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Gimkit's Instructional Value in Secondary Mathematics Education: An Integrative Review

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Abstract. This article provides an integrative review of Gimkit, a game-based learning platform utilised in numerous secondary mathematics classrooms. The review synthesises findings from 26 studies and classroom-based reports published between 2018 and 2025 to investigate the ways in which Gimkit facilitates teaching and learning. Sources were identified through searches of ERIC, ScienceDirect, and SpringerLink, complemented by practice-based reports sourced via Google Scholar. PRISMA-style reporting was employed to enhance transparency in the identification, screening, and selection of sources. It focuses on four key areas: real-time feedback, student engagement, understanding of mathematics concepts, and teacher support. The review is guided by Self-Determination Theory, which explains how motivation improves when students experience choice, confidence, and connection with others. A thematic analysis informed by Self-Determination Theory was used to synthesise findings across the included sources. The findings indicate that Gimkit can help students remain motivated and participate more actively in class. Features such as instant feedback, flexible game modes, and point-based rewards make learning mathematics more engaging. However, some challenges persist, including limited support for deeper conceptual understanding, an overemphasis on competition, and access issues in under-resourced schools. Gimkit works best when used as part of a well-planned mathematics lesson. It can support practice and review but should be combined with strategies such as class discussions, group work, and time for reflection. Teachers also require support to use Gimkit effectively and equitably. The article offers practical ideas for mathematics teachers and curriculum planners and suggests areas for future research, particularly regarding how Gimkit supports learning over time and how it can be adapted for different school contexts.

Keywords: conceptual understanding; formative feedback; gamification; mathematics instruction; student engagement

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1. Introduction

The increasing utilisation of digital tools within the educational landscape has resulted in a heightened adoption of interactive platforms that facilitate teaching and learning, particularly within mathematics classrooms (Aldhafeeri & Khan, 2016). These tools are frequently employed to enhance student motivation and participation while also supporting instructional decision-making. As Kim (2015) elucidates, "gamification is currently being utilised in education and libraries for the purpose of improving user engagement and instruction" (p. 29). In this review, the term 'students' refers specifically to secondary school learners. Across numerous educational institutions, such platforms are progressively employed to modernise lessons and foster more active, student-centred learning environments (Bond et al., 2020).

One illustrative example of such a platform is Gimkit, a game-based learning tool that is now commonly employed by educators during review sessions and formative activities. Although empirical research surrounding Gimkit remains limited, studies conducted in other subject areas suggest that the platform can facilitate engagement, motivation, and learning outcomes. Reported advantages include enhanced participation in language learning (Huang, 2022; Nur Rahman & Anam, 2024; Saputra, 2025), improved recall and conceptual understanding in science and vocational subjects (Hafifurrezy et al., 2024; Rohimat, 2024; Mustafah et al., 2025), and increased confidence and achievement in general classroom activities (Andriana et al., 2024; Harahap, 2025). In particular, innovative applications of the platform through Gimkit Creative have been demonstrated to "foster student engagement and perform formative assessments in their classes" (Shah et al., 2025, p. 1).

Within the domain of mathematics education, research on gamified learning has predominantly centred on established platforms such as Kahoot and Quizizz, which are extensively documented for their roles in promoting motivation and formative assessment (Göksün & Gürsoy, 2019; Wang & Tahir, 2020; Muchuweni et al., 2025). Recent reviews similarly reflect this focus, with newer platforms like Gimkit receiving comparatively less attention in mathematics-focused studies (Sánchez-Arévalo et al., 2025; Slamet & Meng, 2025). In this context, the present study offers an integrative review of existing research and classroom-based literature to explore the instructional roles, strengths, and limitations of Gimkit in secondary mathematics classrooms.

1.1. Research Problem

Although game-based platforms are widely utilised in educational settings, research on how Gimkit specifically supports teaching and learning in secondary mathematics remains limited. Most studies on gamification in mathematics have concentrated on well-established platforms, such as Kahoot and Quizizz (now Wayground), rather than Gimkit (Ling et al., 2022; Alt, 2023; Ortiz-Rojas et al., 2025). These established platforms have demonstrated their effectiveness in enhancing student engagement and facilitating formative assessment (Hamari et al., 2014; Göksün & Gürsoy, 2019; Wang & Tahir, 2020). Consequently, existing reviews and empirical studies typically generalise findings across gamified tools, often assuming similar instructional effects apply to Gimkit without directly investigating its distinct design features, pacing, and reward structures. Due to the relatively limited attention Gimkit has received in the research literature, its instructional value in secondary mathematics is not yet well comprehended. In particular, there is scant evidence elucidating how Gimkit supports feedback, student motivation, and deeper mathematical thinking.

Few studies have synthesised available evidence to examine how Gimkit's specific features correlate with established theories of motivation and formative assessment in mathematics classrooms. This is particularly pertinent, as fast-paced game-based activities can sometimes result in surface learning or transient interest if not employed judiciously (Wang, 2015; Bicen & Kocakoyun, 2018). In the absence of an integrative review of existing evidence regarding Gimkit in secondary mathematics, educators may utilise the platform without clear guidance on its efficacy in supporting their teaching objectives or enhancing student learning outcomes.

Moreover, the lack of a theory-informed synthesis constrains the understanding of whether reported increases in engagement translate into substantial instructional support or enduring learning. This article seeks to address this gap by synthesising the available research and classroom insights regarding the use and effects of Gimkit. By employing an integrative review approach informed by Self-Determination Theory, the study provides a focused synthesis that differentiates Gimkit from other gamified platforms and elucidates its unique instructional roles, strengths, and limitations in secondary mathematics classrooms. Additionally, it offers practical guidance for the effective use of the platform in secondary mathematics education and contributes to broader discussions regarding formative assessment and student motivation in gamified learning contexts (Black & Wiliam, 2009; Ryan & Deci, 2000).

1.2. Rationale

There remains a limited and clear explanation of how Gimkit aligns with current secondary mathematics teaching, despite the platform's widespread use among educators. Much of the existing research on gamified learning has concentrated on more established tools such as Kahoot and Quizizz, resulting in a lack of guidance regarding Gimkit's feedback design, motivational features, and instructional value. Consequently, educators may rely on assumptions based on other platforms, despite the notable differences of Gimkit in terms of pacing, gameplay structure, and utilisation of in-game rewards (Ling et al., 2022; Alt, 2023).

The objective of this integrative review is to synthesise existing research and classroom-based evidence on Gimkit to elucidate its instructional roles, strengths, and limitations within secondary mathematics classrooms. An integrative review is thus warranted to consolidate current knowledge about Gimkit and to identify areas necessitating further investigation. The significance of this review is underscored by its contribution to evidence-informed teaching and curriculum planning in secondary mathematics. Educators require clear evidence to comprehend how digital tools influence student participation, learning, and formative assessment practices (Black & Wiliam, 2009; Cullen et al., 2020). Recent studies also highlight the necessity of investigating whether gamification fosters meaningful mathematical thinking and sustained engagement, rather than merely short-term excitement (Hoyles, 2018; Ortiz-Rojas et al., 2025). By concentrating specifically on Gimkit, this review addresses a recognised gap in the literature and offers a theory-informed synthesis grounded in research on student motivation and self-determination (Ryan & Deci, 2000). This review was guided by the following research questions:

1) What teaching roles can Gimkit play in secondary mathematics classrooms?
2) What are the strengths and limitations of using Gimkit in mathematics instruction?

2. Literature Review

This literature review synthesises existing research on gamified learning in secondary mathematics to examine the instructional value of Gimkit. While gamified platforms are widely reported to enhance student engagement and participation, existing studies and reviews primarily focus on established tools, resulting in limited synthesis of Gimkit's specific instructional roles, strengths, and limitations. Furthermore, much of the literature emphasises short-term motivational outcomes, with less attention given to deeper mathematical understanding or sustained learning. Consequently, there is a need for an integrative review that specifically examines how Gimkit supports teaching and learning in secondary mathematics classrooms. To address these gaps, this review analyses Gimkit-related research and classroom-based evidence through a theory-informed lens. The discussion is organised into two sections: the teaching roles of Gimkit in mathematics classrooms and the strengths and limitations of its use in instruction.

2.1. Teaching Roles of Gimkit in Mathematics Classrooms

This section addresses the first research question by synthesising how the literature describes Gimkit's teaching roles in secondary mathematics classrooms, with particular attention to feedback, engagement, and instructional support. Digital tools, including Blooket, Wayground, Kahoot, and Amplify, are changing the way mathematics is taught, helping teachers explain ideas clearly and support students with quick feedback and progress tracking (Hoyles, 2018; Cullen et al., 2020; Hidayat & Firmanti, 2024).

Gamified platforms like Gimkit are now part of many classrooms, often used to make lessons more interactive and engaging (Viberg et al., 2020; Dockendorff & Gómez Zaccarelli, 2025). Evidence from closely related platforms helps clarify how such tools function in mathematics instruction. In a systematic review of Quizizz, Muchuweni et al. (2025) concluded that “Quizizz is a valuable teaching tool in mathematics education, particularly in supporting student engagement, motivation, academic achievement, formative assessment, feedback, and differentiated instruction” (p. 118). These findings provide a useful reference point for understanding the potential teaching roles of similar game-based platforms, including Gimkit.

In secondary mathematics classrooms, Gimkit is primarily used for review and practice, and it has been reported to support interest and learning outcomes in mathematics lessons (Ainiyeh & Liesdiani, 2025). Teachers use it to reinforce key concepts, check for understanding, and prepare students for assessments (Lee & Lai, 2024; Ortiz-Rojas et al., 2025). Its game modes, such as Team Battles, Classic Mode, and Trust No One, allow teachers to vary instruction and meet different learning needs. These features support flexible use during warm-ups, lesson summaries, or independent practice.

Recent studies (Huang, 2022; Avşar et al., 2023; Wulandari et al., 2024; Chang, 2025; Kurniasari et al., 2025; Purba & Hafniati, 2025; Saputra, 2025) that focus directly on Gimkit reveal similar patterns. These studies describe improvements in participation, content reinforcement, and student motivation across different subjects. Some also highlight Gimkit's applications in language learning, collaboration, and interpretive assessment. Research (Sánchez-Arévalo et al., 2025; Saputra, 2025) indicates that Gimkit enhances student participation by breaking routine, adding challenge, and fostering healthy competition. Its live feedback and visual progress indicators allow teachers to quickly identify students who are struggling and adjust instruction as needed (Cullen et al., 2020; Ramadhan et al., 2024).

This makes Gimkit a valuable tool for formative assessment and identifying learning gaps. Teachers also utilise Gimkit to promote classroom collaboration. Game modes that involve teamwork or shared rewards encourage students to discuss strategies and articulate their thinking (Lee & Lai, 2024; Li et al., 2024), supporting the development of communication and reasoning skills in mathematics. Some educators employ Gimkit to motivate low-performing students by making review feel like a game rather than a test (Espinosa-Pinos et al., 2023; Slamet & Meng, 2025).

Researchers (Boaler, 2013; Yığ & Sezgin, 2021) caution that Gimkit is most effective when implemented with clear learning objectives. If used without structure, it may promote only surface-level recall rather than deep understanding. Specific researchers (Pisba and Rahmanto, 2025; Shah et al., 2025) also warn that students may become more focused on points, rewards, or power-ups than on mathematical reasoning when learning intentions are not emphasised. For this reason, Gimkit has been reported to be most effective when paired with class discussions, follow-up questions, and reflection tasks (Boaler, 2013; Shah et al., 2025). Gimkit can serve several teaching roles in secondary mathematics. It effectively facilitates review, provides real-time feedback, checks understanding, promotes teamwork, and increases student participation. With thoughtful implementation, it can support both individual learning and collaborative classroom experiences.

2.2. Strengths and Limitations of Using Gimkit in Mathematics Instruction

This section responds to the second research question by critically examining the reported strengths and limitations of using Gimkit in secondary mathematics instruction, focusing on both motivational benefits and instructional constraints.

Gimkit offers several strengths that support mathematics instruction, particularly in engaging students and reinforcing skills. One of its key advantages is its ability to boost motivation through game-based features like points, rewards, and dynamic pacing (Lee & Lai, 2024; Ortiz-Rojas et al., 2025). These features make learning feel more interactive and enjoyable, which can help sustain student attention. Gimkit also provides immediate feedback during gameplay, enabling students to monitor their progress and allowing teachers to respond quickly to learning needs (Hoyles, 2018; Cullen et al., 2020; Hidayat & Firmanti, 2024; Ramadhan et al., 2024). Additionally, the platform offers flexibility through various game modes and question types, allowing teachers to align the tool with lesson goals, differentiate tasks, or adjust based on student readiness (Viberg et al., 2020; Lampropoulos & Kinshuk, 2024). It is particularly useful for consolidating previously taught material in a low-pressure setting, helping to strengthen fluency and recall (Yığ & Sezgin, 2021; Espinosa-Pinos et al., 2023; Sánchez-Arévalo et al., 2025).

Despite these strengths, Gimkit has some limitations. On its own, it may not promote deeper mathematical understanding unless paired with strategies that encourage reasoning and explanation, such as discussion and reflection tasks (Boaler, 2013; Chiu et al., 2025). The competitive aspects can also become a distraction for some students or create stress for those who work at a slower pace (Koivisto et al., 2023; Venter & de Wet, 2025). Equity is another concern; in schools with limited access to technology or reliable internet, not all students can benefit equally from using Gimkit (Dockendorff & Gómez Zaccarelli, 2025). This may widen existing gaps, particularly in under-resourced schools. In essence, Gimkit is a useful digital tool that can enhance engagement, provide quick feedback, and support skills practice in mathematics. At the same time, to maximise its instructional value, it should be thoughtfully integrated into lessons and combined with strategies that deepen understanding and promote inclusion.

3. Theoretical Framework

This review is guided by Self-Determination Theory (SDT), developed by Deci and Ryan (1985, 2000), which explains how student motivation improves when three core psychological needs are supported: autonomy, competence, and relatedness. According to Deci and Ryan (2000) and Reeve (2012), autonomy refers to students having meaningful choices or control over their learning; competence involves feeling capable through feedback and progress; and relatedness reflects a sense of connection with peers and teachers. These needs are central to understanding why students engage in learning tasks and how digital tools shape their motivation in classroom environments (Ng et al., 2012).

SDT was chosen as the guiding framework for this review because it offers a clear and practical way to analyse how game-based platforms influence participation and learning. Unlike broader technology frameworks, SDT focuses directly on student motivation, which is central to how Gimkit is used in secondary mathematics classrooms. The theory guided the selection of studies by focusing on sources that discussed student choice, confidence, collaboration, or feedback—features that closely align with SDT's three needs. It also shaped the thematic organisation of the literature, helping to identify common patterns in how Gimkit and similar platforms influence motivation and engagement. SDT provided an interpretive lens for understanding whether Gimkit supports short-term excitement or more sustained forms of participation and learning in secondary mathematics. The theory was used to examine how specific features of Gimkit support or limit student choice, confidence, and collaboration, rather than solely reporting positive outcomes. SDT also informed how we interpreted outcomes, prioritising evidence that reflected autonomy support, competence feedback, and peer relatedness.

Using SDT helped ensure that this review focused not only on whether students enjoy using Gimkit but also on whether the platform supports deeper forms of motivation. This includes examining how specific design features, such as real-time feedback, flexible game modes, and collaborative elements, contribute to autonomy, competence, and relatedness in classroom settings. This approach allows the review to move beyond description and provide a clear, theory-informed explanation of Gimkit's instructional value in secondary mathematics. Figure 1 presents the conceptual framework developed for this review, showing how Gimkit's design features align with the SDT needs and how these connections may influence student engagement and instructional value in secondary mathematics.

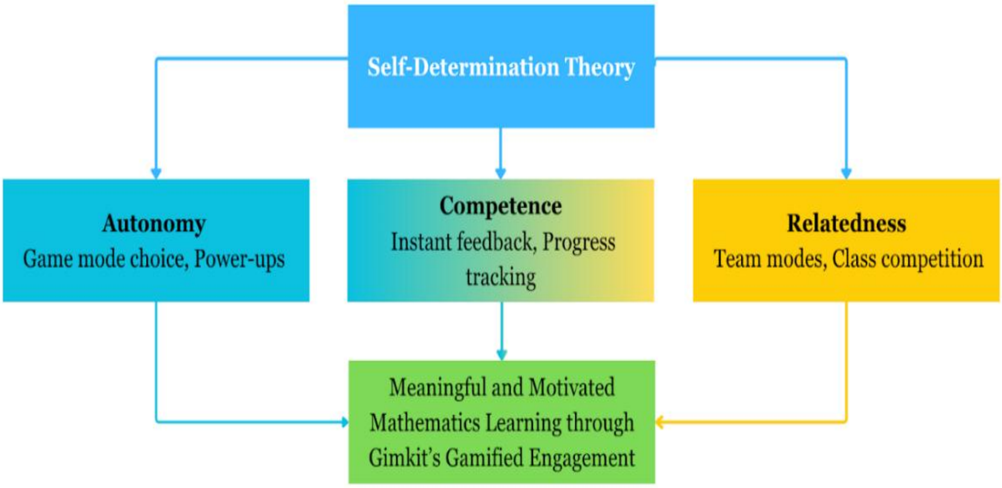

Figure 1: Conceptual framework showing Gimkit's alignment with SDT

4. Methodology

This review employed an integrative review design (Whittemore & Knafl, 2005) to explore how Gimkit is utilised in secondary mathematics classrooms. This approach allows for the synthesis of peer-reviewed studies, classroom reflections, case reports, and literature reviews across multiple contexts and study designs, which is particularly useful when formal empirical research is limited and practice-based evidence is important (Hidayat & Firmanti, 2024; Lampropoulos & Kinshuk, 2024). We applied this method to incorporate both academic and practitioner perspectives. Although Gimkit is already widely used in secondary mathematics classrooms, research on its instructional value remains limited (Yığ

& Sezgin, 2021; Ortiz-Rojas et al., 2025). Adopting an integrative approach enabled us to gather a more comprehensive picture of how Gimkit supports teaching, motivation, and learning in real classroom settings. The study was guided by Self-Determination Theory, which informed the selection of sources that emphasised student choice, confidence, collaboration, and feedback. In this article, the term "studies" refers to both peer-reviewed research and practice-based reports that describe classroom use of Gimkit. Throughout the review, findings from peer-reviewed studies are treated as empirical evidence, whereas practitioner reflections and classroom reports are used to illustrate instructional practices and classroom experiences. As this study is an integrative review, no variables were measured, and no primary instruments were employed; the reviewed peer-reviewed studies and classroom-based reports served as the data sources for analysis.

To maintain focus and alignment with its purpose, clear inclusion and exclusion criteria were established prior to screening the literature. We included sources that examined Gimkit as a classroom tool and reported on at least one of the following: student motivation/engagement, feedback use, understanding of concepts, or teaching strategies. The focus was on secondary mathematics. Given that published Gimkit research in mathematics is still limited, carefully selected studies from other subjects were included only when their findings directly related to motivational or feedback mechanisms relevant to mathematics classrooms. We also incorporated a small number of studies on similar gamified platforms (e.g., Kahoot, Quizizz, and Blooket) only when they helped elucidate motivational design features linked to Self-Determination Theory (choice/autonomy, competence feedback, and relatedness/teamwork).

To be included, sources had to be published between 2018 and 2025, written in English, and report classroom use in school settings. We included peer-reviewed studies and practice-based reports/reflections only when they described real classroom implementation and provided sufficient detail to interpret the outcomes. We excluded sources that were purely promotional, product descriptions, or opinion pieces lacking classroom evidence. Additionally, we excluded studies that focused solely on university-level contexts unless they were used solely to clarify general gamification mechanisms (e.g., motivation, feedback, collaboration) and were not considered direct evidence about secondary mathematics teaching. Figure 2 summarises the criteria used to include or exclude sources.

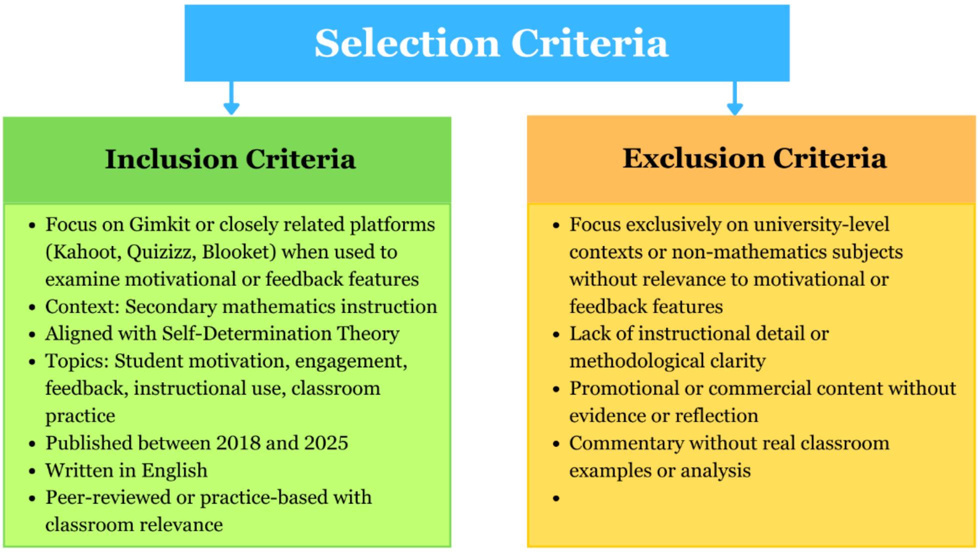

Figure 2: Inclusion and exclusion criteria for the Gimkit review

Once the criteria were established, the next step was to gather the literature that would be assessed through the PRISMA process. Although this study adopted an integrative review design, PRISMA-style reporting was used to enhance transparency and traceability in the identification, screening, and selection of sources, rather than to conduct a full systematic literature review. The aim was to synthesise evidence across diverse study types, including empirical studies and classroom-based reports. Literature for this review was gathered from three academic databases: ERIC, ScienceDirect, and SpringerLink, which were selected because they index peer-reviewed research in education, technology-enhanced learning, and mathematics education. To find additional practice-based materials, we also searched Google Scholar for classroom reflections, educator blogs, and reports from school districts and education organisations. These sources provided insight into how Gimkit is used in real classroom settings.

The search was limited to sources published between 2018 and 2025, covering the period after Gimkit was released and during its growing use in both in-person and remote classrooms. Only English-language sources were included. Boolean operators were used to structure the search. The term "Gimkit" was combined using AND with mathematics-related terms, while OR was employed to group related concepts. For example, searches combined "Gimkit" AND "mathematics education" with terms such as ("student motivation" OR "game-based learning" OR "formative assessment" OR "student engagement"). We focused on studies and reflections that discussed Gimkit directly. In a few cases, we included similar platforms like Kahoot or Blooket, but only when those studies addressed student engagement, choice, or collaboration. These focus areas were chosen to align with Self-Determination Theory.

After removing duplicates and irrelevant titles, we screened the remaining sources to determine whether they provided useful information on how gamified tools support learning in secondary mathematics. Both academic studies and teaching-based reflections were included, as long as they offered insight into student motivation, autonomy, or the instructional use of Gimkit in real classroom settings. The remaining sources were screened at the abstract and full-text levels to assess their compliance with the inclusion criteria. Records were excluded at this stage if they did not report classroom implementation, did not involve school-level learners, or did not provide evidence relevant to the review focus. Following this screening process, a total of 26 studies were included in the final review, as illustrated in the PRISMA diagram in Figure 3.

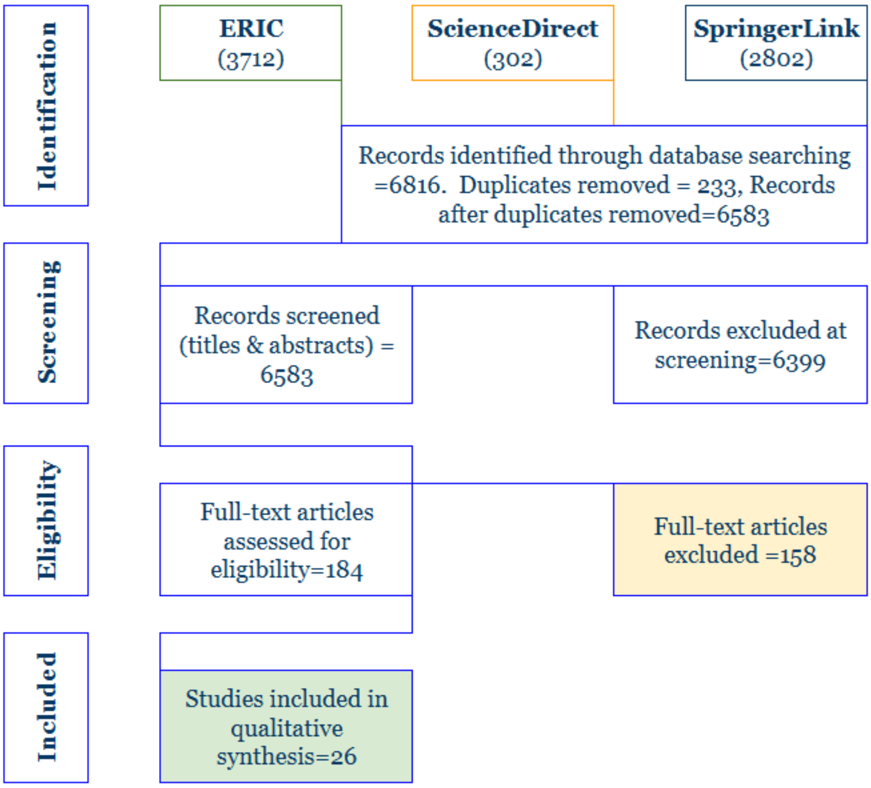

Figure 3: PRISMA flow diagram for study selection in the Gimkit review.

We used a thematic analysis approach to identify patterns across the selected sources. This involved closely reading each source and grouping the information into common themes. The findings were organised into four main areas: student engagement and motivation, use of feedback, understanding of mathematical concepts, and how teachers planned and used Gimkit in their classrooms. As we read through the studies and reflections, we coded parts of the text that described how students responded to Gimkit, how teachers used it during lessons, and the challenges or successes reported.

The analysis was guided by Self-Determination Theory, so we paid special attention to examples that demonstrated how Gimkit supported student choice (autonomy), helped students feel capable (competence), or encouraged collaboration and connection (relatedness). This facilitated our understanding of how the platform may support motivation and learning in secondary mathematics classrooms. Thematic analysis allowed us to combine both research and practice-based findings and to compare different perspectives across the literature (Braun & Clarke, 2006).

The decision to use an integrative review was intentional and closely aligned with the study's goals. An integrative review was chosen because it allows for the inclusion of diverse evidence sources, which is appropriate for an emerging instructional tool such as Gimkit. Unlike a full systematic review or meta-analysis, this approach prioritises conceptual synthesis and instructional insight over statistical aggregation, making it suitable for examining how Gimkit supports motivation and participation in secondary mathematics classrooms. Screenshots from the Gimkit platform were included to illustrate interface features and feedback mechanisms discussed in the literature. These images were used for explanatory purposes only and were not treated as data.

To enhance rigor and trustworthiness, several strategies were employed in this review. Dependability was supported by applying consistent inclusion and exclusion criteria and by using a transparent, PRISMA-style process to guide study selection. Confirmability was strengthened by grounding the analysis in Self-Determination Theory and by focusing on evidence reported in the included sources rather than personal interpretation. Transferability was addressed by clearly describing the school contexts, instructional uses, and limitations reported across studies, allowing readers to judge the relevance of the findings to their own settings.

5. Results

This section presents the main findings from the 26 studies included in the review and reports patterns identified across the reviewed sources without interpretation; explanations and implications are addressed in the Discussion section. The results describe how Gimkit is used in secondary mathematics classrooms and what it offers for teaching and learning. The findings are organised into two main areas. The first focuses on the instructional roles that Gimkit plays in mathematics lessons, such as feedback, collaboration, and instructional support. The second examines how the platform influences student engagement and participation, including both its benefits and limitations. These results provide a clear picture of how Gimkit supports mathematics instruction and where careful use is needed. Table 1 provides an overview of selected studies included in the review, illustrating study contexts, evidence types, and key reported outcomes used to support the thematic synthesis.

Table 1: Overview of Selected Included Sources

Author(s)	Context	Evidence Type	Focus	Key Reported Outcome
Avşar et al. (2023)	Secondary school mathematics	Classroom study	Engagement	Increased participation during review activities
Kurniasari et al. (2025)	Secondary mathematics	Quasi-experimental	Achievement	Improved post-test performance
Saputra (2025)	Upper secondary	Classroom implementation	Motivation	Higher student motivation during practice
Lee & Lai (2024)	Secondary mathematics	Teacher reflection	Feedback use	Real-time feedback supported lesson adjustment
Ortiz-Rojas et al. (2025)	Secondary mathematics	Literature review	Instructional role	Gimkit supports formative assessment

5.1 Teaching Roles of Gimkit in Secondary Mathematics Classrooms

The findings from the 26 studies included in this review indicate that Gimkit is reported to serve several teaching roles in secondary mathematics classrooms (Avşar et al., 2023; Ortiz-Rojas et al., 2025; Saputra, 2025). These roles are evident in both empirical studies and classroom-based reflections. The results highlight four recurring instructional functions associated with the use of real-time feedback, student engagement, collaboration, and instructional support.

Across the reviewed sources (Ramadhan et al., 2024; Zainuddin et al., 2024; Ortiz-Rojas et al., 2025), Gimkit is frequently reported as a tool for providing real-time feedback. Many studies (Avşar et al., 2023; Zainuddin et al., 2024; Saputra, 2025) describe how the platform allows students to see their answers immediately, identify errors, and track progress during gameplay (Black & Wiliam, 2009; Zainuddin et al., 2024). Several sources (Cullen et al., 2020; Ramadhan et al., 2024; Ortiz-Rojas et al., 2025) also report that teachers utilise this feedback during lessons to monitor understanding and identify common errors (Cullen et al., 2020; Ramadhan et al., 2024). The literature notes that visual feedback elements, including accuracy indicators, progress bars, and correction screens, are commonly referenced features during student interaction with the platform.

Gimkit's feedback features are presented through different parts of the game interface. Figures 4a to 4d illustrate examples of how students receive visual feedback, answer confirmation, and progress information during gameplay. These figures demonstrate how feedback is embedded within the platform during practice and review activities.

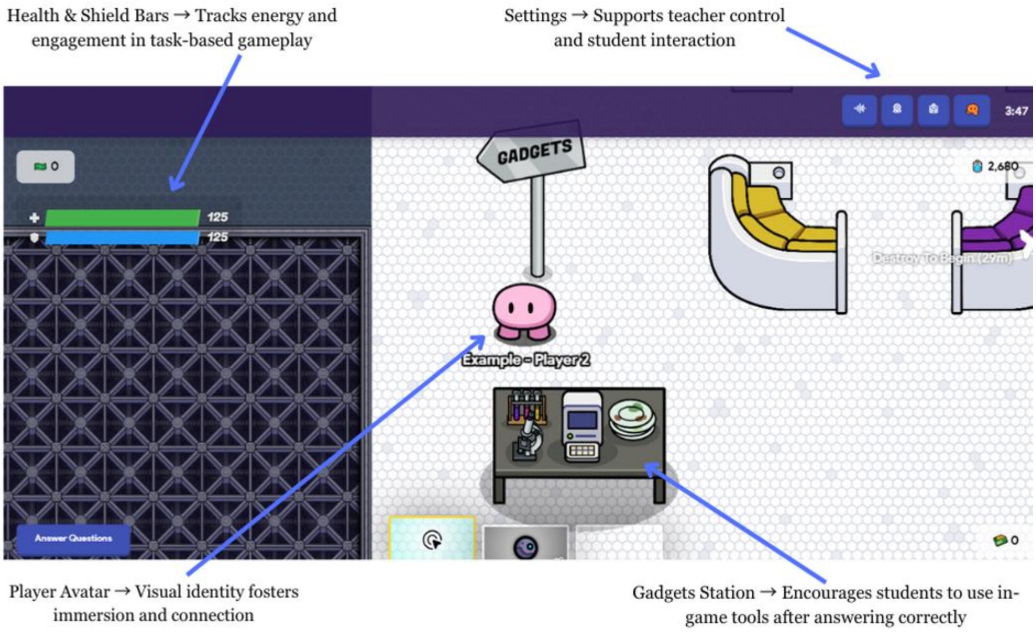

Figure 4a: Gimkit gameplay with avatar, energy stats, and feedback tools

(*screenshot from the Gimkit platform*)

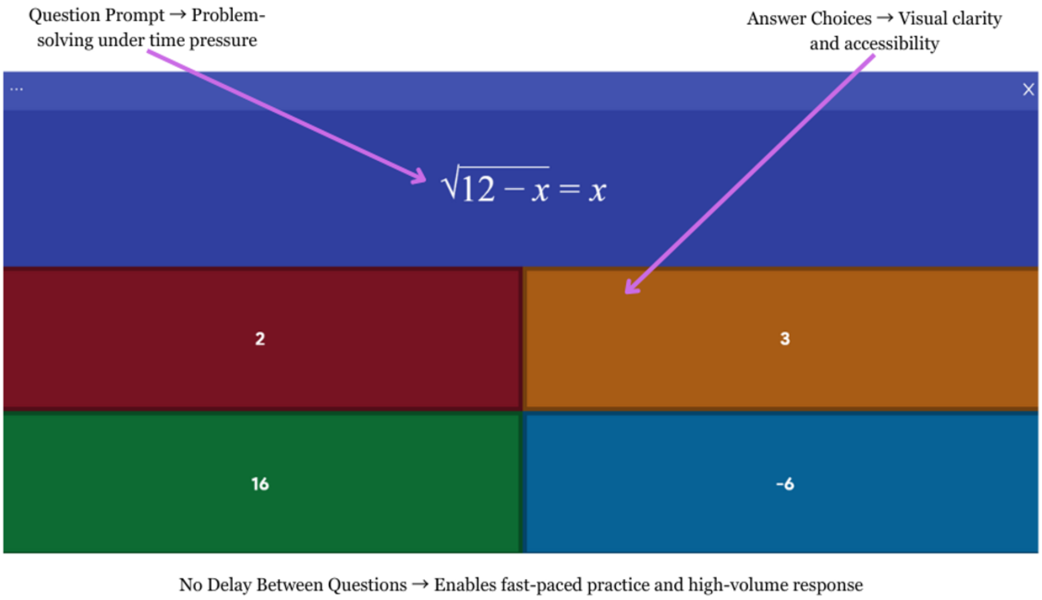

Figure 4b: Multiple-choice question with immediate feedback in Gimkit

(*screenshot from the Gimkit platform*)

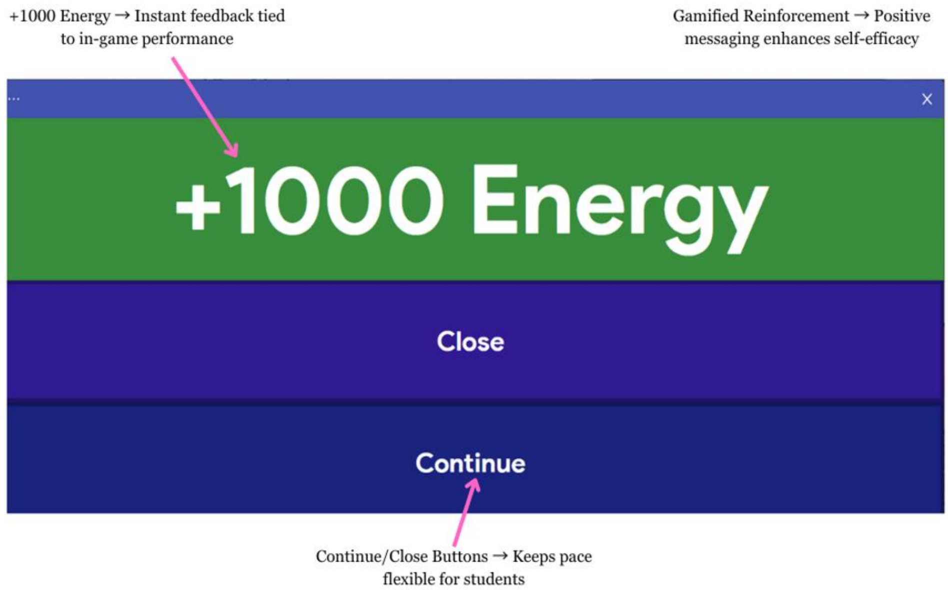

Figure 4c: Feedback screen showing energy gained after a correct answer
(*screenshot from the Gimkit platform*)

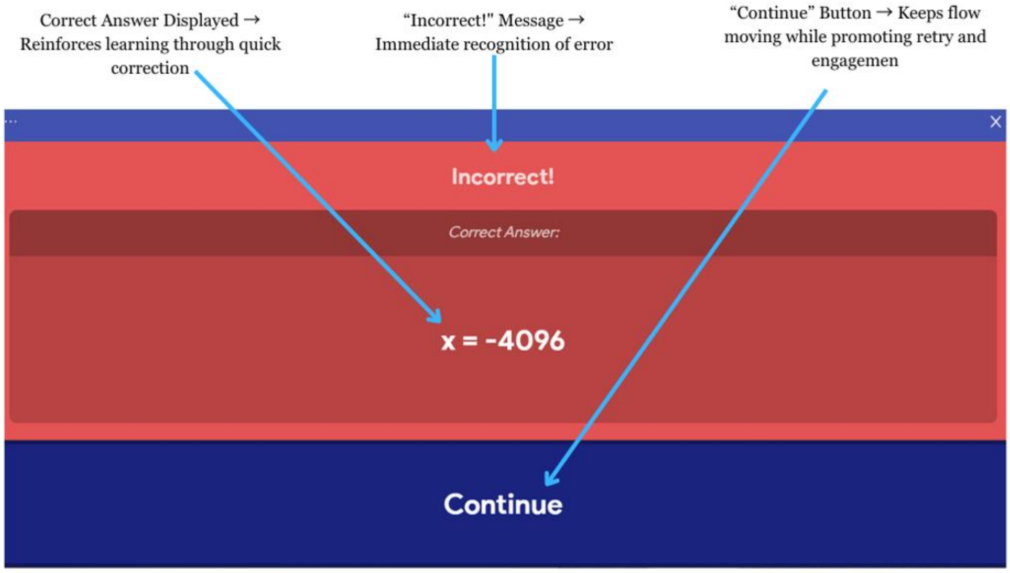

Figure 4d: Feedback screen showing the correct answer after an incorrect response
(*screenshot from the Gimkit platform*)

5.2 Student Engagement and Participation

Across the 26 reviewed studies, student engagement is one of the most frequently reported outcomes associated with the use of Gimkit in secondary mathematics classrooms. Many studies (Avşar et al., 2023; Kurniasari et al., 2025; Saputra, 2025) report increased participation during Gimkit activities, often linked to features such as points, virtual currency, and power-ups that make classroom tasks more interactive (Cheong et al., 2014). These features are commonly described as encouraging students to engage actively during review and practice activities.

Several studies (Espinosa-Pinos et al., 2023; Lee & Lai, 2024; Sánchez-Arévalo et al., 2025) also report that students who are usually quiet or less confident participate more during Gimkit-based activities. This pattern appears in studies that examine teamwork, low-pressure game modes, and flexible participation options (Espinosa-Pinos et al., 2023; Lee & Lai, 2024; Sánchez-Arévalo et al., 2025). These sources note that opportunities to work with peers, respond at an individual pace, or choose different in-game actions are associated with increased willingness to participate in mathematics tasks.

The reviewed literature also reports that Gimkit offers multiple game modes, including Classic, Team Mode, and Trust No One, which teachers use to align activities with different classroom contexts and lesson purposes. Studies describe these modes as enabling broader participation, particularly among students who are less active during traditional whole-class instruction. Some reviewed sources (Göksün & Gürsoy, 2019; Muchuweni et al., 2025) draw parallels with engagement patterns reported for other gamified tools, where game-based features are associated with increased attention and participation during mathematics activities.

At the same time, several studies (Wang, 2015; Bicen & Kocakoyun, 2018) caution that higher levels of participation do not always correspond with deeper mathematical understanding. Some sources (Koivisto et al., 2023; Venter & de Wet, 2025) report that students may focus on game performance rather than on mathematical content, particularly when competition or rewards dominate the activity. Other studies (Hamari et al., 2014; Wang & Tahir, 2020) report a novelty effect, where student interest decreases after repeated use of the platform. Across the reviewed studies, engagement is most frequently reported as a strength of Gimkit use, while sustained focus on mathematical thinking is described as dependent on how activities are structured within lessons.

6. Discussion

This section interprets the results presented in the previous section and explains their implications for teaching and learning in secondary mathematics classrooms. The discussion connects the identified teaching roles of Gimkit and patterns of student engagement to Self-Determination Theory, focusing on autonomy, competence, and relatedness. Rather than merely restating the findings, this section explores how and why Gimkit supports learning in certain contexts, where its limitations become apparent, and what this means for classroom practice. The discussion is organised around the instructional roles of Gimkit and the strengths and limitations of student engagement identified in the results.

6.1 Interpreting Gimkit's Teaching Roles in Mathematics Classrooms

The results of this review show that Gimkit can support several important teaching functions in secondary mathematics classrooms, but the value of these functions depends on how the tool is used. Instead of simply restating the findings, this section explains what these roles mean for teaching practice and how they connect to Self-Determination Theory. The strong feedback features reported across the reviewed studies suggest that Gimkit can meaningfully support formative assessment when teachers use the information to guide instruction. Because students see corrections immediately, they can adjust their thinking during the activity, which strengthens their sense of competence. This aligns with SDT, which emphasises that students remain motivated when they feel capable (Deci & Ryan, 2000). However, fast feedback alone does not guarantee understanding. Teachers still need to decide how to use the information that emerges from gameplay. Without this step, feedback remains superficial and may not lead to deeper learning.

The review also shows that Gimkit can support collaboration through team modes and shared tasks. This is important because mathematics learning is enhanced when students explain ideas and work together. From an SDT perspective, these collaborative elements support relatedness, which helps create a positive learning climate (Ryan & Deci, 2000). At the same time, collaboration does not happen automatically. Teachers must select game modes that encourage teamwork and manage classroom dynamics so that competition does not overshadow cooperation. The studies also indicate that teachers often use Gimkit to gather information about student progress. This makes the tool helpful for planning instruction, identifying common errors, and adjusting lessons. These instructional roles are consistent with research on effective formative assessment (Black & Wiliam, 2009; Cullen et al., 2020).

Even so, teachers may need time and support to develop well-designed question sets and to use the platform in ways that align with curriculum goals. Without careful planning, the tool can become an isolated activity that does not connect to the rest of the lesson. The teaching roles identified in the review highlight that Gimkit has been reported to be most effective when it is part of a structured learning process. It can support feedback, collaboration, and instructional decisions, but these benefits depend on teacher planning and alignment with learning goals. To support this interpretation, Table 2 summarises Gimkit's strengths and weaknesses in relation to the SDT needs of autonomy, competence, and relatedness, showing how different features can support or limit student motivation.

Table 2: Gimkit's Strengths and Weaknesses Based on Self-Determination Theory

Instructional Feature	Strengths	Weaknesses
Autonomy	Offers game mode choices and strategic decisions, giving students control over learning	Too much freedom may lead to off-task behaviour if not well guided
Competence	Provides immediate feedback and rewards, helping students feel successful	Risk of focusing more on points than actual understanding
Relatedness	Encourages collaboration and peer interaction through team modes	Competitive settings may discourage less confident students
Motivation and Participation	Game mechanics make learning enjoyable and increase voluntary participation	Engagement may fade over time (novelty effect) if not paired with meaningful content
Teacher Support	Gives real-time data to inform instruction and guide student progress	Teachers may need training to use feedback effectively and design balanced gameplay

Viewed through the lens of Self-Determination Theory, these findings suggest that Gimkit's instructional value lies less in the tool itself and more in how teachers design activities that balance autonomy, competence, and relatedness.

6.2 Interpreting the Strengths and Limitations of Student Engagement
The review confirms that Gimkit can increase student engagement and participation, especially during review and practice activities (Avşar et al., 2023; Kurniasari et al., 2025; Oledan, 2025; Saputra, 2025). This is expected because the platform includes rewards, choices, and interactive features that appeal to many students (Cheong et al., 2014; Ortiz-Rojas et al., 2025). These elements support autonomy and enjoyment, which are central to Self-Determination Theory (Ryan & Deci, 2000). For quiet or hesitant students, the game setting can reduce pressure and encourage participation, which is a valuable outcome in mathematics classrooms (Espinosa-Pinos et al., 2023; Lee & Lai, 2024).

However, higher participation does not always lead to meaningful learning. Several studies warn that students may focus on game performance rather than mathematical concepts (Wang, 2015; Bicen & Kocakoyun, 2018). This risk is greater when points, leaderboards, or power-ups dominate the experience (Koivisto et al., 2023; Venter & de Wet, 2025). From an SDT perspective, this occurs when activities rely too heavily on external rewards instead of fostering deeper forms of motivation (Ryan & Deci, 2000). Teachers need to design activities that help students connect gameplay to actual understanding by incorporating reflection questions or short discussions after the game (Boaler, 2013; Chiu et al., 2025).

The findings also show that engagement may decrease over time if games are used too frequently or without a clear purpose. This novelty effect is common in gamification research and suggests that the tool must be used with variety and intention (Hamari et al., 2014; Wang & Tahir, 2020). Employing different game modes, rotating instructional strategies, or limiting game frequency can help maintain meaningful engagement (Viberg et al., 2020; Li et al., 2024).

Equity and access also influence how well students benefit from Gimkit. Limited devices or poor internet access can prevent some students from participating fully (Dockendorff & Gómez Zaccarelli, 2025). When students cannot access the tool consistently, their motivation and sense of competence may decline (Ryan & Deci, 2000). This reinforces the need for schools to support digital access and for teachers to plan alternatives for students who cannot participate. While Gimkit is effective for increasing participation, the quality of that engagement depends on instructional design.

When teachers connect game features to learning goals, support student autonomy, and provide opportunities for reflection, engagement can contribute to meaningful mathematical understanding (Black & Wiliam, 2009; Cullen et al., 2020). When these conditions are absent, engagement may remain superficial. Viewed through Self-Determination Theory, these findings indicate that Gimkit supports engagement most effectively when autonomy, competence, and relatedness are intentionally balanced through instructional design rather than driven solely by competition.

7. Limitations of the Review

This review has several limitations that should be considered when interpreting the findings. First, the amount of published research that focuses directly on Gimkit is still small, which has limited the depth of evidence available for analysis. Many of the 26 sources included were broader studies of gamified tools, with only a few examining Gimkit in detail. As a result, some findings had to be interpreted by comparing Gimkit with more established platforms like Kahoot, Quizizz, and Blooket. Second, several included sources were classroom reflections or practitioner reports.

While these sources provided valuable insight into real classroom use, they did not follow strict research designs, meaning the evidence may not be as robust as data from controlled studies. Third, the review only included studies published in English and did not encompass grey literature outside the selected databases. This may have excluded useful work conducted in other regions or languages. Finally, the review focused on secondary mathematics, which suggests that the results may not transfer to primary grades or other subject areas. These limitations indicate that more focused and systematic research is still needed to understand Gimkit's full instructional value.

8. Conclusion

This review showed that Gimkit can support mathematics teaching by improving student motivation, encouraging participation, and helping teachers adjust instruction. Its game-based features align with key ideas from Self-Determination Theory, especially when students feel in control, supported, and connected during learning. Across the literature, Gimkit was found to be most effective for review activities, real-time feedback, classroom collaboration, and maintaining student attention during routine lessons. These strengths were consistently reported in both research studies and teacher reflections. At the same time, Gimkit works best when used with good planning and in combination with other teaching strategies. The review highlighted that Gimkit alone does not promote deeper mathematical reasoning unless teachers add follow-up tasks, including discussions, explanation prompts, or written reflections. The competitive elements can also distract some students or create pressure for those who work more slowly.

For this reason, Gimkit is most valuable when integrated into a broader lesson structure rather than used as a stand-alone activity. Equity and access also emerged as important concerns, especially for schools with limited devices or inconsistent internet connectivity. These challenges may affect how different groups of students benefit from gamified tools, and they should be considered when planning classroom use. Gimkit can play a meaningful role in secondary mathematics instruction when teachers use it purposefully, connect it to learning goals, and support students with follow-up learning opportunities.

It offers a flexible and engaging environment that can strengthen participation, confidence, and practice of key skills. However, its instructional value depends on thoughtful planning, inclusive classroom practices, and attention to student needs. Future research should examine how Gimkit influences deeper understanding of mathematical concepts, how different game modes shape student motivation, and how the platform affects diverse students over time. More school-based studies and teacher training will also be important to help educators use Gimkit in ways that support meaningful and sustained learning for all students.

9. Implications and Recommendations

This review highlights significant implications for educators, school leaders, and curriculum planners who utilise Gimkit to enhance mathematics instruction. While Gimkit can augment student engagement and provide valuable real-time feedback, its instructional efficacy is contingent upon its integration within lessons. The findings indicate that Gimkit is most effective when employed in conjunction with other pedagogical strategies, rather than in isolation. Educators may utilise the platform subsequent to the introduction of a concept, particularly for review or practice, and leverage student response data to inform subsequent instruction. To foster a deeper understanding, educators might adjust pacing, opt for collaborative modes, preview key concepts prior to gameplay, or pause to discuss challenging questions. These implications resonate with Self-Determination Theory by emphasising competence (through feedback), autonomy (through selection of game modes), and relatedness (through collaborative play).

The effective utilisation of Gimkit also hinges on teacher preparation. Educators benefit from support in aligning Gimkit activities with curriculum objectives, differentiating question sets, and interpreting feedback reports. Schools can facilitate this by providing planning time and opportunities for professional collaboration, thereby assisting educators in employing the platform purposefully and linking engagement to meaningful mathematical learning. In the short term, these implications pertain to classroom practices, particularly formative assessment and lesson design. Over the longer term, they underscore the necessity for professional development and clear guidance on the pedagogical application of gamified tools in mathematics education. The review also identifies several avenues for future research. Additional empirical classroom studies are warranted to investigate how Gimkit influences mathematical understanding, beyond mere student engagement.

Future research should incorporate measures of problem-solving, reasoning, and long-term retention. Investigations should also examine how different game modes affect motivation and participation among students with varying needs and confidence levels. Furthermore, deeper exploration is required to understand how educators utilise Gimkit's feedback tools to guide instruction and adapt lessons. Additionally, research should consider how access to technology influences Gimkit usage in under-resourced schools. These implications are pertinent across diverse educational contexts, as issues of engagement, feedback, and access to digital tools are prevalent in secondary mathematics classrooms globally.

Conflict of Interest
The authors declare that they have no conflict of interest.

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