Asia Pacific Journal of Developmental Differences
Vol. 13, No. 1, January 2026, pp. 43—66
DOI: 10.3850/S2345734126000032

Exploring the use of gamification (Blooket Plus) to support mathematical learning in the classroom: A case study

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Abstract

Gamification can transform routine tasks into engaging experiences (Ferriz-Valero et al., 2020; Huang et al., 2019; Parra-Gonzalez et al., 2020; Thu & Dan, 2023). This case study examined four Primary 5 students with dyslexia using Blooket Plus (BP) in mathematics, focusing on engagement and motivation. Semi-structured interviews with four students revealed five themes: (1) Aesthetically Motivating, (2) Useful Features, (3) Positive Classroom Interactions, (4) Encourages Learning, and (5) Fun Learning. BP fostered intrinsic motivation by supporting competence, autonomy, and relatedness. Importantly, students also noted that lessons without gamification can still be enjoyable, highlighting the need for educators to integrate "look-forward-to" experiences that promote emotional fulfilment and excitement, creating positive associations with learning (Fredrickson, 2001; Ashby, Isen & Turken, 1999).

Keywords: gamification, Blooket, Blooket Plus, mathematics, motivation, engagement, learning experiences, learning principles, science of learning, dyslexia

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INTRODUCTION

Singapore's education system excels globally, especially in mathematics, but this achievement comes with high levels of student anxiety, far above Organisation for Economic Cooperation and Development (OECD) averages (OECD, 2022; Ng, 2022). The challenge lies in balancing academic success with student well-being by shifting focus from performance pressures to cultivating genuine enjoyment in learning, an especially urgent need for today's tech-savvy learners.

Research on gamification in education has largely examined motivation, engagement, or achievement, though rarely together (Zeybek & Saygi, 2024). Four studies of those reviewed explored all three elements concurrently, yet none were specific to mathematical learning. Moreover, most experimental studies focus on achievement, often lacking the nuanced insights qualitative research can provide (e.g., Ibberson, 2021). To address this gap, the case examined in this study is the phenomenon of implementing Blooket Plus, a gamified learning platform, in mathematics lessons for students with dyslexia at the Dyslexia Association of Singapore (DAS) and understanding how it shapes their engagement, motivation, and enjoyment.

Blooket, a web-based quiz game, launched in 2018, aims to transform learning through memorable classroom experiences. Its paid version, Blooket Plus, enhances this experience with detailed reports and additional game modes (Blooket.com, 2024). By capturing students' attention and offering interactive feedback, Blooket supports comprehension while promoting motivation and engagement (Thu & Dan, 2023; Wongsaming et al., 2023). Furthermore, Blooket Plus provides multisensory engagement through visual and tactile interaction, complementing the Concrete-Representational-Abstract (CRA) approach, a multi-sensory method used in DAS classrooms to teach mathematics which supports both conceptual and procedural understanding (Kaur et al., 2015). The integration of Orton-Gillingham (OG) principles and the CRA approach within the DAS Essential Math Programme aligns closely with the Science of Learning (SoL) framework (Deans for Impact, 2015). A detailed description of OG principles and CRA approach are provided in Appendix A.

At its core, SoL urges educators to apply six cognitive principles to classroom practice. It begins with understanding how students grasp new ideas, emphasising the need to build new learning upon prior knowledge (Bransford et al., 2000). Learning and retention are strengthened through questioning techniques, stories, and mnemonics that encourage deeper processing (Graesser & Olde, 2003; Peters & Levin, 1986). Problem-solving improves when key facts are committed to memory, reducing cognitive load and freeing working memory for higher-order reasoning (National Mathematics Advisory Panel, 2008). The transfer of learning is facilitated through alternating concrete and abstract representations, as in the CRA approach (Goldstone & Son, 2005). Motivation is cultivated when students believe that their intelligence and ability can be improved through hard work (Blackwell, Trzesniewski, & Dweck, 2007; Smiley & Dweck, 1994). Lastly, educators must stay aware of misconceptions, such as the myth of learning styles. Hence, the OG principles and CRA teaching approach adopted in the current study are derived from the understanding of how students retain knowledge rather than individual learning styles. (Pashler et al., 2007; Newton & Salvi, 2020).

Aligned with SoL principles, this study demonstrates how the scientific underpinnings of Blooket Plus translate into practical outcomes. Grounded in a constructivist paradigm, it explores how students cognitively process and construct personal understandings of their learning experiences with Blooket Plus in mathematics.

Research on Blooket and Blooket Plus remains limited (Thu & Dan, 2023). This study expands current knowledge by exploring Primary 5 students' perceptions of Blooket Plus in mathematics, drawing on interviews with learners who have used the tool for at least a year. Specifically, it seeks to address:

- **RQ 1:** What are learners' perceptions of Blooket Plus as a gamified learning tool in mathematics lessons, with a particular focus on engagement, motivation, and learning experiences?

- **RQ 2:** What specific features of Blooket Plus do learners identify as supporting mathematics learning, and how do these align with established learning principles?

Findings from this study will not only address the knowledge gap surrounding Blooket Plus but also provide insights into students' unique experiences with gamification, positioning Blooket Plus as a valuable tool for mathematics interventions and for supporting diverse learning needs.

LITERATURE REVIEW

The present study is grounded in a theoretical framework that draws upon three underpinning theories: Self-Determination Theory (SDT), Flow Theory, and Technology Acceptance Model (TAM).

Self-Determination Theory (SDT)

The SDT, formulated by psychologists Edward L. Deci and Richard M. Ryan, distinguishes between two types of motivation influencing human behaviour: intrinsic and extrinsic motivation (Deci & Ryan, 2012). The three fundamental psychological needs that fuel intrinsic motivation are competence, relatedness, and autonomy (Deci & Ryan, 2012). These needs are universally recognised as drivers of intrinsic motivation but may vary across individuals depending on their developmental stages and cultural backgrounds

(Deci & Ryan, 2000; Vansteenkiste et al., 2005; Datu et al., 2025). However, the presence of external incentives, such as tangible rewards, can undermine intrinsic motivation. Hence, understanding Self-Determination Theory (SDT) provides valuable insight into the effective use of gamification (Brühlmann, 2018). By addressing these intrinsic needs, designers can create gamified activities that allow users to experience intrinsic rewards, such as a sense of accomplishment, while also reaping extrinsic rewards to sustain motivation (Brühlmann, 2018).

Flow Theory

Mihaly Csikszentmihalyi (1990) introduced the concept of flow, a state of optimal experience characterised by nine dimensions that together create what he terms an autotelic experience (Zhang & Wang, 2024). The first three dimensions are, a balance between perceived challenge and skill, clear and realistic goals, and immediate feedback, which serve as antecedents to flow (Nakamura et al., 2019; Zhang & Wang, 2024). When these conditions are met, individuals may experience deep concentration, a merging of action and awareness, a sense of control, loss of self-consciousness, and distortion of time perception. Such experiences are often described as 'absorbing,' allowing individuals to devote full attention to the task and disengage from external distractions (Nakamura et al., 2019; Zhang & Wang, 2024). Despite its value, flow theory has been criticised for its reliance on self-reported data and its limited representation of human motivation (Zhang & Wang, 2024). Therefore, viewing Self-Determination Theory (SDT) and Flow Theory as complementary provides a more comprehensive understanding of motivation in gamified learning, where aligning task difficulty with learners' skills may elicit autotelic experiences and sustain engagement (Zatarain Cabada et al., 2018; Rachels & Rockinson-Szapkiw, 2017).

Technology Acceptance Model (TAM)

The TAM helps explain users' acceptance and use of technology by focusing on two key factors: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) (Scherer et al., 2019). PU refers to the degree to which a person believes that using a particular technology will enhance their performance, while PEOU reflects the extent to which someone believes that using the technology will be free of effort. In educational contexts, TAM has been widely applied to understand how students and teachers adopt digital learning tools, including gamified platforms such as Blooket Plus. Studies have shown that when learners perceive a gamification tool as easy to use and beneficial for their learning, their motivation and acceptance levels increase (Pham & Ly, 2023). Specifically, features such as immediate feedback, simple language, and interactive elements contribute to enhancing these perceptions.

Gamification

The crucial goal of gamification in education is to engage and motivate learners, thereby enriching their learning experiences (Pereira & Leite, 2025). Beyond its rewarding aspects, gamification taps into fundamental human instincts, particularly the intrinsic love for play that is ingrained from birth (Pereira & Leite, 2025). Hence, gamification essentially integrates principles of Self-Determination Theory (SDT) and Flow Theory, offering a compelling explanation for its positive impact on learning across various age groups (Wongsaming et al., 2023; Thu & Dan, 2023; Jagust et al., 2017). While general trends support the use of gamification in education, certain elements, such as leaderboards, can sometimes produce counterproductive effects (Werbach & Hunter, 2012; Dominguez et al., 2013). This study aims to illustrate the impact of Blooket Plus as a gamification tool within the context of mathematics learning among Primary 5 students, focusing on their engagement, motivation, and learning experiences (RQ1). It also seeks to identify specific features of Blooket Plus that could potentially support Primary 5 learners in their mathematical learning (RQ2).

Blooket Plus

Blooket.com is a free, game-based learning tool that users can sign up for with a Google or email account. Its mission is to provide a fun alternative for students to learn through memorable experiences with classroom content (Blooket LLC, 2025). The free version is called Starter, while the paid version is known as Plus.

Question sets form the foundation of Blooket. Users can choose from over 20 million existing sets or create their own. The Starter plan allows hosting games for up to 60 players, offering 13 different game modes to apply the same set of questions. Each mode includes a brief preview of its skills and player recommendations, and users can choose between time-based or achievement-based formats.

Students join via QR code, game ID, or link, making the platform suitable for virtual classrooms. They select nicknames and Blooks, cute square avatars, to represent themselves. During gameplay, a live leaderboard tracks scores using thematic terms like coins, doubloons, or gold bars. After each session, Starter users can access basic reports, while Plus users receive detailed question-by-question data to support both teacher reflection and student learning.

Additional Plus features include access to exclusive game modes, hosting up to 300 players, organising question sets in folders, merging and editing sets, and uploading audio for accessibility. Longer homework deadlines of up to 365 days (compared to 14 for Starter) and verified curriculum sets further enhance its educational value (Blooket LLC, 2025).

METHODOLOGY

Case Study

This study adopts a case study approach to enable an in-depth exploration of the use of Blooket Plus, a paid gamification tool, in mathematics learning (Creswell, 2024; Bell et al., 2024). Data were collected systematically through a semi-structured interview to capture insights and a research journal to record contextual observations (Bell et al., 2024). The case study provides a qualitative and contextualised understanding of how Primary 5 students perceive Blooket Plus in terms of engagement, motivation, and learning enjoyment, while identifying both benefits (e.g., increased participation, achieving flow) and challenges (e.g., over-reliance on rewards, technology dependence).

Although the case study offers valuable insights, its limitations include limited generalisability and potential researcher bias (Bell et al., 2024; Merriam, 2013). These were mitigated through triangulation using reflective journaling, surveys, and discussions with a critical friend. Findings are thus best interpreted in terms of relatability to similar educational contexts (Bassey, 1981, as cited in Bell et al., 2024).

Participants

Informed consent was obtained from parents before the study began, following ethics approval from both DAS and USW. Parents were first contacted by phone, followed by a text message with further details, and provided with hard copies of the consent form and participant information sheet to ensure clarity (Bell et al., 2024). Students were briefed on the study's purpose and informed that participation was voluntary, with the right to withdraw at any time (BERA, 2024).

A dual sampling approach combining convenience and purposive sampling was employed. Convenience sampling involved selecting participants from the researcher's mathematics class for accessibility, while purposive sampling targeted students with at least one year of prior exposure to Blooket Plus (Wang, 2024).

The cohort comprised four Primary 5 students (three female, one male) enrolled in the DAS Essential Math Programme. All had a formal dyslexia diagnosis, with one student additionally diagnosed with ADHD.

Method Design

i. **Lesson structure**
Math lessons were conducted following the Essential Math Programme Curriculum, which requires a pre- and post-test to monitor students' progress. Each 1-hour lesson comprised three segments:

Review Concept (15–20 minutes): Students revisited previously taught concepts. The teacher recapped key methods on the whiteboard, followed by a 7-minute Blooket Plus (BP) game on a related concept using an iPad or iPhone. Errors were then reviewed.

New Concept (20 minutes): Students learned a new topic using the CRA (Concrete –Representational–Abstract) approach. At the Concrete stage, fraction circles were used for demonstrations; at the Representational stage, visuals such as slides or videos were shown; and at the Abstract stage, students completed a short worksheet before playing BP again for 7 minutes. The teacher reviewed errors, and BP generated a report. The same set of questions was reused in the next lesson's review segment to monitor improvement.

Word Problem (20 minutes): The class worked together on at least one fraction-related problem using POLYA's 4-step problem-solving method.

Each Blooket question was set to a maximum duration of five minutes, allowing students to answer at their own pace. The question set comprised a mixture of multiple-choice and short-answer questions.

ii. Research tools

The main tool used in this qualitative study was the semi-structured interview guide, supported by the Intrinsic Motivation Inventory (IMI) and Emotional Design (ED) questionnaires for triangulation (Bell et al., 2024; Hasian, 2016). Classroom observations recorded in a research journal were also used to verify findings.

Each participant took part in a semi-structured interview lasting up to 45 minutes in their classroom, a familiar setting (Bell et al., 2024). A questionnaire adapted from Hasian (2016) and Justo et al. (2022) guided the discussion, using open-ended and ranking questions with a 4-point Likert scale and game symbols to help students express their views clearly (Amjad & Malik, 2024). The IMI (McAuley et al., 1987) further assessed participants' enjoyment and perceived usefulness of Blooket Plus.

Classroom observations focused on students' interaction with technology, emotional responses, peer interactions, and assistance provided, with reflections documented in the researcher's journal.

Data Collection and Analysis

Interview responses were audio-recorded and transcribed using Otter.ai, after which the researcher verified each transcript against the recording. The transcribed conversations were then sent to participants for confirmation. Thematic analysis was subsequently conducted by applying codes and organising them into identified themes, following

Braun and Clarke's (2006) six phases of analysis. This framework was selected for its rigorous thematic approach, which helps generate valuable and unanticipated insights suited for exploratory research. Although the constructivist paradigm is not solely exploratory, it embraces such approaches to deepen understanding of the complex, contextual, and negotiated nature of reality.

Table 1. Specific steps taken in accordance to Braun & Clarke's phases of thematic analysis

Step	Description	Braun & Clarke's Phases
1	Downloaded the transcript into an Excel document.	Phase 1: Familiarising yourself with your data
2	Created a table with four columns to organise the data.	
3	Penned down initial thoughts in the fourth column to capture early observations and reflections.	
4	Generated initial codes and recorded them in the third column to categorise key elements of the data.	Phase 2: Generating initial codes
5	Transferred the initial codes into a separate tab labelled 'Codes & Themes' in the Excel document for further analysis.	
6	Identified emerging themes from the coded data.	Phase 3: Searching for themes
7	Reviewed and refined the themes with a critical friend to ensure validity and reliability	Phase 4: Reviewing themes
8	Defined and finalised the themes based on the review and feedback.	Phase 5: Defining and naming themes
9	Used a conceptual map to link the identified themes.	Phase 6: Producing the report

Trustworthiness & Ethical Considerations

To ensure the trustworthiness of this study, several strategies were adopted to enhance its credibility, dependability, and confirmability (Bell et al., 2024). Triangulation was achieved through multiple data sources, including semi-structured interviews, the IMI survey, and a research journal used to verify students' responses. Participants also reviewed and confirmed the accuracy of their transcripts, while a critical friend who is an experienced doctorate holder in education, had provided external validation by reviewing analyses and challenging interpretations to minimise bias. These measures collectively strengthened the study's rigour and reliability (Bell et al., 2024).

Ethical considerations were prioritised throughout, particularly given the involvement of children (BERA, 2024). Pseudonyms were assigned to maintain anonymity, and all data were securely stored on a password-protected laptop and in a locked filing cabinet. Participants were reminded that their participation was voluntary and could withdraw at any time without consequence. Minimal risks were present, and students were allowed to take breaks during interviews to ensure comfort, especially those with special needs (Amjad & Malik, 2024). The researcher's dual role as teacher was carefully managed through transparency and reassurance that participation would not affect students' academic standing. Collectively, these measures ensured ethical integrity, participant well-being, and the credibility of the study's findings.

FINDINGS

There are five themes that emerged from the analysis, offering unique insights into the research focus, as supported by participant responses and the ED scale.

Theme 1: Aesthetically Motivating

The theme "Aesthetically Motivating" reflects participants' shared preference for Blooket Plus (BP) over Kahoot! and Quizizz, attributed to its visually appealing interface, variety of game modes, and engaging design. Students described BP as original and easy to navigate, with most agreeing that the language was simple to understand. For example, Student D explained:

> *"It is [uses] very simple English... Yes [you can skip the instruction], if you played it before."* (Student D)

Although the default music was perceived as stressful, the teacher's substitution with piano music created a calming atmosphere:

> *"The song in Blooket makes you feel stressed. [Blooket is] calming... it's from your music."* (Student D)

BP's appeal also stemmed from its customisable animal avatars, Blooks, and usernames, which enhanced enjoyment. For example, one student explained:

> *"I just like the animals [in the café game]"* (Student A).

Game modes such as Cryptohack, Pirate Voyage (exclusive to BP), and Fishing Frenzy simulated real-world experiences, such as "hacking" for coins, seeking treasure, or fishing by chance. Cryptohack was rated the most engaging by most participants as Student D described:

> *"[You can] hack from others...hack their coins, so that is quite fun"* (Student D)

These findings align with research showing that intuitive, game-based tools enhance motivation and engagement (Huang et al., 2019; Parra-Gonzalez et al., 2020; Thu & Dan, 2023). From its playful Blooks to immersive gameplay, BP effectively merges fun with meaningful learning interaction.

Theme 2: Useful Features

Thematic analysis revealed three useful features: the leaderboard, accuracy level and repetitiveness. Although perspectives varied, the overall sentiment reflects an appreciation of the features' usefulness. The mix of competition and progress tracking keeps students engaged, pushing them to improve and stay motivated.

i. **Leaderboard**
   There are two differing opinions on having the leaderboard displayed during game time. On one hand, Student A views the leaderboard as motivational. He feels that even though the leaderboard is competitive, he likes it because it motivates him to learn his mistakes and do better to win. As he explained:

   "You become competitive. Remember the things. And then, after a few games, you remember the thing [the answer]" (Student A)

   On the other hand, Student D views the leaderboard as informational. She feels moving up the leaderboard based on correct answers is not fun but useful to know that she needs to catch up:

   "... then you [after looking at the leaderboard] have to catch up and stuff." (Student D)

Ii. **Accuracy Levels**
   Knowing the percentage accuracy and a snapshot of the errors made at the end of every game makes BP exciting if one scores above 50%. Especially when the

teacher shared with the class if they had improved when compared to the previous week's performance, it made students feel great, a sense of achievement, and motivated them to learn from their mistakes. As evidenced by Student A:

"help me learn my mistakes… and what to improve on next" (Student A).

These data point towards intrinsic motivation, demonstrating interest beyond external rewards (Deci & Ryan, 2012).

Iii. Repetitiveness

Students found the repeated nature of the questions within that 7-minute period useful. It allowed them to recall the steps previously taken to solve the problem and memorise some of the answers as reflected by their responses:

"[helps with learning] by repeating the question. So if I get the question that I got wrong, I can do it again" (Student D).

"it [Blooket] helps you memorise things" (Student A).

Although memorising does not seem ideal for a mathematics lesson, as it may not reflect a student's true understanding of the newly taught concept, it may help with information transfer from working memory to long-term memory (Atkinson & Shiffrin, 1977).

Theme 3: Promotes positive classroom interaction

Interactions in the classroom during the 7-min BP gameplay, though subtle can affect the quality of the learning experience. Students generally agree that BP helps to interact with classmates more positively. However, it may skew the experience when faced with classmates who struggle to accept defeat:

"I think, yeah, agree [BP help to interact with classmates more positively]… unless your classmates are sore losers" (Student A).

Notably, Student D drew comparisons with her classmates outside of math class, particularly her interactions with boys:

"I never had a boy cheering on me. So I don't know how to feel about it. I will just look at them… it's very different. Girl energy." (Student D)

Such comparisons highlight how gender and peer dynamics can influence perceptions of classroom interactions, adding another layer of complexity to classroom dynamics that affect the overall learning experience.

Theme 4: Encourages Learning

Students generally perceived BP not only helpful for their learning through the useful features discussed in Theme 3 but it also makes learning more fun. Student D reported that she would gladly complete her homework if it were in the form of BP:

> *"I would definitely do the homework. I will ask you to give me more homework."* (Student D)

Furthermore, students perceived that BP makes learning new things more exciting and strongly believed that it might be useful for other subjects too. Student D even suggested using BP for Art or Music classes:

> *"Art Also probably can… maybe music too."* (Student D)

Although Student C would like teachers to use Blooket in class, she described it as a means to waste time until the lesson ends:

> *"I like it [Blooket] when, for my school, like when we play, it's for wasting time."* (Student C)

Student C also shared that she feels Blooket does not help her remember better, as evidenced in:

> *"[I strongly disagree Blooket help to remember what I have learned] Because I easily forget"* (Student C)

reflecting her awareness of her poor working memory, an area in which students with dyslexia struggle (Amjad & Malik, 2024).

Student C provided a unique insight into this study. Although she believes that BP does not help her remember what she has learned, observations recorded in the researcher's journal suggest otherwise (see Appendix C). In class, she diligently attempts every question as if encountering it for the first time, consistently working through each solution. This behaviour indicates that, despite her perception, BP reinforces her learning by encouraging repeated practice, helping her internalise the required skills and strengthen her conceptual understanding.

Theme 5: Fun Learning

In contrast to Theme 4, which focused on specifically BP being a learning tool that encourages learning, Theme 5 highlights students' fun learning experiences that go beyond gamifying lessons through BP. Analysis reveals the multifaceted nature of what makes learning enjoyable and engaging. Students define fun learning in diverse ways; from Blooket-integrated classrooms that gave students the illusion that time flies, illustrating an autotelic experience, to unique teacher practices (Zhang & Wang, 2024).

According to the students, any inclusion of games, traditional board games or iPad use, in a lesson would warrant the learning experience as fun. For example, Student A and C shared:

> *"[no preference between board/card games when compared to using iPad in classrooms] I don't know… maybe both..."* (Student A)
>
> *"both equally [no preference between board games and iPad games]".* (Student C)

Moreover, even without gamification in a classroom, a teacher who incorporates humour:

> *"[fun teacher is] funny, creates opportunities for out-of-seat activities,* (Student A)
>
> *"just getting out of your seat… go to the library… just something to look forward to."* (Student D),

or adopts a no-homework policy,

> *"[fun teacher] no homework"… play games [either using technology or board games]"* (Student B)

also contributes to a fun learning experience.

Fun learning in this study serves as a broad umbrella theme encompassing both gamified classrooms and specific teacher practices that contribute to an engaging and enjoyable learning experience. What unites these two elements is their ability to provide shared experiences with the classroom community: the teacher, the student and the classmate, fulfilling the need for belongingness (Datu et al., 2025).

Students described these experiences with teachers and gamified lessons as 'fun', which typically evokes excitement (Fredrickson, 2001). This remarkable finding suggests that within this case study, gamification and specific teacher practices may independently contribute to a positive association with learning, making students look forward to class, motivated and eager to learn. A more detailed analysis of this finding is presented in the Discussion section in relation to RQ 2.

DISCUSSION

This section synthesises the research findings to address the two guiding research questions and critically examines the overarching theme that emerged.

RQ 1: What are learners' perceptions of Blooket Plus (BP) as a gamified learning tool in mathematics lessons, with a particular focus on engagement, motivation and learning experiences?

Participants found Blooket Plus (BP) highly engaging, motivating, and enjoyable, as reflected in their Intrinsic Motivation Inventory scores (see Appendix B). Beyond surface-level enjoyment, students experienced flow, meeting its three conditions: balance between challenge and skill, clear goals, and immediate feedback (Nakamura et al., 2019; Zhang & Wang, 2024). Gameplay followed explicit teaching, ensuring appropriate challenge levels that fulfilled the need for competence (Deci & Ryan, 2012). Clear goals such as topping leaderboards and improving accuracy enhanced focus, while instant feedback through rewards sustained motivation.

Students' laughter, smiles, and comments such as "time flies" indicated complete absorption and intrinsic enjoyment. BP also satisfied autonomy through player choices (Theme 1: Aesthetically Motivating) and relatedness via positive peer interactions (Theme 3: Promotes Positive Classroom Interactions) (Khaleel et al., 2020). Aligned with the Technology Acceptance Model, students valued BP's usefulness and simplicity.

Minor challenges included occasional slow connectivity, smaller screens, and stress-inducing music. Speed-based games like Classic disadvantaged slower learners, while luck-based modes such as Crypto Hack offered fairer play (Jerdee & Newman, 2024). Overall, BP effectively fulfils the intrinsic needs of autonomy, competence, and relatedness, fostering sustained engagement and intrinsic motivation in learning.

RQ 2: What specific features of Blooket Plus (BP) do learners identify as supporting mathematics learning, and how do these align with established learning principles?

Theme 2, 'Useful Features', highlights specific elements of Blooket Plus (BP): the leaderboard, accuracy tracking, and question repetition, that support mathematics learning. Students viewed the leaderboard either as motivational or informational. For those like Student A, the desire to outperform peers encouraged persistence, fulfilling the SDT need for autonomy (Deci & Ryan, 2012). Others, such as Student D, saw it merely as informational, with limited motivational impact (Dicheva et al., 2018).

Tracking overall accuracy and reviewing errors were perceived as beneficial, helping students set personal goals and monitor progress (Dehghanzadeh et al., 2021). Teacher emphasis on improvement over perfection reinforced competence and growth mindset. The repetition of questions provided valuable practice and immediate feedback, supporting both skill consolidation and long-term memory transfer (Atkinson & Shiffrin, 1977; Thu & Dan, 2023).

While some students initially viewed BP as entertainment, their engagement translated into improved outcomes (Theme 4: Encourage Learning), aligning with findings that gamification promotes understanding in a non-threatening environment (Wongsaming et al., 2023). Overall, BP's features not only foster autonomy, competence, and motivation but also provide opportunities that encourage mathematical learning.

Promoting Emotional Fulfilment and Evoking Excitement: A Unifying Perspective

A striking discovery in Theme 5, Fun Learning, is that a teacher with specific practices is comparable to a teacher who uses BP or who gamifies lessons. The similarities between the two types of teachers are that both foster emotional fulfilment and evoke excitement. Figure 1 below is a concept map to illustrate how the emergent themes are interconnected, providing a visual representation for clarity.

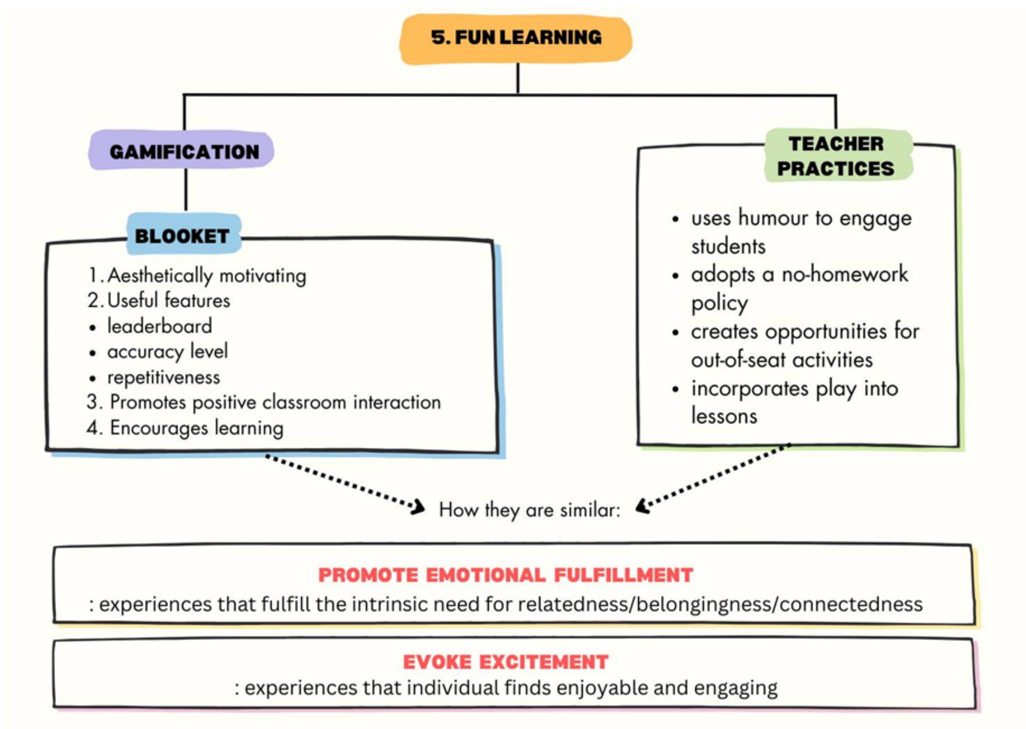

Figure 1. Concept Map of Key Themes in the Study

Playing in collaborative settings such as gamification nurtures peer interaction and social engagement, fulfilling students' intrinsic need for relatedness which is a key element of SDT (Deci & Ryan, 2000). In this study, BP fostered emotionally fulfilling peer interactions (Theme 3), while teacher practices like out-of-seat activities, a no-homework policy, and shared laughter further strengthened classroom connections, making students feel valued and engaged, which can enhance academic outcomes (Datu et al., 2025).

Excitement and laughter also play a critical role in engagement (Fredrickson, 2001; Pereira & Leite, 2025). When students experience joy and anticipation, dopamine is released, boosting pleasure, motivation, and cognitive flexibility (Ashby, Isen & Turken, 1999). BP's excitability made students look forward to class; several described lessons without BP as boring, while DAS sessions were deemed fun because of it (Theme 5). Their verbal and non-verbal reactions such as cheering, laughing, and exclamations like *"Wow! I love this game!"* demonstrate genuine enjoyment (see Appendix C).

Similarly, non-gamified yet interactive lessons can also evoke joy. Student D noted that out-of-seat activities and shared laughter with teachers sparked enthusiasm comparable to BP. This aligns with Fredrickson's Broaden-and-Build Theory (2001), where positive emotions expand psychological resources and foster resilience.

Ultimately, whether through gamification or specific teacher practices, the common thread is creating an environment that fulfils the need for relatedness, offering emotional satisfaction, and incorporating elements that spark excitement (Ashby, Isen & Turken, 1999; Deci & Ryan, 2012; Fredrickson, 2001; Pereira & Leite, 2025). This point implicates the need to include a look-forward-to factor in lessons to ensure a fun and engaging learning experience. By associating learning with enjoyment from a young age, we can potentially nurture an intrinsic love for learning across all subjects, fostering a generation that intrinsically pursues knowledge and strives for excellence.

CONCLUSION

This study positioned Blooket Plus (BP) as a gamified learning tool that fuels intrinsic motivation through enjoyment, engagement, and social connection. Five themes emerged: Aesthetically Motivating, Useful Features, Promotes Positive Classroom Interaction, Encourages Learning, and Fun Learning. BP satisfy the SDT needs of autonomy through player choice and strategic gameplay; competence through the balance of challenge and skill; and relatedness through positive peer interactions and shared laughter. Immediate feedback and accuracy tracking further encouraged self-improvement and reflection.

While BP was widely perceived as "fun learning," students noted areas for enhancement, such as more game options, larger devices, and calmer music, highlighting contextual differences across studies. Importantly, non-gamified lessons that incorporate humour, movement, and shared experiences can evoke similar joy and belonging.

These findings extend previous research (Zeybek & Saygi, 2024) by underscoring the value of a "look-forward-to factor" in all lessons. Whether achieved through gamification or engaging pedagogy, such excitement fosters positive emotions, intrinsic motivation, and deeper learning (Fredrickson, 2001; Datu et al., 2025). Ultimately, creating emotionally fulfilling and joyful classrooms offers a powerful answer to the question: What motivates students to learn? Henceforth, translating scientific understanding to practical implications in the classroom for both users and non-users of BP.

LIMITATIONS

While the case study approach offers valuable insights into the use of BP as a gamified learning tool, it is important to acknowledge the inherent limitations of this approach: the susceptibility to research bias and lack of generalisability (Bell et al., 2024). The risk of committing research bias is concerning because data interpretation may be influenced by the researcher's perspectives (Bell et al., 2024; Merriam, 2013). To mitigate this issue, having a reflective journal and issuing surveys were used as means of triangulation (Bell et al., 2024). Additionally, having a critical friend to discuss contradictions and deviations reduced the chances of committing research biases (Bell et al., 2024).

Given the nature of a case study, it limits the ability to generalise findings to broader contexts (Bell et al., 2024). The term 'relatability' rather than 'generalisability' is typically used to discuss the findings of a case study (Bassey, 1981, as cited in Bell et al., 2024). Since this study focuses on a group of Primary 5 learners using BP in mathematics lessons, the results may not apply to other subjects, age groups or gamified tools.

The extent to which findings from case studies can be applied depends on how similar or related the case study example is to others of its type. The basis of a case study being a single event is difficult for researchers to crosscheck information (Bell et al., 2024). Hence, the merit of the current study is only appropriate for teachers and educational therapists who are working in a similar situation.

IMPLICATIONS FOR PRACTICE

For BP users:

Effective implementation requires teacher training to maximise BP's motivational features and reinforce positive feedback. Integrating BP can heighten enjoyment and engagement in mathematics while allowing targeted reinforcement and self-monitoring. Educators can use error reports and QR codes to extend learning beyond the classroom. Subscription access also offers ready-made materials that support independent learning.

For non-users:

Educators should embed a look-forward-to factor through humour, movement, or shared enjoyment to sustain engagement even without gamification.

FUTURE RESEARCH

Future studies could measure motivation levels before and after BP use to strengthen evidence for its role in fostering intrinsic motivation (e.g., Kingsley & Grabner-Hagen, 2015). Comparative research exploring the relative impact of autonomy, competence, and relatedness could further illuminate how affective needs shape learning.

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APPENDIX A: GLOSSARY OF TECHNICAL TERMS

Term	Definition/Description
Blooket	A gamified online learning platform that allows teachers to host quiz-based games where students answer questions to earn points, power-ups, or rewards. It features multiple game modes (i.e. Café & Cryptohack) designed to increase engagement and motivation (Blooket LLC, 2025).
Blooket Plus	The premium, subscription-based version of Blooket that offers additional features, such as exclusive game modes (i.e. Pirate Voyage), detailed analytics, enhanced customisation, and access to question banks (Blooket LLC, 2025).
Blooks	Customisable digital avatars used within Blooket. Students collect or unlock Blooks, which represent characters or animals (Blooket LLC, 2025).
CRA Approach	A three-stage instructional framework in mathematics that begins with hands-on manipulatives (concrete), transitions to pictorial representations (representational), and finally leads to symbolic or numerical understanding (abstract) (Kaur et al., 2015).
DAS	Dyslexia Association of Singapore: A non-profit organisation providing specialised educational therapy and support services for learners with dyslexia and other specific learning difficulties. DAS offers structured programmes such as the Main Literacy Programme (MLP) and the Essential Math Programme (DAS, 2024).
Leaderboard	A real-time ranking display within Blooket that shows students' positions based on accuracy, speed, or points earned during the game, depending on the chosen game mode (Blooket LLC, 2025).
OG Principles	The Orton-Gillingham principles emphasise on instruction that is structured, sequential, multisensory, explicit, cumulative, and diagnostic-prescriptive and emotionally sound. It is typically used to support learners with Dyslexia (DAS, 2024).

APPENDIX B: STUDENT INFORMATION

Student	Interest/Enjoyment	Value/Usefulness
Student A	5	7
Student B	6.111	6.375
Student C	5.22	5.875
Student D	6.78	6.875

APPENDIX C: RESEARCHERS JOURNAL SAMPLE

Researcher's Journal

Topic 7: Multiplying Fractions (Blooket Game: Pirate Voyage)

Name	Student A	Student B	Student C	Student D
Technology Interaction	Tool: iPad Students experienced no issues with the technology, such as connectivity problems, accidental inputs, or frustration.			
Emotional Responses (Verbal/Non Verbal) and/or Social Interactions	• The student was observed smiling and laughing consistently during the gameplay, showing clear enjoyment. • The student exclaimed, "I love this game too, but I'm not very good at it!" expressing both enthusiasm and self-awareness. • Upon succeeding, the student cheered, "Yes! Yes! Yes!" showcasing excitement and a sense of accomplishment. • The student praised their peer, saying, "She's so good!" to Student C, demonstrating admiration and social interaction.	• The student was observed smiling and laughing enthusiastically throughout the gameplay, demonstrating clear enjoyment and engagement. • The student exclaimed, "Wow, I love this game! Can we play it every day?!" expressing excitement and a desire to continue the activity.	• The student remained calm and focused throughout the gameplay, showing steady engagement. • After the game ended, the student remarked, "Wow, I only got one wrong! I'm going to try this again!" demonstrating satisfaction and motivation to improve.	• The student was observed smiling and laughing enthusiastically throughout the gameplay, showing clear enjoyment and engagement. • The student excitedly exclaimed, "OMG, I'm getting money! I'm getting money!" reflecting their excitement and immersion in the game. • During the game, the student commented, "This song [background piano music from the teacher's playlist] is very nice," demonstrating their appreciation for the music and multitasking awareness.
Teacher's Role/ Reflection	• The teacher offered assistance to the students, providing support as needed. • The teacher helped Student B and Student C answer some of the questions, guiding them through the activity. • Although Student C required some help to answer the questions, she achieved the highest accuracy level among the group. • All students completed their workings on mini whiteboards, except for Student A, who did not use one.			