International Journal of Digital Content Management (IJDCM)
Vol. 7, No. 12, Autumn & Winter 2026; P 54-79
dcm.atu.ac.ir
DOI: 10.22054/dcm.2025.85674.1270

ATU PRESS

ISSN: 2717-3305 eISSN: 2717-3313 Submit Date: 06-05-2025 Revise Date:17-09-2025 Accept Date:27-09-2025 Original Research

Gamification Really Works Out! An Experiment among Adolescents Reading Gamified Electronic Books

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Abstract

Purpose: The current study examined the effectiveness of gamified reading of electronic books among adolescents in school libraries.

Method: A randomized sample of students aged 11 to 12 years including two control and experimental groups from four schools participated in this study. According to the Mechanics, Dynamics, and Emotions (MDE) framework, six gamification elements were implemented as group challenges. The experiences were then evaluated based on a quasi-experimental design with a post-test via the GAMEX scale.

Findings: Multiple independent t-tests using SPSS 26.0 showed that the gamified experience and its relevant subscales including enjoyment, absorption, creative thinking, activation, absence of negative affect, and

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How to Cite: Hasani, M., Keshavarz, H., Asnafi, A., Basiriran Jahromi, R. (2026). Gamification Really Works Out! An Experiment among Adolescents Reading Gamified Electronic Books, International Journal of Digital Content Management (IJDCM), 7(12), 54-79. DOI: 10.22054/dcm.2025.85674.1270

dominance differed significantly between the two groups. Therefore, the results revealed that implementing gamification in the reading experience within a gamified environment is highly effective and will influence adolescents' interest, motivation and ability to read in library contexts, which can be of interest to experts and policymakers in education and computer science.

Conclusion: Various game mechanisms can be integrated into the educational context or platforms like electronic books to make learning interesting and motivating to the students.

Keywords: Gamification, Extracurricular Reading, Adolescent Reading, Gamified Reading, Gamified Books

Introduction

Games have existed since the beginning of human culture, serving as tools for entertainment and establishing a connection between learning and survival. Indeed, games retain deep roots in learning processes and have an unprecedented impact on our social and professional life (Bess, 2013; Seaborn & Fels, 2015). Therefore, it is well-argued that games are an effective means of enhancing learning activities, and neglecting their role may lead to certain consequences (Silva et al., 2019; Li & Chu, 2020). Intrinsically, adolescents are more eager to play and expected to experience more entertainment in everyday interactions and serious activities such as studying and learning (Bovermann & Bastiaens, 2020; Bravo et al., 2021).

In recent years, the gamification concept has emerged as a cognitive innovation in educational activities (Prados Sánchez et al., 2021). The purpose of gamification is to support and motivate users to perform specific task dynamically and to cultivate their interest in a particular field that may enhance learning. In an educational context, it makes the learning environment more attractive because it aims to improve educational activities and make education enjoyable, motivating, and satisfying (Al-Azawi et al., 2016). A multitude of scholars agree on the benefits of gamification for target audiences, as games allow users to make mistakes and engage in learning without fear and thus become more involved in the learning process (Dale, 2014; Silva et al., 2019).

Deterding et al. (2011) define gamification as "the use of game design elements in non-game contexts". Therefore, educational programs have always been evolving and employing innovative approaches to meet the instructional needs of students so that to make learning more engaging and enjoyable through games and plays (Li et al., 2018). However, many students rarely read for enjoyment outside of school because they lack motivation and enthusiasm for extracurricular reading (Rahman et al., 2018; Li & Chu, 2020). As a result, students' reluctance to engage in extracurricular reading presents a challenge and an issue of concern. Therefore, applying motivating tools that create an interest in reading among students is a priority.

Gamification is seen as a persuasive method or a tool for improving user experience and interaction, or a process for problem-solving, increasing participation and user interaction, which is the fundamental idea behind invoking specific behaviors by activating user motivations.

A crucial element in guiding users toward specific objectives is the organized modification of their current usage behaviors. By doing so, the user is engaged in an entertaining process of pursuing goals and expected activities. Gamification seeks to incorporate motivational aspects of the gaming world into real-world activities. It aims to be a popular solution for encouraging specific behaviors and increasing motivation and participation (Dichev et al., 2014).

In a broader term, attention has always been paid to the potential contribution of gamification experience in various research fields (Eppmann et al., 2018; Högberg et al., 2019; González & Robles, 2019; Robles et al., 2020; Arifah, 2021). However, empirical examination of the gamification experience in reading has been limited. Although in various contexts such as libraries and schools, gamification has been utilized as a solution to enhance professional activities and improve information services, this research set out to empirically investigate the effectiveness of gamification elements in reading and to analyze the experience designed for adolescent users.

Moreover, User experience (UX) refers to the feelings and challenges that a given individual faces when using a particular product, system, or service. This includes user acceptance, satisfaction, usability, and user motivation when using a gamified product (Khaleel et al. 2016). As a UX framework, the Mechanics, Dynamics, Emotions (MDE) model derived from the Mechanics-Dynamics-Aesthetic (MDA) approach, has been developed based on the relationship between user experience and the designer's intention and is a combination of rules, systems, and enjoyment (Hsieh & Yong, 2019). Many studies concerned with gamified experiences have used MDE as an underlying framework for analyzing users' behaviors. As a result, we chose this framework as the primary instructional resource for conducting a gamification experiment.

According to the findings of some studies (Kim, 2012; Martens, 2015; Panopoulou-Huovila, 2020), adolescents' presence in library environments and their reading habits have declined. While Panopoulou-Huovila (2020) considered gamification in the retrieval process of library users, Bigdeli et al. (2016) in designing library websites through developing gamified software namely Ketadan, Li et al. (2018) in gamified learning through e-quiz systems, Zarinbal (2017) in applying the concepts of gamification in theses and dissertation registration systems, there is no research in Iran investigating how to

enhance reading habits and experiences when using electronic books, especially in school library settings. Considering that today's adolescents are surrounded by digital games, the gamified factor has become much stronger. Many libraries, including school libraries, have limited resources and would support implementing solutions to enhance their services (Felker, 2015). Therefore, research aimed at introducing creative solutions like gamification to attract users to the library environments will be highly valuable. Hence, through doing this research, while we implemented some gamification components in adolescents' reading, the experiences resulting from it were examined based on a standard scale developed through previous professional research. By creating and developing a gamified space, the designer's concepts and values are supposed to be taught to the learner in the form of unconscious learning. While reading electronic online platforms such as e-books using gamified elements is crucial for education and learning, but we found no similar research in Iran, neither in school libraries nor academic settings. Therefore, this research examined the impact of the gamified reading environment on students' experience in engaging in a library environment, paving the way for future research in this field, especially given the scarcity of similar studies and the urgent need for timely investigation.

Literature Review

Importantly, introducing gaming elements in non-gaming contexts attracts users to the environment and increases their engagement with educational services, resulting in positive outcomes for promoting reading, as explored through establishing game elements in the design process (Khorram & Monfared, 2017). For example, Zarinbal (2017) experimentally showed that by applying the concepts of gamification in theses and dissertation registration systems, the users' participation and system use will be improved and the accuracy of the input information also increased.

One of the main fields in which gamification plays a significant role is pedagogy. Gamification has emerged as a substantial pedagogical strategy to enhance reading skills among students. Integrating game-like elements into educational contexts has fostered greater engagement, motivation, and improved reading comprehension. For instance, Wang's systematic review highlights theoretical models and implementation strategies of gamification in reading instruction,

emphasizing its effectiveness across various educational settings and age groups (Wang et al., 2024). The review identifies a gap in the literature regarding the empirical evidence supporting gamification's benefits, suggesting that well-structured gamified interventions can lead to measurable improvements in reading performance and student engagement. Similarly, Nitiasih et al. found that gamification significantly enhances students' reading comprehension, particularly during emergency online learning scenarios, by improving motivation and academic performance (Nitiasih et al., 2022). It aligns with findings from Qiao et al. (2022) who demonstrated that a gamified approach embedded with self-regulated learning support positively affected students' reading performance and intrinsic motivation (Qiao et al., 2022).

Julita (2023) explored effective game elements that enhance reading comprehension among English as a Foreign Language (EFL) students, providing evidence-based practices for educators. The incorporation of gamification strategies not only fosters engagement but also creates dynamic learning environments that promote active participation (Julita, 2023).

Moreover, Castillo-Cuesta's research on using genially games illustrates how gamification can enhance reading and writing skills by allowing students to practice critical reading elements while engaging in gameplay (Castillo-Cuesta, 2022). It is further supported by Cano's systematic review, which highlights the role of Information and Communication Technologies (ICT) in strengthening reading skills through gamified learning experiences (Cano, 2023). The integration of ICT with gamification has been shown to enhance students' reading motivation and comprehension, as evidenced by Anggrainy's analysis of gamification's impact on EFL learners (Anggrainy, 2024).

Gaming models can be used to promote reading and motivate reading habits. Li et al. (2018) conducted a study on gamified learning through e-quiz systems. This study examined the effects of a gamified reading platform called Reading Battle on the reading experience of elementary school students in Hong Kong. Using a mixed-method approach, the study achieved its quantitative goal by inviting 39 students, 23 parents, and 7 teachers to complete a 4-point Likert scale questionnaire. On the other hand, the qualitative objective of this study was met by inviting 37 students, 20 parents, and 7 teachers for face-to-face interviews. The results showed that Reading Battle helps foster

active reading habits in student users, improves their academic performance, enhances reading skills, and increases reading motivation. Once again, Li and Chu (2021) conducted a three-year longitudinal study to investigate the impact of gamified instruction on adolescents' reading. The results showed that students' interest in reading did not decrease significantly and their reading habits were maintained after discontinuing the use of the Reading Battle platform. The findings indicate that well-designed gamified instruction can increase students' reading interest and motivation and if the game shifts its focus from ranking/rewards to intrinsic enjoyment, abandoning the game does not harm their intrinsic motivation for reading. (i.e., purposeful activity). Therefore, the long-term sustainable effects of gamified instruction largely depend on its success in internalizing students' motivation.

Prados Sánchez et al. (2021) addressed the impact of a gaming platform on enhancing content comprehension and attitude toward reading in elementary education using computer-assisted language learning. This study utilized a gamified platform called Ta-tum, which provides an environment for integrating adolescents' books with gameplay. The results of this study confirmed that even though gameplay execution in learning environments can be done with greater depth, implementing gamified elements through a gamified platform in the classroom compared to traditional worksheet-based methods has a positive effect on students' attitudes towards reading and their comprehension of the content.

Panopoulou-Huovila (2020) examined the impact of gamification in information retrieval sessions. A field experiment using the A/B test method with a control group was conducted to help measure the effects of gamification in the instructional session. Participants were randomly assigned to groups without focusing on their academic background. In fact, this research aimed to record the participants' experience and engagement during the information retrieval training, as well as their motivation level for future use of university library services with the absence of gamification. According to the findings, gamification can provide numerous opportunities for university library users. It can enhance skill development and facilitate active innovative learning.

Through a note-taking system, gamification mechanisms for improving reading performance were evaluated by Chen et al., (2020). This research highlights the increasingly prevalent use of gamification for enhancing learning motivation, engagement, collaboration, and

effectiveness. Based on the results obtained, various game mechanisms such as points, badges, surfaces, and leaderboards can be integrated into educational platforms to make learning more engaging and motivating. As stated, platforms for reading containing electronic books with gamification elements like the Reading Battle are essentially gamified reading environments designed to impact students' interest, motivation, habits and abilities to read non-curricular books. A thorough review of the literature shows that research conducted is limited, with less focus on integrating gamification into library activities. Additionally, the international background suggests that gamification has been used to attract more users to libraries, but there's less emphasis on the user experience of gamified reading. Furthermore, we found no study evaluating the user experience of gamified reading in libraries. Last but not least, the literature review indicates that creating a digital gamified environment for libraries is costly and not all libraries are capable of implementing such projects cost-effectively, which can be considered a pressing concern.

Research Questions

This study aims to examine the user experience in a gamified reading experiment through six components including enjoyment, absorption, creative thinking, activation, absence of negative affect and dominance derived from the MDE model in the form of six questions for each component as follows. These components were used for evaluating user experiences using a well-documented scale.

Main research question: The use of gamification elements makes reading different between the control and experimental groups.

Research question1: The use of gamification in developing user enjoyment from reading is different between the control and experimental groups.

Research question 2: The use of gamification in developing user absorption from reading is different between the control and experimental groups.

Research question 3: The use of gamification in developing creative thinking during reading is different between the control and experimental groups.

Research question 4: The use of gamification in causing user activation through the reading process is different between the control and experimental groups.

Research question 5: The use of gamification in reducing the perception of negative emotions during reading is different between the control and experimental groups.
Research question 6: The use of gamification in developing user dominance over the reading experience is different between the control and experimental groups.

Method

This research was defined as a Master's project at one of the top universities in Iran. The research met all requirements like receiving the ethical approval and number as well as originality and plagiarism checking.

Experiment Design

The present research is a quasi-experimental study that was conducted with a control group and an experimental group with a post-test. The control group was invited to read in the normal library conditions (without gamification), while the experimental group was invited to read in gamified conditions (with gamification). Ultimately, the reading experience of both groups was evaluated afterward. In the first step, some components and elements of gamification according to the MDE framework were implemented in the school library environments through games and group challenges. In the second step, the GAMEX scale (Appendix A) with some minor changes to adapt it to the current research was used to evaluate users' experience. The third step involved assessing the impact of gamification on the experience according to the components of the gamification experience.

Data Collection

The tool used was the GAMEX scale; a gamified user experience scale developed and validated in English and Spanish (González & Robles, 2019; Robles et al., 2020; Högberg etal., 2019; Eppmann et al., 2018).

We adapted the scale just in terms of wording. We adapted the word playing in the original scale to reading or playing the game to reading the book. Two research leaders were responsible for conducting the

experiment and asking questions to the students. This scale consists of twenty questions covering six dimensions including enjoyment, absorption, creative thinking, activation, absence of negative affect and dominance. Measurement was done using a five-point Likert scale with responses ranging from 1 (strongly disagree) to 5 (strongly agree).

The face and content validity of the questionnaire were assessed before distribution by examining the opinions of information science and education instructors at Shahid Beheshti University, after which the necessary changes were made. The Cronbach's alpha test was used to assess the reliability of the questionnaire.

The questionnaire was distributed among 30 students and the obtained data were entered into SPSS software. The values obtained were as follows: enjoyment (0.873), absorption (0.805), creative thinking (0.661), activation (0.767), absence of negative effects (0.731), dominance (0.744) meaning that the total six-dimensional scale is equal to 0.827 and suitable for further use in the main data collection.

Participants

The participants were 200 students aged 11 to 12 years old. For this purpose, students from the fifth and sixth grades of four differently-located schools in Tehran with a maximum number of 500 students participated in this study voluntarily. To find a representative sample, we employed purposive random sampling. In this way, we identified four densely populated areas of Tehran in terms of school libraries and identified schools according to characteristics such as age, gender, and educational level of the students. The study was conducted during the second semester (early June 2024) of the academic year due to the presence of a large number of students attending schools. The experimental group including 100 students from four schools (n=25 for each school) was invited to read a famous historical electronic book that included gamified elements like browsing options, iconic pictures, links and interactive shapes; another group including 100 students from four schools (n=25 for each school) was invited to read the same book in a normal condition without a gamified option. We used multiple devices

to make the electronic book available to the students because we anticipated some issues when doing the research like absence of PCs. In cases that there was no PC, we used a mobile version of the book installed on the mobile phone of the research leaders.

We did try to use randomization order when inviting students so that students from different classes, grades and genders participated in the research. Before inviting the students, we sent a consent form to their parents to receive their permission. In case the parents did not fill out the form, we received their consent via a phone call. All administration staff of the schools were informed about the research before arranging the schedule with students and the research team.

Research Process

The experimental process of the research was based on a six-step approach designed by Werbach and Hunter (2012) proposed for doing gamification-related studies. In the first step, the research objectives were defined. After reviewing theories and frameworks of gamification, the MDE framework was selected and components of this framework (Mechanics, Dynamics, and Emotions) suitable for implementation in the research environment were identified. As Plangger et al. (2016) mentioned, mechanics are the rules and components of the gamified system. They are the building blocks that define how the game operates. Common mechanics include: points, badges, leaderboards, challenges/quests, levels, and feedback. Dynamics refer to the interactions and behaviors that emerge from these mechanics.

They describe how users engage with the gamified system and each other. Key dynamics include: competition, collaboration, exploration, progression, and social interaction. Emotions are the feelings and psychological responses arising from the gamified experience's mechanics and dynamics. Understanding these emotions is crucial for creating a compelling user experience. Key emotions include: joy, surprise, curiosity, pride, and belonging (Plangger et al., 2016).

In the second step, attention was paid to determining the users' perceived behavior concerning what behavior this research causes

among the users. According to the research objectives, the users are not expected to feel tired or bored when reading with gamification elements such as points, badges, and competition. Thus, it was necessary to add joy to the activity of reading by engaging the participants in group games.

In the third step, our target participants, adolescents aged 11-12 years, who were invited to read in the library, were identified.

In the fourth step:

- The researchers in the school library observed the reading activities of the control group, who were visiting the library and reading in normal conditions. Another group was engaged in reading activities in gamified conditions. The reading experience was evaluated using a questionnaire as a post-test scenario for both groups.
- After selection and grouping, a group leader was chosen for each group to supervise the stages and collect scores. A game guide was prepared and provided to the group leaders. The group leaders kept their members informed about the game and its stages via WhatsApp groups. The book chosen by each group was made available to the group leader so that the pages and questions for each stage of the game were prepared in advance.

In the fifth step, attention was paid to the enjoyable and cheerful nature of the stages and activities. Since this research needed to create a gamified environment, the activities could not make the participants feel joyful. Therefore, it was necessary to evaluate their experience by adding joy to the reading activity through group games as proposed in participatory learning.

In the final step, the point system including rewards and scoreboard was clearly and explicitly established for the participants, which was not only observable in their progress but also created a sense of competition among them, which were considered important factors for their participation and continuation throughout the game.

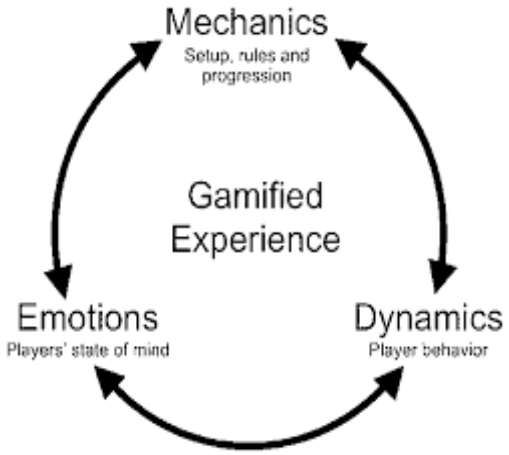

Figure 1. MDE Framework (Robson, et al., 2015)

Findings

The indicators of central tendency and dispersion of the gamification experience and its related sub-components in the experimental group are listed in Table 1.

Table 1. The descriptive statistics in the experimental group (n=100)

Elements	Number of Items	Statistical Indicators						
		Mean	SD	Minimum	Maximum	Skewness	Kurtosis	Average Score
Enjoyment	3	11.90	1.43	9	15	0.05	-0.35	79.33
Absorption	3	8.60	2.74	3	15	0.07	-0.26	57.33
Creative Thinking	4	15.00	2.13	10	20	-0.15	-0.07	75
Activation	3	10.30	2.43	5	15	-0.14	-0.17	68.67
Absence of Negative Affect	3	11.64	1.69	7	15	-0.36	0.34	77.6
Dominance	4	13.94	2.14	10	19	0.08	-0.44	69.7

According to the results shown in Table 1, in the experimental group, the highest score was related to the variable of enjoyment (79.33 out of

100) and the lowest score was related to the variable of absorption (57.33 out of 100). The total score of the game experience was 38.71 out of 100. The two quantities of skewness and kurtosis were between +2 and -2, so the research variables had a normal distribution.

Table 2. The Descriptive Statistics in the Control Group (n=100)

Elements	Number of Items	Statistical Indicators						
		Mean	SD	Minimum	Maximum	Skewness	Kurtosis	Average Score
Enjoyment	3	10.06	2.05	5	15	-0.23	0.11	67.7
Absorption	3	6.63	2.66	2	12	0.11	-0.95	44.2
Creative Thinking	4	12.26	2.72	6	18	-0.49	0.19	61.3
Activation	3	9.28	2.32	5	14	-0.02	-0.58	61.87
Absence of Negative Affect	3	10.92	1.68	7	14	-0.25	-0.05	72.8
Dominance	4	12.88	2.12	8	17	-0.46	-0.14	64.4

As Table 2 shows, in the control group, the highest score was related to the dimension absence of negative affect (72.8 out of 100) and the lowest score was related to the absorption variable (44.2 out of 100). The total score of the game experience was 61.76 out of 100. The two quantities of skewness and kurtosis were between +2 and -2, so the research variables had a normal distribution.

Before conducting inferential statistics and testing the research questions, a test for the normality of data distribution was performed using the Shapiro-Wilk test.

Table 3. Normality Test

Scale	Control		Intervention	
	Shapiro-Wilk Statistics	Sig. Level	Shapiro-Wilk Statistics	Sig. Level
Enjoyment	0.95	0.051	0.95	0.051
Absorption	0.96	0.150	0.98	0.568

Creative Thinking	0.96	0.128	0.98	0.477
Activation	0.97	0.269	0.97	0.301
Absence of Negative Affect	0.96	0.079	0.96	0.113
Dominance	0.95	0.042	0.97	0.333

According to the results shown in Table 3, the significance level values for all variables in the control and experimental groups were greater than the alpha value (0.05). Therefore, the data were considered normally distributed.

Table 4 presents the independent samples t-test to compare the means of the two control and intervention groups in terms of user experience. Levene's test indicates that the variance of the two samples is equal (p=0.36). Therefore, the assumption of equal variances was addressed in the analysis.

Table 4. Overall User Experience between the Two Groups

Group	SD±Mean	Levene's test		tstatistic	DF	Sig. level
		F	Sig. level			
Intervention	71.38±±6.92	0.86	0.36	6.15	98	P< 0.001
Control	61.76±8.64					

Since the significance level value ($p < 0.001$) is smaller than the alpha value ($\alpha = 0.05$), there is a statistically significant difference in the mean user experience between the intervention and control groups. In other words, the null hypothesis, which assumes no difference between the two control and intervention groups, is rejected. Therefore, it can be concluded that the use of gamification elements in the user experience for studying is effective and the main hypothesis of the research is confirmed.

Table 5 presents the independent samples t-test for comparing the means of the two control and intervention groups in terms of six elements. Levene's test for all elements to make sure the variances of the two samples are not equal. As shown in Table 5, as significant levels for all six elements are within the accepted range, the unequal variances

assumption is addressed. The degrees of freedom for the t-test were adjusted accordingly.

Table 5. Comparison of Gamification Elements between the Two Groups

Element	Group	SD±Mean	Levene's Test		tStatistics	DF	Sig.Level
			F	Sig. level			
Enjoyment	Intervention	11.9±1.43	6.87	0.01	5.2	87.52	P<0.001
	Control	10.06±2.05					
Absorption	Intervention	8.6±2.74	0.03	0.87	3.62	98	P<0.001
	Control	6.63±2.66					
Creative thinking	Intervention	15±2.13	2.37	0.13	5.6	98	p<0.001
	Control	12.26±2.72					
Activation	Intervention	10.3±2.43	0.01	0.91	2.14	98	0.035
	Control	9.28±2.32					
Absence of negative affect	Intervention	11.64±1.69	0.02	0.90	2.14	98	0.035
	Control	10.92±1.68					
Dominance	Intervention	13.94±2.14	0.03	0.87	2.49	98	0.014
	Control	12.88±2.12					

Considering that the significance levels for all six elements are less than the alpha value ($\alpha = 0.05$), there is a statistically significant difference in user experiences between the intervention and control groups. In other words, the null hypothesis of no difference between the two groups is rejected. Therefore, it can be concluded that the use of gamification elements for all six elements is effective. Therefore, all the sub-hypotheses of the research are confirmed.

Discussion

The present study focused on creating a distinct reading experience for students through gamification and examined its impact on them. By creating an engaging and enjoyable experience, adolescents became more inclined to reading activities. Therefore, the implementing of gamification elements such as creating competition, earning points and badges, engaging with friends in activities, and achieving higher ranks in the game, which eventually lead to reading and overcoming challenges and issues, were identified as crucial.

The independent samples t-test for comparing the means of the two control and intervention groups in terms of the overall user experience indicated a statistically significant difference in user experience between the groups. The findings of this section indicated that gamification affects the user's enjoyment of reading (Table 5). This may relate to the study design in a gamified environment, compared to a regular one, having a better alignment with the community's mindset under study, resulting in a more desirable reading process for adolescents. The finding related to enjoyment aligns with the research of Hsieh and Yang (2019), which examines perceived user enjoyment in two conditions: gamified and non-gamified, indicating that users' experience in the presence of gamification yields higher enjoyment compared to users' experience without gamification.

Moreover, the findings indicated that gamification affects users' absorption in reading (Table 5). This may be attributed to the factor's inclusion of elements related to flow, immersion and presence, which are sometimes recognized as common participation factors in operational gaming. Game absorption is a collective term referring to the psychological aspects of the games. Flow refers to complete absorption in an activity and unconscious enjoyment of it, which includes aspects such as loss off self-awareness, intense concentration and a distorted sense of time. Immersion encompasses a sense of involvement and presence in the environment. This result is consistent with the findings of Eppmannet et al. (2018), which suggest that some gamification researchers have highlighted the relationship between structures related to game absorption for an outstanding gaming experience. This dimension indicates students' absorption in reading in gamified conditions, but the concept of increased attraction to reading is related to user interest and occurs in the long term. It is essential to evaluate this dimension by assessing users who enjoyed reading in these

conditions to determine the impact of their engagement in reading in non-gamified conditions.

Exploration and imagination are recognized as important components of a player's gaming experience, which were assessed in terms of user's creative thinking (Table 5). The results align with the findings of Arifah's research (2021) which found that imagination occurs during a gamified situation more than a normal one. The impact of gamification on user activation was another finding, in such a way that instead of just reading, the user becomes engaged in activities where the information that needs to be conveyed to the user occurs, putting them in an active situation where active learning takes place and creates a pleasant experience for them, alleviating the boredom of reading, which is unpleasant for adolescences who are not accustomed to reading. Similarity, the findings of Robles et al. (2020) suggest that the goal of creating a gamified environment where students feel active, see themselves as heroes, and become interested in the tasks to be done is compatible. This indicates that active methodologies facilitate the transfer and absorption of educational content in a participatory manner, benefiting from the activation of students in their learning tasks. User activation was observed in the experimental group, with competition, cooperation in-game execution and stages, joy, and friendship among adolescents being as notable aspects.

The findings also indicated that the use of gamification elements effectively reduces negative emotions among users. This is due to the fact that students can repeatedly perform educational tasks without fear of failure. Students take on an active role in constructing their knowledge through these methods, which helps reduce anxiety and stress as they complete tasks at their own pace, independently. These cognitive features are enhanced through collaborative work with other classmates. Ultimately, students actively and positively achieve the goals set by the teacher. Using gamified programs can reduce the risk of loss in win-lose situations, thus reducing negative effects, as losing negatively affects players' self-esteem. This section of the results aligns with the findings of Robles et al. (2020), suggesting that to encourage the absence of negative effects in the teaching and learning process, experts recommend games and gamification applicability. Furthermore, some studies indicate that competitive conditions in gamification can have different effects on players' self-esteem and well-being. Destructive competition can induce anxiety and lower self-esteem,

while constructive competition can help build greater self-esteem (Zhang et al., 2023; Featherstone, 2018).

The average of the two intervention and control groups showed a statistically significant difference in terms of the adolescents' sense of dominance (Table 5). Therefore, implementing gamification components creates a sense of control within users, instilling belief in the user's influence over what is happening and making the user perceive themselves as the source of control and a position of power. Previously, some studies have shown that gamification features that support user autonomy, such as providing decision freedom and aligning with user's values, can enhance the user's sense of control and influence over the system (Conway, 2014; Forde et al., 2015; Suh et al., 2018).

Implications and Limitations

Reading experience of adolescents in the library under the influence of gamification processes can be regarded the most significant aspect of the current research. Such studies can significantly highlighting the impact of school library services on learning outcomes. Libraries with financial backing can engage their users in staged games by planning for each stage to involve reading specific resources. In this way, users become familiar with the library's services and are encouraged to use them. Publishers focused on book sales and readership can include a game guide at the end of the book using gamification elements. This guide can engage readers, individually or in groups, in activities that involves reading during the stages and provide an enjoyable reading experience. Instructors can also leverage gamification processes to enhance the learning experience across various instructional stages and thereby increase the role of libraries in this regard.

The present research encountered some limitations, such as the difficulties in accessing students and their parents for data collection, which delayed collaboration in gathering data. Cooperation from schools and teachers in this area was also limited, which posed challenges for data collection. Moreover, since the data were collected from a limited number of students and due to difficulties in accessing a larger sample, the findings cannot be generalized to other research populations.

Research Suggestions and Future Studies

Since this study was conducted in school libraries, it is suggested that the effects of the gamified reading experience on students' reading comprehension, abilities, progress, and skills be examined. It is also necessary to examine the gamified reading experience in different libraries catering to older age groups and measure its dimensions. Moreover, it is recommended that a more comprehensive study be conducted over a longer period of time through interviews and surveys of supervising professors in the fields of gamification, information science, and activists in the field of reading in order to obtain more practical results for reading policymaking in the country. The results of the research can inform digital content producers to understand the importance of enhancing the services existing in school libraries and similar institutions with e-book software and applications.

Conclusion

Schools have an educational mission that focusing on teaching fundmaental principles of effective learning and increasing the information literacy of the students in addition to mechanisms to engage and entertain them. The use of gamification is not only entertaining and enjoyable but also engaging, as it can enrich the learning experience among users. The results of the current research indicated that after the intervention, the average scores of the gamification experience and relevant subscales including enjoyment, absorption, creative thinking, activation, absence of negative emotions and dominance differed significantly in the two groups.

Therefore, it can be concluded that the use of gamification in enhancing the user experience for reading in gamified environments is highly effective. Thus, educators and librarians must pay attention to the application of gamification patterns in adolescents' activities and lay the groundwork for its implementation in libraries and other educational settings. To address the research gaps in the field of gamification of learning, especially in school libraries in Iran, the results showed that library managers should take action towards the gamified tools and technologies that interest and attract users to library activities.

CONFLICT OF INTEREST: The authors declare that they have no conflicts of interest regarding the publication of this manuscript.

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Appendix A. Research Questionnaire (Adapted from GAMEX Scale)

Components	Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Enjoyment	It was fun to read the book.					
	I liked to read the book.					
	I enjoyed reading the book.					

Absorption	Reading made me forget where I was.					
	I lost track of time while reading.					
	Reading took me away from everything.					
Creative Thinking	Reading sparked my imagination.					
	While reading, I felt creative and thought of doing new things.					
	While reading I felt like I could discover things.					
	I felt adventurous while reading.					
Activation	I felt activated while reading.					
	I felt excited while reading.					
	I felt successful while reading.					
Absence of Negative Affect	I did not feel uncomfortable while reading.					

	I did not feel hostile while reading.					
	I did not feel frustrated while reading.					
Dominance	I felt dominant while reading.					
	I felt influential while reading.					
	I felt autonomous while reading.					
	I felt confident while reading.					

How to Cite: Hasani, M., Keshavarz, H., Asnafi, A., Basiriran Jahromi, R. (2026). Gamification Really Works Out! An Experiment among Adolescents Reading Gamified Electronic Books, International Journal of Digital Content Management (IJDCM), 7(12), 54-79. DOI: 10.22054/dcm.2025.85674.1270