

How Gamification Affects Motivation and Retention Level of Primary and Middle School Students? A Narrative Review

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Abstract: Gamifications have been a unique way of teaching practical lessons and testing young ones in real situations since ages. Gamification provides ample of opportunities for educators to convey their thoughts among students. This paper follows the approach of qualitative analysis of previously published articles for gaining insights at present about how gamification is affecting motivation and retention level of primary and middle school students. The articles published between 2020-2025 have been considered under the study. The whole thing comes down to key theories, in this case, Cognitive load theory, Self-determination theory, and Flow theory. The key outcomes of this study, gamification increases learning outcomes, particularly for elementary students. Points, badge, leader boards, storylines, progress bars, and team play all these mechanisms were looked at. Of course there are downsides: the over justification-effect, anxious competition, and the fact that novelty fades away. The paper concludes with useful hopes for teachers as well as a map of the directions for the researches to take in K-8 gamified classrooms.

Keywords: Gamification, Motivation, Retention, Primary Education, Middle School, Game Based Learning.

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I. INTRODUCTION

In the last decade, the concept of tossing things like game mechanics into teaching have become a major tech trend in the schools. Gamification basically, cherry-picking bits of game design for non-game stuff has jumped off the charts in K-12 because teachers are interested in fresh ways to get at the attention of students and really improve learning (Sailer & Homner, 2020). The grounding is inspired by Self-Determination Theory (SDT), it proposes, kids feel satisfaction when autonomy, competence, and victory feelings are fulfilled (Deci & Ryan, 2000). Gamification can theoretically land on all those marks since it lets the students to choose avatars (autonomy), level up with badges (competence feedback), and team up on missions (relatedness). Flow Theory also come into play, which argues that you get maximum engagement at that associated with just right challenge for the skill level, which is something smart gamification can craft (Csikszentmihalyi, 1990).

At present, schools are shifting on gamification like it's the new, especially after that you just about took on a whole new role that has been made available to you as we came out of the pandemic with everything being online. Apps such as Kahoot, Classcraft, Quizizz and Duolingo are, for all intents and purposes, household names in primary and middle school classrooms. Meta-analytic level data support that gamification in some ways does raise learning. It has been found positive inclination towards gamification among students in a study conducted by Li et al., (2023), that overall result ($g=0.822$) across 41 studies, 5,071 participants, elementary kids took the biggest lift ($g = 1.293$) way bigger than their secondary counterparts ($g = 0.014$).

But the rate of adoption is way ahead of what research can keep pace with. Studies have warned that gamification is racing ahead of the evidence, with a mix of solid and even negative findings that tell us the hype curve is levelling off into real critical reviews (Dichev and Dicheva, 2017). There are concerns about the over justification effect (kids getting

obsessed with external rewards), anxiety due to competing and how long interest endures after the initial fun wears off (Hanus & Fox, 2015). These shots are super relevant for k-8 kids, especially because right now their brains, and sense of themselves, is still in the process of being shaped.

Despite all the awareness of gamification in K-8, there is an absence that a target, fully updated snapshot focusing on numbing grades 1-8. Most reviews either lump disorders in all school levels, or get stuck on university settings. Because younger kids think differently, less developed cognitive abilities, different motivation patterns, different social and emotional skills, it is important to know what actually keeps them motivated in their particular context. The rapid flux of platforms and approaches also underline the need for new data between 2020 and 2025 to capture the post pandemic wave and latest meta-analytic resolutions.

So, this review attempts to provide more concrete, secondary data-based evidence tips for teachers on how to go about rolling out gamification with younger learners. By examining what motivates students, creating and sustaining retention, and separating the roles of singular game elements, it's creating an on-the-ground, practical tool box that both fits strategies and content to the categories in which they belong.

➤ *Research Questions*

- RQ1: What are the theoretical frames to support gamification in primary and middle school?
- RQ2: How do concrete elements of gamification (points, badges, leaderboards, storey, etc.) affect kids' motivation, grade 1-8?
- RQ3: What's the gamification effect on knowledge retention and academic performance in different subjects?
- RQ4: What are some of the challenges and constraints present when sprinkling gamification onto young learners and where is the next step for future research?

➤ *Research Objectives*

- Address the fundamental theories like self-determination theory, flow theory, and cognitive load theory of gamification up to K-8.
- To understand how gamification affects student's retention, performance, and general learning, whatever the subject is and whether the subject is science, math, history, etc.
- To identify the challenges and constraints present when integrating gamification for young learners.

II. REVIEW OF THE RELATED LITERATURE

➤ *Theoretical Frameworks of Gamification*

Gamification, the most spoken theory is Self-Determination Theory or (SDT) which is presented by Ratinho and Martins (2023). Basically, SDT says that we get motivated when we feel autonomous (having a say), competent (feeling capable) and related (connecting with others). A meta-analytic

study by Sanchez et.al. (2023) found that gamification was beneficial to intrinsic motivation and led to a perception of autonomy ($g=0.638$) and relatedness ($g=1.776$), but not so much for competence ($g=0.277$). So, whilst games can make us feel in-control and connected, they still need to go further than just flashy features in order to make us actually feel capable.

The next is, Flow Theory, that's another lens as to why we get "in the zone." Flow is that sweet spot where the level of challenge is met or there is a match of challenge and skill (Csikszentmihalyi, 1990). Luking et al., (2023), found students with learner autonomous and competence as strong predictors of flow in digital gamified learning ($R^2=0.22$), more so if you were allowed to choose your avatar and topic. Chalco et al., (2023) even created the framework Gamiflow, which transformed the Flow Theory into a practical game design tool for educational games, which can be applied across ages and kids as early young as 4-5 years old.

When you start talking about design limits, you are dealing with what is called Cognitive Load Theory, and especially for younger learners who have a smaller working memory. It has been demonstrated that gamified cognitive training that was well designed for kids with learning disabilities, could sustain their challenge and motivation and even minimize the additional mental load (Ahmed & Indurkha, 2021). Learner engagement combining SDT and cognitive load theory have been put into an equation to explain around 60.6% of the variance in engagement for learning by this theory: Gamified stories were particularly excellent to ease cognitive load and increase understanding (Baah et al., 2024).

➤ *Effects of Individual Gamification Elements*

Recent studies are attempting to disentangle the role of which parts of gamification matter. Points, badges and leaderboards (PBL), the more traditional go-to tools, are largely tapping into external motivation. Mekler et al., (2017) conducted an experiment, they found that while points, levels and leaderboards are increasing how much people did, they didn't really gain intrinsic motivation, or competence. Ratinho & Martins (2023) also pointed out that points increased in 75% of gamification studies, competition in 65% and leaderboards in 55% and badges in 52.5%.

Mohammed et al., (2024) did a field test of 30 fifth grade students in Egypt testing badges versus leaderboards. Both increased cognitive and achievement motivation equally, so maybe the overall design quality and novelty is far more important than being able to choose one element rather than another. Storeys and narratives do in particular appear to be good at triggering intrinsic motivation. Joining a narrative using avatars helps the students to stick with it longer than mere accumulation of PBL (Ratinho & Martins, 2023). Alotaibi's (2024) review of early-childhood game-based learning concluded that story-telling and role-playing can help children with narrative development and as well as developing a greater ability to read in contexts within which they find meaning.

With competition vs. collaboration, is another big deal. Sailer & Homner (2020) meta-analysis showed that the use of competition in conjunction with collaboration was a win ($g=0.25$) for behavioural learning, while competition alone showed more mixed results. Team-based setups are able to harness the advantages of competition but lessen the pressure that is felt about individual performance without doing so. Indicators of progress and feedback are also medium to large-sized effects. Indicators of progress and feedback has medium to large sized effect through feeding into competence needs from visible tracking (Wang et al., 2024).

➤ *Research on Gamification Platform*

There are some platforms that appear on a fair number of studies, particularly in the K-8 classroom. Kahoot is a huge one, with a review by Wang & Tahir (2020) of 93 studies showing positive impacts in performance, classroom dynamics and attitudes. Rayan & Watted (2024) conducted a quasi-experimental study with 5th and 6th graders on Kahoot, integrating science with math mastery, post-test score for the experimental group was 89.79 while control 56.70. But, Fegely et al. (2021) sounded a note of caution, that although a majority of students enjoyed playing Kahoot, the competitive and time pressured environment may cause some students to experience anxiety. Classcraft is all about role playing and working together. In a study, ClassCraft assisted 10–12-year-olds to learn about sustainable mobility concepts and found class more fun with it (Gonzalez et al., 2021). Duolingo gamified language lesson killing it for receptive skills (Jiang et al., 2022), reported that about 120 hours on Duolingo was like four semesters of university read. Zeng and Fisher (2024) conducted a qualitative study of Chinese junior high school students using Duolingo to identify that there were gains in self-efficacy and good transfer of learning to school situations.

III. METHODOLOGY

The researchers have employed a narrative review to aggregate empirical literature about gamification in primary and middle school. The focus was on peer-reviewed articles, meta-analyses, and those from 2020 through 2025, in order to capture the most up-to-date trends. They have used Google Scholar, ERIC, Scopus, and Web of Science for searching with keywords such as 'gamification,' 'game-based learning,' 'motivation,' 'retention,' 'primary education,' and so forth.

➤ *Inclusion Criteria*

- Empirical investigation regarding gamification's influence on motivation or retention;
- Students are stipulated to be in the elementary school grades 1st-8th, or aged 6-14;
- Peer-reviewed journals; and
- Publications characterized by 2020-2025.

➤ *Exclusion Criteria*

Researchers have excluded studies that were exclusively in higher education, that focused on game-based learning and didn't involve gamification elements or papers that lacked data. Researchers have paid more attention to what researchers consider to be high-grade EdTech journals, so regional journal articles were not mentioned.

➤ *Data Extraction*

Data extraction was target at participants (age, grade), gamification elements used and outcome measures (types of motivation, retention, grades) as well as key theoretical frameworks and key findings. The narrative synthesis combined some quantitative effect sizes from meta-analysis with some qualitative understandings from individual studies to provide a rounded understanding of how gamification works in K-8 settings.

IV. FINDINGS AND DISCUSSIONS

➤ *Effects of Gamifying on Student Motivation*

Multiple meta-analysis was indicated from the years 2020 - 2025, with positive effects of gamification on motivation especially for understanding what elementary students. Li et al., (2023) found an overall effect size well over .800 ($g = .822$) for 41 publications with elementary kids taking even larger effect sizes of $g = 1.293$ compared with the little to negligible effect sizes for Secondary school ($g = 0.014$). This likely reflects a more natural tendency of younger children to be open to play and their lower level of academy pressures to socialize.

Kurnaz F. (2025) showed in a meta-analysis comparing intrinsic and extrinsic motivation through a total combined effect size of $g=0.654$ of gamification. The study also highlighted that extrinsic motivation received a little bit boost from the other side compared to intrinsic motivation which is likely because most games are based on PBL mechanism as external rewards. That means that designers should look to add more elements that facilitate intrinsic motivation, rather than simply points and badges.

Bai et al. (2020) identified four main reasons on why students enjoy gamified learning: they spark enthusiasm, provide quick feedback, meet the recognition needs, set goals. Yet, some students felt that games simply did not offer any additional value, and a select few had some anxiety or jealousy from competition. These mixed reactions indicate the need for the tailored implementation that considers the preferences and traits of each student.

➤ *Impacts of Gamification in Knowledge Retention and Academic Performance*

The case for the impact of gamification on cognitive outcome and retention is encouraging, especially at the K-8 level. Sailer and Homner (2020), found that there were significant effects of cognitive learning ($g=0.49$) which remained powerful in rigorous studies, which is rare among

Edtech interventions. Bai et al. (2020), found a medium effect on academic performance ($g = 0.504$); while Huang et al. (2020), found similar outcomes ($g = 0.464$) in their meta-analysis of 30 studies based on 3083 participants.

Subject specific data indicate big differences. The most influential types of sciences revealed by Li et al. (2023) are the sciences with the greatest influence ($g = 3.220$), which is more than double the children's average levels overall, followed by math ($g=2.005$). In math, there are studies that confirm positive results for elementary students. Umboh et al. (2021), followed fourth grade math gains from 64 to 72 to 81 several cycles through 4th grade. Big improvements on addition and subtraction were found for 4–6-year-olds using Kahoot by Xezonaki A. (2023).

In terms of reading and language arts, gamified reading instruction was reviewed here and the results revealed that primary students engaged to a greater level, proving most effective use of badges, reward, leaderboard and progress bars. Al Ali et al. (2024), proved that gamification increased creative reading skills (fluency, originality, flexibility) in a sample of second graders as compared with traditional lessons. The duration of the intervention was important: Li et al. (2023) report that long durations of intervention (much more than one semester) led to bigger effects suggesting that sustained engagement contributes to consolidation of learning.

➤ *Challenges and Limitations to Gamification in K-8 Education*

Despite the optimism, there are a number of challenges that create doubt. One of the over justification effects is a major concern. Hanus and Fox (2015), conducted 16-week research in which gamified courses (badges, leaderboards) actually decreased satisfaction, motivation, and empowerment over time, and resulting in reduced end scores due to decreased intrinsic motivation. This demonstrates a case whereby some gamification mechanics can backfire.

Competition anxiety is another threat for younger kids who are in the process of developing a self-concept and academic identity. In research by Almo et al. (2024), 1389 Irish primary students were studied and leaderboards were found to have the potential to be harmful for those of you who can't cope with competition, social anxiety or stress, with lower-ranked kids feeling inadequate and reacting negatively.

The novelty effect threatens sustainability in the long term. Ratinho and Martins (2023), found that even as you experience high peaks of motivation at the beginning, after a while if you ignore the extrinsic mechanics of the piece, the motivation will go down dramatically.

Some of the implementation barriers are cultural perceptions (perceiving gamification as fun), tech limitations (access to devices and digital literacy), and institutional barriers (stiff curricula and limited teacher training) (Sambo et al.,

2025). These issues may disproportionately impact under-resourced schools which therefore raises equity issues.

➤ *Implications and Future Areas of Research*

Key research priorities emerge longitudinal studies beyond the novelty period are few, so researchers need more long-term data. Developmental differentiation is important, mechanics for a 6–8-year-old will likely be different than they are for 12–14-year-olds, but size studies rarely compare age-demographic designs. Isolating the effects of individual elements would help explain which mechanics really make things happen as opposed to bundled ones. More research is needed in the non-Western context, since the majority of current data is from the North American and European contexts. Finally, there are equity implications, which is how gamification affects students with disabilities, English-language learners, and students without access to technology, that need more exploration.

For practice, the evidence is in favour of narrative rich, collaborative designs with challenges in balance; point and badge systems. Educators should be extra cautionary about any competition induced anxiety of vulnerable students and consider team-based ways of diffusing pressure. Regular engagement checks will help to catch novelty decline and rotation of gamification strategies over time may keep it alive.

V. CONCLUSION

This narrative review reveals that gamification is a promising and complex tool to increase motivation and retention in primary and middle-school. Elementary students benefit the most. However, success depends on making design decisions that foster intrinsic motivation (based on autonomy, competence and relatedness) as opposed to focusing on the structured, extrinsic mechanics of PBL. Theories such as Flow Theory, Self-Determination Theory, and Cognitive Load Theory are all good guides for creating age-appropriate gamified learning experiences.

The risks of over justifying effects, competition anxiety, and novelty decline need to be carefully implemented and attended to, especially with young learners as their psychological development is continual. As a student looking at the existing research in the field of education, it's easy to see how these pitfalls can become an issue when it comes to motivation when not properly addressed.

For educators working in the elementary grades of grade 1-8 grade levels, this evidence indicates to focus more on narrative-rich, small group, rich designs with the right calibration of challenge. This approach, it seems to be, normally fits well into the needs of development and encourages such engagement which is felt rather than contrived.

Progress indicators and immediate feedback mechanisms seem to work well for supporting the competence needs, leaderboard systems should be implemented carefully with consideration of their negative impact on vulnerable students. In real life, we all are probably more inclined toward personalized vs. public ranking of feedback in order to keep the learning environment inclusive and positive.

REFERENCES

- [1]. Ahmed, M. M. H., & Indukhya, B. (2021). Evaluation of user experience, cognitive load, and training performance of a gamified cognitive training application for children with learning disabilities. *Frontiers in Computer Science*, 3, 617056. <https://doi.org/10.3389/fcomp.2021.617056>
- [2]. Al Ali, R., Al-Hassan, O., Al-Barakat, A., Bataineh, O., & Al-Jawaldeh, F. (2024). Effectiveness of utilizing gamified learning in improving creative reading skills among primary school students. *Forum for Linguistic Studies*, 6(6), 816-830. <https://doi.org/10.30564/fls.v6i6.7518>
- [3]. Almo, A., Ryan, R., Halloran, E., & Butler, D. (2024). Exploring children's experience with an infinite leaderboard in a digital maths game. *International Journal of Serious Games*, 11(4).
- [4]. Alotaibi, M. S. (2024). Game-based learning in early childhood education: A Systematic review and meta-analysis. *Frontiers in Psychology*, 15, 1307881. <https://doi.org/10.3389/fpsyg.2024.1307881>
- [5]. Baah, C., Govender, I., & Subramanian, P. R. (2024). Enhancing learning engagement: A study on gamification's influence on motivation and cognitive load. *Education Sciences*, 14(10), 1115. <https://doi.org/10.3390/educsci14101115>
- [6]. Bai, S., Hew, K.F., & Huang, B. (2020). Does gamification improve student learning outcome? Evidence from a meta-analysis and synthesis of qualitative data in educational contexts. *Educational Research Review*, 30, 100322. <https://doi.org/10.1016/j.edurev.2020.100322>
- [7]. Chalco, G. C., Bittencourt, I.I., Reis, M., Santos, J., & Isotani, S. (2023). Gamiflow: Towards a flow theory-based gamification framework for learning scenarios. In *Artificial Intelligence in Education (AIED 2023)*. Springer. https://doi.org/10.1007/978-3-031-36336-8_65
- [8]. Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. Harper & Row.
- [9]. Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychology Inquiry*, 11(4), 227-268. https://doi.org/10.1207/S15327965PLI1104_01
- [10]. Dichev, C., & Dicheva, D. (2017). Gamifying education: What is known, what is believed and what remains uncertain. *International Journal of Educational Technology in Higher Education*, 14(9). <https://doi.org/10.1186/s41239-017-0042-5>
- [11]. Fegely, A., Schultz, M., Senkpeil, R., Cao, C. T., Hsu, J. L., & Bhatt, J. M. (2021). A tale of two institutions: Analyzing the impact of gamified student response systems on student anxiety. *CBE-Life Sciences Education*, 20(2). <https://doi.org/10.1187/cbe.20-08-0187>
- [12]. Gonzalez, S., Sanchez, M., & Chacon, J. (2021). Using ClassCraft to improve primary school students' knowledge and interest in sustainable mobility. *Sustainability*, 13(17), 9939. <https://doi.org/10.3390/su13179939>
- [13]. Hanus, M. D., & Fox, J. (2015). Assessing the effects of gamification in the classroom: A longitudinal study on intrinsic motivation, social comparison, satisfaction, effort, and academic performance. *Computers & Education*, 80, 152-161. <https://doi.org/10.1016/j.compedu.2024.08.019>
- [14]. Huang, R., Ritzhaupt, A.D., Sommer, M., Zhu, J., Stephen, A., Valle, N., Hampton, J., & Li, J. (2020). The impact of gamification in educational settings on student learning outcomes: A meta-analysis. *Educational Technology Research and Development*, 68(4), 1875-1901. <https://doi.org/10.1007/s11423-020-09807-z>
- [15]. Jiang, X., Pajak, B., & Kittredge, A. (2022). Evaluating the reading and listening outcomes of Douingo learners. *Foreign Language Annals*, 55, 1-28. <https://doi.org/10.1111/flan.12600>
- [16]. Kurnaz, F. (2025). A meta-analysis of gamification's impact on student motivation in K-12 education. *Psychology in the Schools*. <https://doi.org/10.1002/pits.70056>
- [17]. Li, M., Ma, S., & Shi, Y. (2023). Examining the effectiveness of gamification as a tool promoting teaching and learning in educational settings: A meta-analysis. *Frontiers in Psychology*, 14, 1253549. <https://doi.org/10.3389/fpsyg.2023.1253549>
- [18]. Luking, P., Markic, S., & Kelkel, M. (2023). The effect of basic psychological needs on the flow experience in a digital gamified learning setting. *Frontiers in Psychology*, 14, 1243530. <https://doi.org/10.3389/fpsyg.2023.1243530>
- [19]. Mekler, E. D., Bruhlmann, F., Tuch, A. N., & Opwis, K. (2017). Towards understanding the effects of individual gamification elements on intrinsic motivation and performance. *Computers in Human Behavior*, 71, 525-534. <https://doi.org/10.1016/j.chb.2015.08.048>
- [20]. Mohammed, M., Fatemah, A., & Hassan, L. (2024). Effects of gamification on motivations of elementary school students: An Action research field experiment. *Simulation & Gaming*. <https://doi.org/10.1177/10468781241237389>
- [21]. Ratinho, E., & Martins, C. (2023). The role of gamified learning strategies in student's motivation in high school and higher education: A systematic review. *Heliyon*, 9(8), e19033. <https://doi.org/10.1016/j.heliyon.2023.e19033>

- [22]. Rayan, B., & watted, A. (2024). Enhancing education in elementary schools through gamified learning: Exploring the impact of Kahoot! on the learning process. *Education Sciences*, 14(3), 277. <https://doi.org/10.3390/educsci14030277>
- [23]. Sailer, M., & Hommer, L. (2020). The gamification of learning: A meta-analysis. *Educational Psychology Review*, 32(1), 77-112. <https://doi.org/10.1007/s10648-019-09498-w>
- [24]. Sambo, K. U., Shishah, W., & Isiaku, L. (2025). Barriers to gamification adoption in education: A ansystematic review of cultural, technological, and institutional challenges in developing countries. *Information Development*. <https://doi.org/10.1177/02666669251331268>
- [25]. Sanchez, D. R., Langer, M., & Kaur, R. (2023). Gamification enhances student intrinsic motivation, perceptions of autonomy and relatedness, but minimal impact on competency: A meta-analysis and system review. *Educational Technology Research and Development*. <https://doi.org/10.1007/s11423-023-10337-7>
- [26]. Umboh, D., Tarusu, D., Mirini, A., & Sumantri. M. S. (2021). Improvement of student mathematics learning outcomes through Kahoot learning games application at elementary school. *Journal of Physics: Conference Series*, 1869, 012124. <https://doi.org/10.1088/1742-6596/1869/1/012124>
- [27]. Wang, A. I., & Tahir, R. (2020). The effect of using Kahoot! for learning- A literature review. *Computers & Education*, 149, 103818. <https://doi.org/10.1016/j.compedu.2020.103818>
- [28]. Wang, Z., Harun, J., & Yuan, Y. (2024). Enhancing reading instruction through gamification: A systematic review of theoretical models, implementation strategies, and measurable outcomes (2020-2024). *Journal of Information Technology Education: Research*, 23, Article 28. <https://doi.org/10.28945/5394>
- [29]. Xezonaki, A. (2023). The use of Kahoot in preschool mathematics education. *Advances in Mobile Learning Educational Research*, 3(1), 648-657. <https://doi.org/10.25082/AMLER.2023.01.014>
- [30]. Zeng, C., & Fisher, L. (2024). Opening the “black box”: How out-of-class use of Duolingo impacts Chinese junior high school students’ intrinsic motivation for English. *Sage Open*. <https://doi.org/10.1177/20965311231171606>