly in rural schools, remain a persistent barrier to effective media use (Kurniawan, 2024). Additionally, interest is maximized when content is highly relevant to the curriculum and provides real-time feedback, reinforcing learning motivation (Nasution, 2025; Darmawan, 2024). These findings suggest that simply adopting educational media is not sufficient; thoughtful integration, guided use, and institutional support are essential for long-term impact on interest.

Table 2. Factors Affecting Media Effectiveness

Factor	Positive Influence	Barrier Identified	Study Examples	Recommendation
Teacher Competence	Yes	Lack of Training	Utami (2023)	Teacher PD
Media Familiarity	Yes	Initial Resistance	Hamzah (2025)	Gradual Introduction
Access to Technology	Partial	Infrastructure Gaps	Kurniawan (2024)	Invest in IT
Content Relevance	Yes	Misalignment with Curriculum	Nasution (2025)	Curriculum Alignment
Student Autonomy	Yes	Lack of Guidance	Rizki (2023)	Scaffolded Learning
Feedback Mechanism	Yes	Delayed Feedback	Darmawan (2024)	Real-time Systems

The findings reveal that when educational media are dynamically integrated into mathematics instruction, students' interest in the subject increases markedly, especially when media are interactive and contextually relevant. For example, the use of interactive animation media in elementary mathematics significantly elevated interest levels from pretest to posttest scores. Additionally, educational games and media puzzles tailored for young learners also contributed to higher engagement and enthusiasm for mathematics. These empirical outcomes align with the patterns shown in the tables: media types with high interactivity (e.g., digital games, AR, blended media) correlate with "High" reported interest levels, and mediating factors such as teacher competence, infrastructure, and content relevance play critical roles in determining effectiveness. Importantly, this suggests that the mere presence of media is not sufficient its *fit* with student age, context, technological readiness, and pedagogical design strongly influences outcomes. As one study observed, even in schools with access to digital tools, students' interest remained modest if the media lacked curriculum alignment or teacher facilitation. Overall, these findings underscore the value of designing educational media interventions that are

interactive, contextually adapted, and supported by teacher and infrastructure readiness, to truly enhance mathematics learning interest among primary students.

This research presents novel contributions by extending the scope of educational media in mathematics learning beyond traditional digital formats, focusing specifically on the integration of interactive and emerging technologies within elementary school settings. For instance, recent studies highlight animation-based media and interactive digital tools as enhancing interest in mathematics, yet many lack detailed exploration of elementary students' affective responses and media alignment with curriculum standards (Umar, 2025). The current study advances this by systematically investigating *which types* of educational media (e.g., game-based, augmented reality, hybrid interactive modules) most strongly foster interest, thereby moving beyond the common outcome of achievement alone to highlight motivational outcomes (Apriani et al., 2025). Additionally, the research incorporates contextual variables including teacher readiness, infrastructural levels, and student autonomy as mediators of media-effectiveness, which prior work seldom addresses. For instance, while interactive digital media have shown promise in higher education, applications at the primary level remain under-explored (Ariyanto et al., 2023). By situating the investigation within elementary mathematics and emphasizing interest (rather than only performance), this study addresses a clear gap and delivers actionable insights for practice and policy.

A further innovative element of this study lies in its methodological synthesis: rather than deploying one media-type intervention, the review draws from a broad range of recent studies (2020–2025) across diverse media forms to generate a conceptual model linking media characteristics, contextual conditions, and student interest outcomes. For example, while other reviews focus on media effectiveness in terms of cognition (Apriani et al., 2025), few extend to formulating mechanisms by which media stimulate interest and sustain it over time, especially within elementary school contexts (Ningsi, 2025). Moreover, this research explicitly addresses the *sustainability* and scalability dimension—How can schools with varying resources, teacher competence levels, and student profiles successfully adopt educational media to boost interest? Such questions are rarely addressed in the literature to date (Suhartuti, 2025). The integration of interest (affective domain) alongside traditional measures, and the handling of contextual variables, thus constitute a substantive originality in the study's design and theoretical contribution.

This research holds global relevance as it addresses a widely recognized educational challenge: declining student interest in mathematics at the elementary level. By examining how various forms of educational media such as digital games, interactive videos, and augmented reality can enhance students' motivation and engagement, the study contributes to the international discourse on innovative pedagogy in STEM education. The findings provide actionable insights for educators, curriculum designers, and policymakers globally, particularly in developing countries where resource allocation for educational technology must be efficient and evidence-based. Moreover, the study's emphasis on contextual variables such as infrastructure, teacher competence, and media

accessibility ensures its recommendations are adaptable across socio-economic settings. As education systems worldwide grapple with digital transformation post-COVID-19, this research offers a timely and scalable approach to integrating educational media for deeper, interest-driven learning. Through its library-based methodology and cross-contextual literature synthesis, the study adds theoretical and empirical value to global efforts to foster early interest in mathematics an essential foundation for future innovation and economic growth.

CONCLUSION

Based on the results and discussion, it can be concluded that the integration of educational media significantly enhances students' interest in learning mathematics at the elementary school level. Media types such as digital games, augmented reality, and blended formats consistently show high levels of engagement, particularly when aligned with students' developmental stages and contextual needs. The study also confirms that interest is not solely influenced by media design but also by teacher competence, infrastructure, and curriculum alignment. These findings emphasize that effective media implementation requires both pedagogical and technological readiness. Furthermore, educational media that promote interactivity, autonomy, and real-time feedback tend to sustain student motivation over time. Thus, choosing the right type of media and ensuring contextual fit is key to boosting interest in mathematics learning. This study contributes to a deeper understanding of how media-based instruction can support affective learning outcomes and offers a valuable framework for future classroom innovation.

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