

Learner Enjoyment in Gamified and Non-Gamified Pedagogical Approaches

A Comparative Analysis

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Abstract

This study was undertaken to compare how gamified and non-gamified pedagogical approaches affect Learner Enjoyment. The quasi-experimental study utilised a post-test only control group design, involving Grade 9 students (n=80) from a CBSE-affiliated secondary school. Two intact Grades were randomly selected and assigned to either a control or experimental group, with 40 students in each. The experimental group received a gamified pedagogical intervention in Mathematics for a duration of two months. Conversely, the control group underwent traditional, non-gamified instruction on the same subject matter and topics for the same period of time. At the completion of the treatment, both groups were assessed by administering the Learner Enjoyment tool. After analysing the post test data using the t-test, the study's findings indicated that Learner Enjoyment of the gamified approach is 90.15 on average, significantly greater than that of the non-gamified approach, which has a mean score of 60.08. Therefore, the study revealed that, in comparison to the non-gamified educational approach, the proposed gamified pedagogical strategy may be effective in enhancing Learner Enjoyment. The study also examined how gender affects Learner Enjoyment in both gamified and non-gamified pedagogical approaches. It discovered that students who were taught using gamified and non-gamified pedagogical approaches irrespective of their gender, demonstrated the same degree of Learner Enjoyment.

Keywords: Gamification, Pedagogical Approaches, Learner Enjoyment, 21st Century Learners

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INTRODUCTION

In today's rapidly evolving educational landscape, a nation's strength is significantly contingent upon the quality of its education system. Therefore, establishing a robust educational foundation that fosters holistic development in the young generation is crucial. The current zettabyte age, marked by exponential data growth and AI revolution, presents both opportunities and challenges for educational frameworks. As digital natives, students in educational institutions, who are part of the alpha generation, require twenty first century pedagogical designs that cater to their unique learning aspirations and styles, equipping them with critical thinking, problem-solving, and teamwork abilities.

A favourable learning environment for twenty first century learners involves providing diverse learning experiences that maintain enjoyment of learning and stimulate intellectual curiosity. Learner enjoyment, a significant determinant of learning and academic achievement, necessitates investigation into its influencing factors and development in modern educational settings. However, recent research indicates a notable decline in school children's enjoyment of learning (Motteli *et al.*, 2023). Although research on emotions in education is gaining traction, there is still limited understanding of how learning environments influence learner enjoyment.

According to Molina (2021), a paradigm shift in the contemporary educational system is necessary to address the current realities, integrating dynamic and collaborative learning settings, revising pedagogical approaches, and incorporating innovative educational tools. Gamification, an emerging trend in education, applies game elements (that is, motivational affordances) to non-game contexts to enhance the learning experience of students. The literature review on gamification in education highlights the potential of gamified instructional strategies to increase intrinsic motivation and positively impact attitudes and behaviours. Nevertheless, empirical literature on the impact of gamified pedagogical approaches on fostering learner enjoyment, particularly in the Indian context, remains scarce. This study addresses this research gap by investigating the effectiveness of gamified pedagogical approaches in fostering learner enjoyment compared to non-gamified approaches.

THEORETICAL BACKGROUND

Gamification

Gamification is a burgeoning area of research in twenty first century education, with a growing body of evidence suggesting its potential benefits in enhancing student motivation and engagement, thereby improving the learning experience. According to Deterding *et al.* (2011), gamification is defined as "the use of

game design elements in non-game contexts” to provide experiences akin to games and promote positive behaviours and behavioural changes. This approach leverages game features such as points, badges, leaderboards, narratives, and rewards to augment user motivation, engagement, and participation in various domains, including education.

In the present study, Khan Academy, a gamified learning platform, was employed to teach mathematical concepts aligned with the NCERT curriculum to Grade 9 students. The gamified pedagogical intervention consisted of video lessons on the topic of ‘Circles’, specifically addressing the following subtopics: Angle subtended by a chord at a point, Perpendiculars to chords and equal chords, Angles subtended by an arc of a circle, and Cyclic quadrilaterals. These lessons were supplemented with interactive exercises, quizzes, and unit tests, enabling students to earn mastery points, badges, and rewards as they progressed through the content and demonstrated mastery of specific skills.

The Personalised Learning Dashboard (PLD) facilitated the tracking of student progress, identified areas where students required additional support or enrichment, and offered real-time feedback. Students could earn virtual rewards and badges upon completing math lessons, achieving milestones, or demonstrating mastery of specific

mathematical concepts, which helped to enhance their enjoyment of learning activities.

Impact of Gamification on Learner Enjoyment

Educators face challenges in engaging students, who often feel bored and uninterested in traditional learning activities. In contrast, games captivate students, fostering intrinsic motivation and enjoyment (Deci and Ryan, 1985; Guo and Barnes, 2011). By incorporating game elements into pedagogy, educators can enhance learner engagement, motivation, and enjoyment. Gamification has gained attention in education for its potential to boost learner motivation and outcomes (Zeng *et al.*, 2024). The following theoretical frameworks highlight the significance of intrinsic motivation, game design elements, and psychological engagement in gamified environments.

Key Theoretical Foundations for Learner Enjoyment in Gamification

Two key theories underpin learner enjoyment in gamification: Self-Determination Theory (SDT) and Flow Theory.

Self-Determination Theory (SDT)

Self-Determination Theory (SDT) formulated by Edward L. Deci and Richard M. Ryan in the 1980s, plays a crucial role in supporting learner enjoyment in gamification by addressing the intrinsic psychological

needs of competence, autonomy, and relatedness. These needs are essential for fostering intrinsic motivation, which is a key driver of enjoyment in learning environments. Gamification, when designed with SDT principles, can significantly enhance learner engagement and enjoyment by aligning game elements with these psychological needs.

Gamification provides autonomy by offering choices and allowing learners to make decisions, while elements like points, badges, and leaderboards enhance competence by providing feedback and opportunities to develop skills. Additionally, gamification can foster relatedness through social interaction, collaboration, or friendly competition (Smirani and Yamani, 2024). By satisfying these needs, gamification increases intrinsic motivation, promotes engagement, and enhances learner enjoyment, leading to a more effective and joyful learning process.

Flow Theory

In the 1970s, Mihaly Csikszentmihalyi developed Flow Theory to try to understand why and how individuals feel while they are having the most fun. Csikszentmihalyi's investigation into the question, "What is enjoyment?" led him to develop the concept of flow. In accordance to Flow Theory, individuals who are totally absorbed in an activity lose consciousness of time and are completely involved. When an activity becomes so enjoyable one does not require other

incentives to keep them motivated to continue doing it.

Those who enjoy their work are likely to include some or all of the following feelings: (1) that they are fully engaged in what they are doing with all of their minds and bodies, (2) that they are highly focused, (3) that they are aware of their goals, (4) that they are aware of their performance, (5) that they are not concerned about failing, (6) that time is flying by, and (7) that they have lost the ordinary sense of self-consciousness and gnawing worry that characterise so much of daily life (Csikszentmihalyi, 1975). This autotelic state of consciousness is what called the "flow experience". In flow experience, the individual is functioning at its highest capacity and the experience itself serves as reward, which makes it intrinsically motivating (Csikszentmihalyi and Nakamura, 2014). Gamified experiences can induce flow by providing clear objectives, prompt feedback, and optimal challenge.

In summary, by integrating SDT and Flow Theory, educators can design gamified experiences that enhance enjoyment, engagement, and educational outcomes. These theories provide a foundation for creating effective gamified learning environments that promote intrinsic motivation and deeper learning.

REVIEW OF RELATED LITERATURE

Gaonkar *et al.* (2022) conducted empirical research on gamification

in education using case studies, employee observation, and web content analysis. The study found that successful gamification techniques fulfill psychological needs, enhance learners' motivation, and foster a supportive learning environment. To guarantee improved learning results, the study did, however, suggest extensive research to support the role of gamification in education. Luarn *et al.* (2023) studied how gamification components can boost students' interest and motivation for learning. The study employed a well-structured, 26-item questionnaire with a survey-based approach. They observed that gamification elements including feedback, competitiveness, self-expression, collaborative work, and a sense of control boost intrinsic motivation, leading to increased learner enjoyment and engagement in educational environments, aligning with previous research. Othman *et al.* (2023) aimed to understand the optimal environment for gamified lessons, focusing on learner acceptance and aesthetics. A survey with 283 university students revealed that aesthetics, enjoyment, perceived usefulness and ease of use positively influence students' readiness to integrate gamification in education, ultimately improving learning outcomes. Yang (2023) investigated on the effect of gamified instruction on higher-level English learning. The research used surveys, questionnaires, and

evaluations to assess students' performance and interest levels. Results showed that gamified activities increased enthusiasm and improved performance. However, the study suggested further investigation into the long-term impacts of gamified instruction on different learning domains. Febriansah *et al.* (2024) did a systematic literature review on gamification in Indonesian education, revealing a significant increase in its use during the COVID-19 pandemic. They found that points and leaderboards were commonly used to engage learners. The study emphasised the potential benefits of gamification in enhancing students' motivation to learn through an interactive educational setting, but also highlighted challenges in improving educational resource quality. Wang *et al.* (2024) focused on gamified learning software's effectiveness in improving student interest and engagement in vocational colleges. The study involved 71 students and found that the software increased motivation, engagement, and enjoyment of learning content. The results indicated that gamification can improve student learning outcomes by increasing enjoyment and efficiency in vocational education. Xiao (2024) proposes gamified teaching strategies based on embodied cognition theory to enhance English learning for non-native learners. Techniques include kinesthetic activities, gesture-based

learning, Augmented environments, interactive storytelling, and Virtual Reality simulations. These methods enhance learning outcomes and student involvement.

Despite the established educational significance of gamified pedagogical approaches, a paucity of empirical research exists that systematically evaluates its theoretically predicted impact on learner enjoyment. To address this knowledge gap, this study conducted an exhaustive review of related literature to elucidate the role of gamification in fostering a positive learning environment. The synthesis of existing research suggested that gamification can enhance student learning outcomes by cultivating intrinsic motivation and engagement. However, a notable scarcity of studies on gamification in the Indian context was observed. The identification of this research gap in the reviewed literature provided the foundation for the present investigation, which aimed to explore the potential benefits of gamified pedagogical approaches in promoting learner enjoyment, in comparison to non-gamified approaches.

RATIONALE OF THE STUDY

The researchers identified a pressing need to cultivate learner enjoyment in educational activities, amidst the myriad distractions that characterize the lives of twenty-first century learners. Against this backdrop, a comprehensive review of the

literature on gamified pedagogical approaches revealed their potential to enrich learning experiences and revolutionise the educational paradigm. Nevertheless, despite of the growing enthusiasm for gamification, empirical research supporting its effectiveness in promoting Learner Enjoyment remains limited. Moreover, the scarcity of research on gamification in Indian educational settings underscored the need for studies that investigate the impact of gamified pedagogy on Learner Enjoyment. This study aimed to address this knowledge gap by exploring the impact of gamified and non-gamified pedagogical approaches on learner enjoyment. By examining the differential effects of these approaches on learner enjoyment, this study sought to provide insights into the design and implementation of effective pedagogical strategies that promote learner enjoyment and better educational experiences.

STATEMENT OF PROBLEM

Learner Enjoyment in Gamified and Non-gamified Pedagogical Approaches—A Comparative Analysis

Research Questions

- Does gamified pedagogy lead to higher learner enjoyment compared to non-gamified approaches?
- Do demographic characteristics, specifically gender moderate the relationship between gamified pedagogy and learner enjoyment?

- Do demographic characteristics, specifically gender moderate the relationship between non-gamified pedagogy and learner enjoyment?

Objectives

- To examine the difference in learner enjoyment between gamified and non-gamified pedagogical approaches.
- To investigate whether learner enjoyment varies across demographic groups—gender in response to gamified approach.
- To investigate whether learner enjoyment varies across demographic groups—gender in response to non-gamified approach.

Hypotheses

H₀₁: There is no significant difference between the mean scores of learner enjoyment of gamified and non-gamified pedagogical approaches.

H₀₂: There is no significant difference between the mean scores of learner enjoyment of male and female students taught through gamified pedagogical approach.

H₀₃: There is no significant difference between the mean scores of learner enjoyment of male and female students taught through non-gamified pedagogical approach.

OPERATIONAL DEFINITION OF KEY TERMS

To ensure clarity and precision, the investigators operationally defined key terms employed in the study. These definitions are presented below:

Gamified Pedagogical Approach

Gamified Pedagogical Approach (GPA) refers to the systematic integration of gamification elements, including: Point systems, Multiple attempt options, Personalised suggestions, Virtual rewards, and Immediate feedback into the instructional methods employed to teach mathematical concepts aligned with the NCERT Curriculum for Grade 9. In this study, the investigators utilised the Khan Academy gamified platform as the primary tool for implementing GPA during the experimental phase.

Non-Gamified Pedagogical Approach

The Non-Gamified Pedagogical Approach (NGPA) denotes traditional instructional methods of mathematics, characterised by: Chalk-and-talk methodology, Textbook-based learning, and Teacher-led discussions. This approach prioritised structured content delivery and direct knowledge transfer, devoid of gamification features.

Learner Enjoyment (LE)

A multi-dimensional model of enjoyment developed by (Davidson,

2018), defined enjoyment as “a positive feeling, when engaged in a pleasurable and challenging activity, which allows for skill improvement, makes you feel connected to others, and makes you feel proficient with the activity”. In this study, learner enjoyment is conceptualised as a multifaceted construct (Davidson, 2018) and measured using the standardised Learner Enjoyment Scale, which encompasses five distinct dimensions:

- **Pleasure:** Positive emotional experiences and sensations derived from engaging with mathematical concepts.
- **Relatedness:** The extent to which students feel connected to their peers, teacher, and the learning environment, fostering a sense of belonging and social bonding.
- **Competence:** Students’ perceptions of their ability to understand and master mathematical concepts, influencing their confidence and self-efficacy.
- **Challenge/Improvement:** The motivation to enhance mathematical skills and the sense of accomplishment derived from overcoming challenging mathematical tasks.
- **Engagement:** A state of complete absorption in mathematical activities, characterised by intense concentration, loss of track of time, and intense focus.

These five dimensions collectively capture the essence

of Learner Enjoyment, providing a comprehensive framework for assessing students’ enjoyable learning experiences in mathematics.

METHODOLOGY

Population and Sampling

This study targeted secondary school students enrolled in CBSE-affiliated schools in Raigarh city, India, with a total population of approximately 4,000 students across 12 schools. To optimise feasibility and precision, a two-stage sampling strategy was employed. Initially, a single CBSE-affiliated secondary school, St. Teresa’s Convent School, was purposively selected based on its suitability for the study. From the school’s four Grade 9 sections (students aged 14–16), two intact sections of 40 students each were randomly selected and assigned to either the control group or the experimental group, resulting in a total sample size of 80 participants.

Rationale for Sampling Strategy and Sample size

The purposive selection of a single school was necessary for integrating the gamified intervention into the regular class schedule over a two-month period. Grade 9 students were chosen as the focus group to avoid disrupting Board Exam preparations for Grade 10 students. In Social Science research, experimental studies often involve the selection of intact groups from naturalistic

settings, as random assignment of participants to treatment conditions may not be practical or feasible (Sansanwal, 2020). Thus, two intact classes, each with 40 students, were randomly selected yielding a total sample size of 80 participants. The sample size, although relatively small, is deemed sufficient for experimental research purposes (Cohen *et al.*, 2007), as it allows for a controlled examination of the intervention's impact.

Variables

The current study investigated the relationship between pedagogical approaches and Learner Enjoyment, while considering the demographic variable of gender. The variables employed in this study were:

- Independent Variable: Pedagogical approach, which comprised two levels: Gamified Pedagogical Approach and Non-Gamified Pedagogical Approach.
- Dependent Variable: Learner Enjoyment, a multidimensional construct consisting of five dimensions: Pleasure, Relatedness, Competence, Challenge/Improvement, and Engagement.
- Demographic Variable: Gender, categorised into two levels: Male and Female.

Research Design

This study employed a quasi-experimental design with a post-test-only control group design.

The experimental group received a gamified teaching intervention, while the control group received traditional instruction. The comparison was made at a single post-intervention assessment point, allowing for a straightforward evaluation of the intervention's effect, while minimising potential biases and confounding variables.

TOOLS

The Learner Enjoyment Scale (LES-SA), developed and standardised by the researchers, was employed to assess Learner Enjoyment. This self-report measure utilised a five-point Likert Scale, comprising 20 items distributed across five dimensions: Pleasure, Relatedness, Competence, Challenge/Improvement and Engagement. Respondents indicated their level of agreement with each statement on a 5-point continuum: Strongly Disagree, Disagree, Undecided, Agree, and Strongly Agree. This scale provided a comprehensive understanding of Learner Enjoyment, encompassing affective, social, and cognitive aspects.

EXPERIMENTAL INTERVENTION

The experimental group (n=40) received a two-month gamified pedagogical intervention in Mathematics using Khan Academy, a mobile and web-based programme. Khan Academy facilitated self-paced learning with video lessons, practice exercises, and quizzes, incorporating gamification elements like points,

badges, rewards, immediate feedback and progress tracking. This engaging approach not only motivated students to continue practicing and honing their skills but also enhanced their overall learning experience. Whereas, the control group (n=40) received traditional instruction on the same subject matter and topics for the same period. After the two-month intervention, both the experimental and control groups underwent an assessment to measure learner enjoyment using the Learner Enjoyment Scale, and the resulting data were collected for subsequent analysis.

PROCEDURE OF DATA COLLECTION

The researchers selected a co-educational CBSE school in Raigarh city, obtained necessary permissions, and assured the authority that all ethical concerns would be addressed during the two-month experimental study and data collection. Two intact classes were randomly selected and assigned to either the Experimental Group or the Control Group. The Experimental Group received a

gamified intervention using Khan Academy, where mathematical concepts aligned with the Grade 9 NCERT curriculum were taught. In contrast, the Control Group received traditional instruction on the same mathematical concepts using the Chalk-and-Talk method and textbook-based learning. After the two-month intervention, both groups underwent a post test using the Learner Enjoyment Scale (LES-SA). The post-test scores were compiled and analysed using IBM SPSS Statistics 21.

RESULTS AND DISCUSSION

Comparison of mean scores of Learner Enjoyment of gamified and non-gamified pedagogical approaches.

In the first objective, the mean scores of Learner Enjoyment of gamified and non-gamified pedagogical approaches were compared. There were two levels of pedagogical approach, namely, gamified and non-gamified. A t-test was employed to statistically analyse the data, and Table 1 presents the findings.

Table 1
Pedagogical Approach-wise N,
Mean, SD, and t-values of Learner Enjoyment

Category	Pedagogical Approach	N	Mean	SD	df	t-value	Remark
Experimental Group	Gamified Approach	40	90.15	9.61	78	12.03	p < 0.01
Control Group	Non-gamified Approach	40	60.08	12.56			

Table 1 makes it clear that the resulting t-value is 12.03, which, with $df = 78$, is significant at the 0.01 level. Learner Enjoyment of gamified and non-gamified pedagogical approaches has considerably different mean scores, as demonstrated by this. As a result, the null hypothesis—that the mean scores of Learner Enjoyment of gamified and non-gamified pedagogical approaches do not differ significantly—is rejected. Additionally, the average score for learner enjoyment of the gamified pedagogical approach is 90.15, which is substantially higher than the average for the non-gamified pedagogical approach, which is 60.08. Therefore, compared to the non-gamified pedagogical approach, the gamified pedagogical approach is more successful at guaranteeing the learner enjoyment. A graphical representation of the comparison of learner enjoyment statistics between pedagogical approaches is presented in Fig. 1.

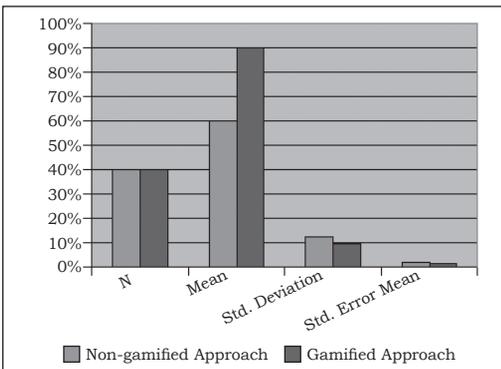


Fig. 1: Pedagogical Approach-wise Comparison of Learner Enjoyment Statistics

Comparison of Mean Scores of Learner Enjoyment of male and female students taught through gamified pedagogical approach.

In the second objective, the mean scores of Learner Enjoyment of male and female students taught through gamified pedagogical approach were compared. There were two levels of gender, namely, male and female. The data underwent t-test analysis to determine statistically significant differences, and Table 2 presents the findings.

It is evident from Table 2 that the calculated t-value of 0.73 is not significant. This indicates that there was no significant difference in the mean scores of Learner Enjoyment between male and female students who were taught using a gamified pedagogical technique. The null hypothesis, which states that there is no discernible difference in the mean scores of Learner Enjoyment of male and female pupils who were taught using a gamified pedagogical technique, is therefore not disproved. As a result, it can be said that both male and female students who were taught using a gamified pedagogical approach showed an equal degree of enjoyment of learning.

Comparison of mean scores of Learner Enjoyment of male and female students taught through non-gamified pedagogical approach.

In the third objective, the mean scores of Learner Enjoyment of male

Table 2
Gender-wise N, Mean, SD, and t-values of
Learner Enjoyment of Gamified Approach

Gender	N	Mean	SD	df	t-value	Remark
Male	19	91.3158	5.63	38	0.73	Not Significant
Female	21	89.0952	12.21			

Table 3
Gender-wise N, Mean, SD, and t-values of
Learner Enjoyment of Non-gamified Approach

Gender	N	Mean	SD	df	t-value	Remark
Male	20	60.7000	11.83	38	0.31	Not Significant
Female	20	59.4500	13.52			

and female students taught through non-gamified pedagogical approach were compared. There were two levels of gender, namely, male and female. A t-test was employed to statistically analyse the data, and Table 3 presents the findings.

Table 3 makes it evident that the obtained t-value, which is 0.31, is not significant. It indicates that there was no discernible difference in the mean learner enjoyment scores between male and female students taught using a non-gamified pedagogical approach. Therefore, it is not necessary to reject the null hypothesis, which states that there is no discernible difference between the mean scores of learner enjoyment of male and female pupils taught using a non-gamified pedagogical technique. Therefore, it can be claimed that both male and female students who were taught using a non-gamified

pedagogical technique exhibit same level of enjoyment of learning.

CONCLUSION

The observable findings of the current study, which came from the statistical analysis of the post test data, indicated that gamified pedagogical approaches significantly enhance learner enjoyment compared to non-gamified pedagogical approaches, with a mean score of 90.15 versus 60.08. The findings underscore the impact of gamification to revolutionise learning experiences by promoting interactive engagement and enjoyment. This finding aligns with existing research highlighting gamification's potential to make learning more engaging and fun. Notably, the study also found that learner enjoyment was not moderated by gender, with both male and female learners

responding similarly to gamified and non-gamified approaches.

The study's findings have significant educational implications, emphasising the importance of pedagogical innovation, educator training, and policy reform. Given the digital immersion of today's students, gamified educational experiences can be a valuable twenty-first-century instruction tool, enhancing reasoning abilities, digital literacy, and adaptability skills. By leveraging gamification, educators can better engage and inspire students, preparing them for the modern workforce. This study contributes to the growing body of research supporting the benefits of technology-enhanced learning and gamification in education, providing valuable insights for educators and policymakers.

LIMITATIONS AND FUTURE RESEARCH

Despite the fact that the current experimental research supported

the beneficial effects of gamified teaching methods in improving Learner Enjoyment, there are certain limitations which need to be dealt with in future research. The study's intervention period lasted only two months, which is not long enough to evaluate the impact. Both, the approach's novelty and its brief use may have contributed to the favourable outcome. The researchers can evaluate the treatment's effects in all respects if the duration is extended. The present study solely took into account the intervention's post-test results and used a post-test-only control group design. The use of a pre-test and post-test control group design, extended duration, and evaluation of pretest scores could all be advantageous for future studies. To enhance the generalisability of the findings, future research should investigate the effectiveness of gamified pedagogical tools in promoting Learner Enjoyment across diverse educational contexts, subjects, and age groups.

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