



Gamification and motivation in elementary education: A self-determination theory approach to teacher perspectives

Ioannis Berdousis ^{a1}, University of the Peloponnese, Greece, berdousis@sch.gr

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Abstract

Gamification is increasingly recognized as a strategy for enhancing student engagement in elementary education, yet there is limited research on how it supports core psychological needs related to student motivation, particularly from the perspective of classroom teachers. This study explores how teachers perceive the motivational impact of gamified instruction in relation to the psychological needs of autonomy, competence, and relatedness, as described by Self-Determination Theory. A total of 105 elementary school teachers participated in a cross-sectional survey that included both closed- and open-ended questions focused on motivational outcomes, specific game design elements, and implementation challenges. The results indicate that teachers perceive gamification as a meaningful way to support student motivation. Among the three psychological needs, competence received the highest ratings, followed by relatedness and autonomy. Teachers who used gamification more frequently reported stronger perceptions of its motivational benefits. Elements such as points, progress tracking, and collaborative play were viewed as especially effective, while competitive features like leaderboards were more polarizing. Reported barriers included limited time for lesson planning, insufficient professional development, and inequitable student access to technology. These findings suggest that gamification, when thoughtfully implemented, can support students' intrinsic motivation in elementary classrooms, though broader institutional and structural support is essential for its sustained use.

Keywords: Elementary education; gamification; self-determination theory; student motivation; teacher perceptions.

* ADDRESS FOR CORRESPONDENCE: Ioannis Berdousis, University of the Peloponnese, Greece.
E-mail address: berdousis@sch.gr

1. INTRODUCTION

Over the past decade, gamification has garnered significant attention as an instructional strategy in education, aiming to enhance student motivation, engagement, and participation (Triantafyllou et al., 2025). Defined broadly as the use of game design elements in non-game contexts (Deterding et al., 2011), gamification is seen to introduce reward systems, progression mechanisms, and competitive or collaborative dynamics into classroom environments without relying on fully developed educational games. In the context of elementary education, where learners are in the early stages of cognitive, social, and emotional development, gamification is particularly appealing due to its ability to transform mundane or abstract academic tasks into playful, goal-oriented experiences (Kapp, 2012; Shao et al., 2025).

Research on gamification in schools has reported positive outcomes across various educational domains. Studies have linked gamified instruction with increased classroom engagement (Cheong et al., 2013; Sáez-López et al., 2024), improved attention and focus (Subhash & Cudney, 2018), and higher levels of content retention (Domínguez et al., 2013). However, most existing literature centers on secondary or higher education contexts, where students are more autonomous and digital literacy is assumed. Fewer studies have explored gamification in elementary school settings, especially from the perspective of teachers, who are ultimately responsible for adapting game elements to suit pedagogical goals and student developmental levels.

Moreover, while many studies focus on the functional features of gamification (badges, leaderboards, points), less attention has been paid to the psychological mechanisms through which these features influence learner motivation. Existing models, such as the Technology Acceptance Model (TAM) or Unified Theory of Acceptance and Use of Technology (UTAUT), are often used to understand technology adoption behavior in educational settings (Venkatesh & Davis, 2000), but they tend to emphasize utility and ease of use, rather than addressing how gamification meets students' internal motivational needs.

To understand gamification's motivational potential, it is necessary to move beyond behavioral or attitudinal predictors and toward theories of human motivation that account for learners' psychological needs. One such framework is Self-Determination Theory (SDT), developed by Deci and Ryan (1985) and extensively applied in educational contexts (Ryan & Deci, 2000). SDT proposes that individuals are most motivated when their environments support three basic psychological needs: autonomy, the feeling of volition and self-direction; competence, the sense of mastery and effectiveness; and relatedness, the experience of connection and social belonging. When these needs are met, learners are more likely to experience intrinsic motivation and sustained engagement in learning tasks (Niemiec & Ryan, 2009).

In the context of gamified learning, elements such as choice, challenge, feedback, collaboration, and progression can support these psychological needs, though they may also undermine them, depending on how gamification is implemented (Hanus & Fox, 2015; Mekler et al., 2017). For instance, a point system that focuses excessively on competition may erode relatedness or autonomy if not balanced with cooperative elements or student choice. Therefore, understanding gamification through the lens of SDT provides a more theoretically grounded, student-centered, and motivation-sensitive approach to evaluating its effectiveness.

Despite the potential for gamification to satisfy students' psychological needs, there remains a significant gap in the literature concerning how elementary teachers perceive these motivational effects. Teachers are uniquely positioned to observe whether students demonstrate increased enthusiasm, persistence, or social engagement when exposed to gamified strategies. Their insights are essential, as they design and mediate the learning environments in which gamification occurs. Yet, most SDT-focused gamification research has concentrated on student self-reports or experimental interventions, rather than tapping into the practical knowledge and pedagogical observations of teachers, especially at the primary level.

Given this gap, the present study seeks to explore how elementary school teachers perceive the effects of gamification on students' motivation, specifically in relation to the satisfaction of autonomy, competence, and related needs. By applying SDT as a theoretical framework, this study aims to assess how gamification strategies used in real-world classrooms align with the motivational principles that support deep and sustained learning.

1.1. Literature review

1.1.1. *Gamification in education*

Gamification, defined as the use of game design elements in non-game contexts (Deterding et al., 2011), has become increasingly prevalent in educational settings as a method to increase student motivation, participation, and learning outcomes. In the classroom, gamification commonly involves the incorporation of elements such as points, levels, badges, challenges, feedback, and leaderboards into teaching activities (Kapp, 2012). Unlike traditional game-based learning, which involves the use of full-fledged educational games, gamification applies select mechanics to enhance existing curricula and instructional strategies.

In primary education, gamification has been used to support early literacy, mathematics, and science instruction, with reported benefits including higher levels of student engagement, improved classroom behavior, and enhanced content retention. Teachers often adopt gamified strategies to address the motivational challenges associated with young learners, who may have limited attention spans or low initial interest in academic subjects (Subhash & Cudney, 2018). However, despite the growing implementation of gamification in elementary classrooms, empirical research remains fragmented and is often limited to studies of digital tools without paying attention to the underlying motivational mechanisms that explain why gamification works.

A recurring theme in the literature is the tendency to measure gamification's success through behavioral indicators such as increased time-on-task or participation rates rather than through theoretical constructs tied to student motivation (Domínguez et al., 2013; Cheong et al., 2013). As a result, questions remain about how gamification functions at a psychological level, particularly for younger learners who are still developing the cognitive and emotional maturity to engage with complex reward structures or abstract learning goals.

Gamification and motivation: Motivation is one of the most cited benefits of gamified learning, but literature reveals considerable variation in how it is defined and operationalized. Some studies focus on extrinsic motivators such as points and rewards, while others emphasize engagement and enjoyment (Alsawaier, 2018). However, gamification may not always produce uniformly positive outcomes. Research has shown that poorly designed gamification can decrease intrinsic motivation if it overemphasizes competition or undermines students' sense of autonomy (Hanus & Fox, 2015; Mekler et al., 2017).

In addition, many gamification studies conflict with motivation. While engagement is a behavioral construct referring to time spent or activity completed, motivation is a deeper psychological state involving personal relevance, goals, and persistence. For this reason, several researchers have called for the use of more theoretically grounded motivational frameworks in gamification research (Seaborn & Fels, 2015). This need is particularly pressing in primary education, where the balance between fun and learning must be carefully managed to avoid undermining the educational value of instructional time.

Self-determination theory (SDT): To address these concerns, a growing body of literature has turned to Self-Determination Theory (SDT) as a theoretical lens for understanding motivation in gamified learning environments. Developed by Deci and Ryan (1985), SDT posits that human motivation exists along a continuum from controlled to autonomous regulation and that optimal motivation arises when three innate psychological needs are fulfilled: autonomy (feeling volitional and self-directed), competence (feeling effective and capable), and relatedness (feeling socially connected and valued) (Ryan & Deci, 2000). When these needs are supported, learners experience greater intrinsic motivation, persistence, and well-being (Niemiec & Ryan, 2009).

In educational contexts, SDT has been widely used to examine the conditions under which students are most likely to engage with and value academic tasks. For example, Classrooms that supported student autonomy predicted higher intrinsic motivation and academic performance. Similarly, Reeve and Tseng (2011) demonstrated that students who perceive their teachers as autonomy-supportive report greater enjoyment and persistence in learning tasks. These findings are highly relevant to gamification, which often involves elements designed to foster autonomy (choice of tasks), competence (progress bars, levels), and relatedness (team quests or collaborative play).

Applying SDT to gamification: Recent empirical work has explored how gamification can be aligned with SDT to enhance learning outcomes. For example, Su and Cheng (2015) found that gamified language learning platforms that included progress tracking and personalized feedback significantly enhanced learners' feelings of competence and autonomy. Similarly, Sailer et al. (2017) found that badges and leaderboards supported competence and relatedness when implemented with clear goals and collaborative elements. In contrast, Hanus and Fox (2015) reported that overuse of extrinsic rewards, such as points and rankings, reduced students' intrinsic motivation and led to lower academic performance. These findings indicate that not all gamification is equally effective—its success depends on how well it is aligned with students' psychological needs.

Despite the growing application of SDT in gamification research, most existing studies have focused on secondary or higher education settings, where students are assumed to have higher levels of self-regulation and digital fluency (Hamari et al., 2014; Landers et al., 2018). Few studies have examined elementary education, where students' developmental characteristics, such as limited attention span and need for concrete feedback, may alter how gamification impacts motivation. Furthermore, existing research tends to prioritize student self-reports, with limited attention given to teacher perspectives, even though teachers are the ones designing, adapting, and delivering gamified activities in real-world classrooms.

The role of teachers in supporting motivational needs: Teachers play a crucial role in mediating the motivational impact of gamified learning. Their decisions about how to implement gamification, what kinds of tasks to gamify, how to structure rewards, and whether to promote collaboration or competition can either support or hinder the satisfaction of autonomy, competence, and relatedness. As Deci et al. (1991) noted, the classroom environment is shaped not only by curriculum and tools but by teacher beliefs and instructional choices, which in turn affect student motivation.

While SDT provides a robust theoretical model for understanding the conditions that support motivation, it has rarely been applied to examine how teachers perceive the motivational effects of gamification on young learners. Understanding these perceptions is essential for two reasons: first, because teachers are uniquely positioned to observe student behavior and engagement across different learning contexts; and second, because their beliefs influence the likelihood that gamification will be adopted or sustained in practice (Ertmer et al., 2012). By applying SDT to teacher perspectives, researchers can better understand not just whether gamification works, but how and why it works (or fails) in the dynamic context of elementary education.

Research gap and justification: In summary, while gamification has demonstrated potential to enhance educational motivation, literature reveals key limitations: a lack of theory-driven approaches in elementary settings, minimal attention to psychological needs, and limited exploration of teacher perspectives. Self-Determination Theory offers a valuable framework for analyzing the motivational mechanisms underlying gamification, particularly regarding autonomy, competence, and relatedness. However, few studies have examined how elementary school teachers perceive the alignment between gamified strategies and students' basic psychological needs.

This study addresses these gaps by investigating how elementary educators perceive gamification as supporting or failing to support students' motivational needs, using SDT as a conceptual framework. In doing so, it contributes

to the growing intersection of gamification and motivation research, providing actionable insights for teacher training, instructional design, and future theory-based intervention studies.

1.1. Purpose of study

The purpose of this study is to investigate the perceptions of elementary school teachers regarding the motivational impact of gamified learning activities on students, through the lens of Self-Determination Theory. The study focuses on how gamification supports or undermines students' psychological needs and aims to identify which features or conditions are most conducive to fostering intrinsic motivation in young learners.

The study addressed the following questions:

- How do elementary school teachers perceive the impact of gamification on students' autonomy, competence, and relatedness in the classroom?
- Which elements of gamified learning do teachers believe enhance or hinder students' intrinsic motivation?
- What are the main contextual barriers and enabling conditions affecting the implementation of gamification strategies in primary education?

2. METHOD AND MATERIALS

2.1. Research design

This study employed a quantitative, cross-sectional survey design to examine how elementary school teachers perceive the effects of gamified instruction on student motivation, specifically through the lens of Self-Determination Theory (SDT). SDT identifies three fundamental psychological needs: autonomy, competence, and relatedness as necessary conditions for fostering intrinsic motivation and optimal learning (Ryan & Deci, 2000). This research aimed to assess whether and how gamified strategies support the fulfillment of these needs in primary school learners, from the perspective of classroom teachers.

2.2. Participants

A total of 105 elementary school teachers (grades 1–6) participated in the study. Participants were recruited through convenience sampling, primarily via professional teaching networks, email invitations, and educator-focused online platforms. While efforts were made to ensure variation in participant characteristics, the sample was not randomly selected. Nonetheless, it included teachers from diverse backgrounds, representing a range of grade levels, years of teaching experience, school types (public and private), and geographic contexts (urban, suburban, and rural). To be eligible, teachers were required to have implemented at least one gamified instructional activity, digital or non-digital, within the previous academic year.

2.3. Data collection instrument

Data were collected through a structured online questionnaire consisting of five sections: demographic information, perceived impact of gamification on SDT-based motivational needs, perceived impact of game elements on motivation, contextual barriers and facilitators, and an open-ended reflection.

The first section of the questionnaire gathered background information, including participants' age, gender, years of teaching experience, subject area, grade levels taught, type of school (public or private), and geographical context (urban, suburban, or rural). Teachers were also asked to indicate the frequency with which they used gamification in their classroom (Never, Rarely, Sometimes, Often, Very Often) and to rate their digital literacy on a five-point scale from 1 (Novice) to 5 (Expert).

The second section focused on teachers' perceptions of how gamified learning strategies affect students' autonomy, competence, and relatedness. These constructs were measured using an adapted version of the Basic

Psychological Needs Satisfaction and Frustration Scale (BPNSFS) (Chen et al., 2015), reworded to capture teacher perceptions of student experience, rather than teacher self-assessment. Responses were collected on a 5-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

To assess autonomy, teachers responded to six statements: they were asked to indicate whether they believed gamified activities gave students meaningful choices, promoted self-directed learning, encouraged initiative-taking, reduced dependency on teacher guidance, enhanced students' control over how they completed tasks, and created space for students to express individual preferences during learning.

For competence, teachers evaluated whether students appeared to experience success in gamified tasks, whether gamified systems (such as levels, progress bars, or immediate feedback) helped students monitor and master content, whether game-based rewards reinforced a sense of achievement, and whether students persisted more when learning was gamified. They were also asked if students seemed more confident in completing tasks and if gamification appeared to scaffold increasingly difficult challenges that promoted a sense of growth.

To assess relatedness, teachers responded to statements concerning the social dynamics of gamification. These included whether students worked collaboratively in gamified tasks, expressed enjoyment in peer interaction during gamified lessons, showed increased social engagement, offered support to teammates or classmates during challenges, and whether gamification appeared to enhance classroom cohesion and reduce social isolation among learners.

The third section explored teachers' perceptions of specific game mechanics and their motivational influence. Teachers indicated their level of agreement with the following assertions: that reward systems such as points or badges increased engagement; that narrative elements or themed quests helped learners connect more deeply with content; that leaderboards fostered healthy competition or created anxiety among some students; that customizable avatars or choices in game paths enhanced autonomy; and that time-based or challenge-based elements increased focus and effort. Teachers were also asked to reflect on whether competitive elements sometimes undermined cooperation or motivation in less confident students.

The fourth section focused on contextual barriers and enabling conditions that affected gamification implementation. Teachers responded to a series of statements, including whether they felt they had adequate preparation time to design gamified lessons, whether access to technology and digital tools was sufficient, and whether their school leadership supported or encouraged innovative instructional strategies. Items also explored access to professional development opportunities related to gamification, the availability of high-quality, curriculum-aligned resources, and the role of peer collaboration in promoting or inhibiting gamified learning adoption.

The final section included one open-ended question, allowing participants to elaborate on any personal experiences, challenges, or observations not captured in the Likert-scale items. Teachers were encouraged to describe specific examples of successful or unsuccessful gamification efforts in their classrooms.

The full questionnaire was reviewed by three experts in educational psychology and instructional design for content validity. A pilot study with 15 elementary teachers was conducted to evaluate clarity, item reliability, and completion time. Cronbach's alpha values for autonomy, competence, and relatedness subscales were .86, .88, and .91, respectively, indicating strong internal consistency.

2.4. Procedure

Participation in this study was entirely voluntary and posed minimal risk to respondents. As the research involved adult professionals responding anonymously to a non-sensitive questionnaire, no formal institutional ethical approval was required. Nevertheless, ethical standards consistent with the responsible conduct of research were observed.

The online questionnaire was distributed via teacher professional networks, email invitations, and closed social media groups for educators. An information sheet was presented on the first page of the survey, outlining the study's purpose, the nature of participation, the approximate time required to complete the survey, and assurances of anonymity and confidentiality. Respondents were informed that completion of the survey implied consent to participate and that they could withdraw at any point before submission without penalty.

The survey platform did not collect any identifying information such as names, email addresses, or IP addresses. Responses were stored securely and accessed only by the research team. The survey remained open for three weeks, during which reminder messages were sent weekly to encourage participation.

2.5. Data analysis

All quantitative data were analyzed using IBM SPSS Statistics (Version 27). Descriptive statistics were calculated for demographic variables and each item on the SDT and gamification perception scales. Internal consistency of the psychological needs subscales was verified using Cronbach's alpha.

To address the first research question, mean scores and one-sample t-tests (compared to the neutral scale midpoint of 3) were used to determine the extent to which teachers perceived gamification to support each psychological need.

The second research question was analyzed using Pearson correlation coefficients, which tested relationships between the frequency of gamification use and the perceived motivational value of specific game elements.

The third research question was explored through both quantitative and qualitative approaches. Frequencies and means were calculated for all barrier and facilitator items. Thematic analysis was conducted on the open-ended responses using Braun and Clarke's (2006) method, coding and categorizing patterns related to implementation challenges, perceived success factors, and structural conditions affecting gamification practices.

3. RESULTS

This section presents findings from 105 elementary school teachers who completed the online questionnaire exploring their perceptions of gamification's motivational impact, using the framework of Self-Determination Theory (SDT). Analyses are structured around the three research questions and include descriptive statistics, inferential testing, correlation analysis, and qualitative themes from open-ended responses.

3.1. Participant demographics

The final sample consisted of 105 elementary school teachers. The average participant age was 39.4 years ($SD = 8.9$), with teaching experience ranging from 1 to 32 years ($M = 13.2$, $SD = 6.1$). A majority were female (75.2%), and 24.8% were male. Most respondents taught grades 3–6 (62.9%) and were employed in public schools (71.4%), with the remainder in private institutions. Teaching environments included urban (54.3%), suburban (28.6%), and rural (17.1%) settings.

Regarding the frequency of gamification use, 18.1% reported using it "often", 44.8% "sometimes", 29.5% "rarely", and 7.6% "never". Self-rated digital proficiency had a mean score of 3.71 ($SD = 0.84$) on a 5-point scale.

3.2. Research question 1: Do teachers perceive that gamification supports autonomy, competence, and relatedness?

To assess teacher perceptions of gamification's impact on students' psychological needs, one-sample t-tests were conducted against the neutral scale midpoint (3.0) for the three SDT dimensions.

Table 1

One-Sample t-Test Results for SDT Dimensions (N = 105)

SDT Construct	Mean (M)	SD	t (104)	p-value	Interpretation
Autonomy	3.87	0.56	16.81	< .001	Perceived support significantly above 3
Competence	4.12	0.48	24.07	< .001	Strongest perceived support
Relatedness	4.03	0.52	20.62	< .001	Also highly supported

Teachers reported significantly positive perceptions of gamification's impact on all three SDT needs. The strongest support was for competence (M = 4.12), followed by relatedness (M = 4.03) and autonomy (M = 3.87), all statistically significant (p < .001).

3.3. Research question 2: What is the relationship between gamification frequency and perceived motivational benefits?

To determine whether the frequency of gamification use was associated with stronger perceptions of motivational support, **Pearson correlation coefficients** were calculated.

Table 2

Pearson correlations between gamification frequency and SDT perceptions (N = 105)

SDT Construct	r	p-value
Autonomy	.42**	< .001
Competence	.54**	< .001
Relatedness	.49**	< .001

Note: p < .01

All correlations were **moderate to strong and statistically significant**, indicating that teachers who reported more frequent use of gamification were also more likely to perceive that it supports students' autonomy, competence, and relatedness.

This suggests a **positive feedback loop**: the more teachers embed gamification in their practice, the more they observe its benefits on student motivation, reinforcing continued use.

Participants rated how effective various gamification features were in enhancing student motivation.

Table 3

Descriptive statistics for motivational value of game elements (N = 105)

Game Element	Mean (M)	SD	Interpretation
Points and rewards	4.25	0.52	Strong motivator
Leveling/progress systems	4.18	0.59	Supports competence
Collaborative team play	4.08	0.54	Enhances relatedness
Narrative/story integration	4.01	0.66	Positively supports engagement
Avatars/customization options	3.76	0.72	Supports autonomy moderately
Time-based challenges	3.45	0.77	Mixed: energizing but stressful for some
Leaderboards (competition)	3.28	0.84	Least positive; sometimes demotivating

Teachers identified **points, progress systems, and team collaboration** as the most consistently motivating elements. While **narrative-based learning** also received favorable ratings, **competitive mechanics** such as leaderboards were seen as **potentially harmful**, particularly for lower-performing or anxious students.

3.4. Research question 3: What are the barriers and facilitators to implementation?

Quantitative ratings for implementation factors were analyzed to identify common challenges and enablers.

Table 4

Perceived barriers and facilitators of gamification implementation

Statement	Mean (M)	SD	Interpretation
I lack the time to design gamified lessons	4.17	0.69	Major barrier
My students lack access to devices/internet	3.89	0.76	Common logistical concern
I have access to gamification training	2.64	0.79	Lack of PD identified.
My school leadership supports gamified learning	2.81	0.88	Limited institutional encouragement
Curriculum alignment is difficult with gamification	3.45	0.71	Moderate concern
I collaborate with colleagues on gamified instruction	3.52	0.82	Peer support is somewhat present.
Access to pre-made resources would increase my usage	4.33	0.61	Strong facilitator
I would use gamification more with technical support available	4.08	0.66	Indicates need for systemic supports

The most reported barriers were lack of time, technological access, and limited professional development. Teachers expressed frustration over having to design gamified materials from scratch without institutional support or training.

However, strong facilitators were also identified. The highest-rated support item was the availability of curriculum-aligned, pre-made gamification content, followed by technical assistance and peer collaboration.

3.5. Thematic analysis of open-ended responses

To gain deeper insight into the nuanced experiences of teachers, 72 participants provided open-ended feedback describing their successes, challenges, and observations related to gamification. A thematic analysis following Braun and Clarke's (2006) six-phase approach yielded three overarching themes: *engagement through challenge and play*, *differentiated learner impact*, and *need for practical support and resources*. Each theme is illustrated below with representative quotes.

Engagement through challenge and play. Many teachers reported how gamified activities transformed classroom dynamics by making learning more playful and intrinsically motivating. One veteran teacher explained, *"My reluctant readers suddenly clamor to answer questions when we turn a quiz into a 'quest' with points and levels."* Another remarked that *"the moment I introduced a narrative thread, students solving math problems to advance their character, they began helping one another and stayed on task far longer than usual."* Several participants described how the element of challenge fostered persistence: *"When I set a time-bound puzzle for fractions, my usually chatty students became laser-focused; no one wanted to miss the 'win.'"* Collectively, these comments underscore teachers' perception that well-designed gamified tasks captivate students' attention and promote sustained involvement.

Differentiated learner impact. While many students thrived under competitive or team-based structures, teachers noted that gamification does not affect all learners equally. One teacher observed, *"My high flyers love the leaderboard, but my struggling students often shut down when they see themselves at the bottom."* Another shared, *"I noticed two of my students became anxious during head-to-head races; they dreaded losing more than they enjoyed playing."* Conversely, some teachers found ways to mitigate negative effects: *"By grouping students of mixed abilities into teams, everyone contributes strengths, and no one feels left behind."* These reflections highlight the importance of careful grouping, varied game formats, and alternative reward systems to ensure that gamification uplifts rather than discourages vulnerable learners.

Need for practical support and resources. A recurrent concern among respondents was the significant investment of time and resources required to plan and implement gamification. Numerous teachers lamented, *"I know gamification works, but creating new game content every week is simply unsustainable."* Others expressed a desire for collaboration and ready-made materials: *"If there were a bank of vetted, standards-aligned games I could download, I would use gamification daily."* Several participants also called for targeted professional development: *"I would attend a workshop on integrating storylines into science lessons. I want to learn how to do*

it without reinventing the wheel." Together, these comments reveal that while teachers recognize gamification's pedagogical value, they urgently need institutional support, shared resources, and training to translate enthusiasm into consistent classroom practice. Overall, the thematic analysis of open-ended responses provides a rich, nuanced understanding of teachers' lived experiences with gamification. The findings illustrate that gamified learning can markedly enhance engagement and motivation, but its impact varies across student populations and hinges critically on the availability of pragmatic supports.

The findings of this study provide clear evidence that elementary school teachers perceive gamification as a valuable pedagogical approach for enhancing student motivation, particularly when evaluated through the lens of Self-Determination Theory (SDT). Across the full sample of 105 teachers, there was consistent agreement that gamified learning activities support students' psychological needs for competence, relatedness, and autonomy. Among these, competence was rated the most strongly, suggesting that teachers observe students feeling more capable and successful when engaged with gamified tasks. Relatedness was also positively perceived, reflecting the social benefits of collaborative and team-based game elements. Autonomy, while slightly lower, was still significantly supported, indicating that gamification offers students meaningful choices and greater ownership over their learning.

Further analysis revealed a significant positive correlation between the frequency with which teachers use gamification and their perceptions of its motivational value. Teachers who integrate gamification more regularly were more likely to report that it enhances students' sense of competence, fosters peer relationships, and encourages autonomy. This pattern suggests that sustained and embedded use of gamified strategies may reinforce teachers' recognition of their benefits and potentially deepen the observed impact on student motivation.

In terms of specific game mechanics, teachers rated point systems, leveling/progression, and collaborative team play as the most effective components in supporting motivation. Narrative structures and customizable avatars were also seen as valuable, particularly in enhancing student engagement and autonomy. In contrast, competitive elements such as leaderboards received more cautious responses. While some teachers acknowledged their motivating role for high-achieving students, others noted the potential for discouragement among learners who struggled to perform in competitive environments.

The study also identified key factors that influence the successful implementation of gamification. The most frequently cited barriers included a lack of time to design gamified lessons, insufficient student access to technology, and limited access to professional development. Teachers also indicated that school leadership often provided limited support for innovative instructional methods such as gamification. Conversely, they noted that access to curriculum-aligned, pre-made gamification resources and opportunities for collaboration with colleagues significantly increased their willingness and ability to integrate gamification into their teaching.

Qualitative responses complemented the quantitative findings, with many teachers describing gamification as a powerful tool for increasing classroom engagement, especially for students who are typically less motivated by traditional instructional methods. However, teachers also voiced concerns about planning time, unequal student access, and the emotional impact of competitive structures. They expressed a strong desire for more institutional support, resource-sharing platforms, and training that could enable them to adopt gamification more efficiently and effectively.

Taken together, these results suggest that gamification, when implemented thoughtfully and supported by appropriate conditions, is widely perceived by elementary educators as a motivationally beneficial strategy. However, its success depends not only on the design of game elements but also on the availability of resources, equity in access, and institutional support structures that enable teachers to use it consistently and meaningfully.

4. DISCUSSION

The purpose of this study was to examine elementary school teachers' perceptions of how gamification affects student motivation, using Self-Determination Theory (SDT) as a theoretical framework. Specifically, the study explored whether gamification supports students' psychological needs for autonomy, competence, and relatedness, and which game elements and contextual factors contribute to or hinder these outcomes. The findings offer valuable insight into how gamification is experienced and interpreted by educators, particularly in primary school contexts where students are at critical stages of social and cognitive development.

The quantitative results strongly indicate that teachers perceive gamification as supportive of all three basic psychological needs proposed by SDT: autonomy, competence, and relatedness. This finding aligns with prior studies that have shown gamification to be a viable tool for increasing intrinsic motivation when implemented with attention to motivational design principles (Sailer et al., 2017; Su & Cheng, 2015). Among the three needs, competence received the highest mean rating, suggesting that teachers believe gamified activities are particularly effective in helping students feel successful and capable. This is likely attributable to features such as progress bars, levels, feedback systems, and achievable short-term goals, which allow students to recognize and celebrate incremental achievements, an important condition for reinforcing perceived competence (Ryan & Deci, 2000).

Teachers also recognized the value of gamification in supporting relatedness. Team-based challenges, group quests, and peer-to-peer support during games were frequently mentioned in both closed- and open-ended responses. These findings support existing literature that emphasizes the social affordances of gamification, particularly when collaborative or cooperative game mechanics are employed (Cheong et al., 2013; Bressler & Bodzin, 2013). Although autonomy was rated slightly lower than competence and relatedness, it was still significantly above the neutral midpoint, indicating that gamified strategies, especially those involving choice, customization, and narrative flexibility, offer students meaningful opportunities for self-directed learning.

These findings confirm the value of using SDT as a lens to evaluate gamification. While many gamification studies have emphasized engagement as a surface-level outcome, this study extends the conversation to the deeper motivational structures that underpin student persistence and enjoyment in learning tasks.

A significant contribution of this study is the demonstration of a clear and positive correlation between the frequency of gamification use and teachers' perceptions of its motivational impact. Teachers who used gamified activities more frequently were more likely to report that such strategies foster autonomy, competence, and relatedness. This suggests that familiarity with gamification may enhance not only pedagogical comfort but also awareness of its motivational potential. This echoes earlier findings in technology integration research, which show that repeated use and reflective practice often increase teacher confidence and deepen perceptions of effectiveness (Ertmer et al., 2012).

It is also plausible that these findings reflect a self-reinforcing dynamic: teachers who observe motivational gains in their students are more likely to continue using and refining gamified approaches, which in turn leads to more positive perceptions and expanded application. However, causality cannot be inferred from this relationship, and future longitudinal studies are needed to explore this reciprocal interaction over time.

The study's detailed analysis of specific gamification elements provides important guidance for educators and instructional designers. Point systems, progress tracking (levels), and team-based play were consistently rated as the most motivating features. These elements align well with SDT constructs: points and levels provide feedback that enhances competence, while team-based collaboration supports relatedness. Teachers also emphasized the value of narrative and story-driven game structures, which help contextualize learning and sustain engagement over longer timeframes. These findings corroborate previous research that highlights the importance of storytelling and thematic immersion in motivating learners (Kapp, 2012; Dichev & Dicheva, 2017).

Conversely, competitive features, particularly leaderboards, were perceived with more ambivalence. While some teachers noted that competition can motivate high-achieving students, others expressed concern that it demoralizes struggling learners. This reinforces the assertion by Hanus and Fox (2015) that poorly designed or overly competitive gamification can undermine intrinsic motivation by fostering anxiety or social comparison. It also suggests the importance of designing gamified systems that offer multiple paths to success, allowing students to experience achievement regardless of relative rank.

Despite the largely positive views of gamification's motivational effects, teachers also identified several systemic barriers to effective implementation. Lack of preparation time emerged as the most common constraint, followed by limited student access to technology and insufficient professional development opportunities. These findings echo prior research on technology integration, which consistently identifies time and training as critical obstacles (Lawless & Pellegrino, 2007; Teo, 2011). In particular, the open-ended responses reveal a deep need for access to curriculum-aligned, pre-made gamified content that reduces planning burdens while maintaining pedagogical integrity.

Teachers also expressed a desire for greater institutional support, including encouragement from school leadership, access to gamification workshops, and more opportunities to collaborate with peers. These results suggest that while gamification is often initiated by individual teachers, its sustained success may depend on a broader school culture of innovation and professional learning. As one participant noted, "Gamification works, but it's just too much to plan alone." This underscores the value of community-based practice, shared digital resources, and system-level endorsement to enable widespread, equitable use.

An important nuance in the data concerns the differentiated impact of gamification across learners. While many students were described as thriving in gamified environments, teachers cautioned that certain students, particularly those with low confidence or learning challenges, may experience anxiety or disengagement when exposed to competitive or fast-paced mechanics. This reinforces the importance of pedagogical intentionality: gamification should not be treated as a one-size-fits-all solution, but rather as a flexible framework that can be tailored to student needs. Teachers must carefully consider the cognitive load, emotional climate, and social dynamics of each gamified activity, ensuring that motivation is promoted for all learners, not just the most competitive or digitally savvy.

5. CONCLUSION

This study set out to explore elementary school teachers' perceptions of how gamification influences student motivation, using Self-Determination Theory (SDT) as a guiding framework. In contrast to studies that focus narrowly on technological novelty or engagement metrics, this research positioned motivation as a function of psychological need satisfaction, specifically autonomy, competence, and relatedness. The findings affirm that, from the perspective of classroom practitioners, gamification holds considerable promise as a motivationally rich pedagogical approach when implemented with thoughtful design and adequate support.

The results demonstrate that gamified learning experiences are widely perceived by teachers to foster students' sense of competence through clear goals, feedback, and tangible progress. Relatedness is likewise enhanced when game-based activities promote social interaction, peer collaboration, and shared classroom goals. Autonomy, though slightly less emphasized, is supported through opportunities for student choice, narrative immersion, and self-directed play. Importantly, teachers who use gamification more frequently are more likely to observe these motivational benefits, suggesting that integration depth and teacher familiarity may amplify gamification's impact.

However, this potential is not without constraints. Teachers consistently identified significant structural and logistical barriers, including time limitations, lack of professional development, and inconsistent access to devices, that hinder the regular use of gamified practices. Furthermore, while many students thrive in game-based environments, teachers expressed concern about the potential for increased anxiety or disengagement among

learners who struggle with competitive dynamics or fast-paced challenges. These concerns underscore the need for pedagogically balanced and inclusive gamification strategies that address the diverse emotional and cognitive profiles of students in elementary classrooms.

This study contributes to the growing body of literature that seeks to connect gamification to established psychological theories of learning. By applying SDT to teacher perceptions, it offers a nuanced, theoretically grounded, and practice-oriented view of how gamification functions within the classroom ecosystem. At the same time, it highlights critical gaps between vision and reality, between what gamification can offer and what current systems enable.

Moving forward, both policy and practice must converge to bridge this gap. Teachers require more than enthusiasm to bring gamified learning to life; they need access to high-quality, curriculum-aligned resources, time to adapt materials thoughtfully, and institutional recognition of the pedagogical sophistication that gamification demands. Schools and educational leaders should prioritize not only technological infrastructure but also sustained professional learning that positions teachers as designers of motivational learning environments.

The findings of this study have several important implications for practice. First, professional development programs should be designed to not only introduce teachers to gamification tools but also explicitly link these tools to motivational theory, such as SDT. This could empower educators to design experiences that intentionally support psychological needs. Second, educational technology developers should focus on creating gamification platforms that emphasize customization, collaboration, and non-competitive engagement, allowing for more inclusive classroom dynamics. Finally, schools and districts should consider investing in shared repositories of gamified lesson plans and providing dedicated time for teachers to explore, experiment, and reflect collaboratively.

Finally, future research should build on this study by incorporating student perspectives, investigating longitudinal effects, and examining classroom-level implementation in diverse educational settings. Only through continued inquiry and systemic support can gamification evolve from a promising innovation to a sustainable, equitable, and transformative element of 21st-century learning.

Several limitations must be acknowledged. First, the study relied exclusively on self-report data from teachers, which may be subject to biases such as social desirability or recall distortion. While teacher perceptions offer valuable insight, future studies should include triangulated data sources, such as classroom observations, student feedback, or learning analytics. Second, the cross-sectional design limits the ability to assess changes over time or causal relationships. Longitudinal research would be valuable to examine how sustained gamification use influences both teacher practice and student motivation.

Additionally, while the sample was geographically and demographically diverse, it was still limited to voluntary respondents who had prior experience with gamification. Future studies should investigate the views of teachers who are skeptical or inexperienced with gamified instruction, as well as explore student perspectives across different developmental stages.

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