

Perceived Level of Effects of Gamification and Student Engagement of Senior High School Students

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Abstract. This study investigated the impact of gamification on student engagement and learning outcomes among grade 11 students. Specifically, it examined the relationship between the perceived effects of gamification and student engagement. A non-experimental quantitative research design with a descriptive correlational method was employed, involving 76 senior high school students from a medical school in Davao City. Data were collected using modified versions of the "Gamification and Learning Engagement Questionnaire" (GLEQ) and the "Student Course Engagement Questionnaire" (SCEQ). Results indicated high mean scores for both the effects of gamification and student engagement, with a significant positive correlation between the two variables. This suggests that gamification can significantly enhance learning outcomes by creating an engaging and dynamic learning environment. The study highlights the potential of gamification to foster student engagement, encouraging instructors to integrate game-like elements and activities into their teaching. Teachers can increase student interest and improve classroom performance by adopting various gamified strategies.

Keywords: Gamification; Student engagement; Senior high school.

1.0 Introduction

Gamification has drawn significant interest and attention from researchers and educators worldwide. The use of game-like elements in education was adopted in different institutions worldwide. Although gamification has been utilized in fields such as business, fitness, and health, the study of gamification in education is still in its early phases (Bullock, 2023). The application of gamification has garnered significant attention among instructors as a method to enhance student engagement and learning outcomes. According to Betts et al. (2021), gamification involves using game design elements and principles in non-gaming contexts. Gamification in education has become a trend in the 21st century (Glowacki et al., 2018). Gamification in classrooms can potentiate student motivation and engagement in the learning process (Huseman, 2023). The usefulness of awards and scores, developing a sense of community, and immersive learning environments will all contribute to raising student engagement.

In the research conducted by Pin et al. (2023) and Costa (2023), both found that gamification can improve an individual interest, leading to increased engagement in various settings. In the Philippines, gamification has been recognized in the educational sector as one of the supplementary tools in accommodating the diverse learning demands of Filipino learners, bringing up an array of ways for students to engage and interact with the evolving

world. Gamification provides a unique alternative to raise and improve the learners' engagement, productivity, competence, enthusiasm, personality, and diverse learning outcomes (Delizo et al., 2019). A gamified learning environment improves students' achievement, motivation, and satisfaction (Zainuddin et al., 2020). The effect of gamification varies according to the type of learning environment, the material covered, the teacher, the gamification technique employed, and the gamified designs used (Alsawaier, 2018).

The gamified elements of learning experiences have shown promising results in enhancing student engagement and promoting collaborative learning, ultimately leading to more effective learning outcomes. Mindanao, specifically in Butuan, provides substantial evidence supporting the benefits of gamification. The study's data revealed a noteworthy improvement in students' academic performance, with scores indicating a "high" level after the introduction of gamification interventions (Pelegro, 2022).

On the other hand, critics contend that gamification fails to account for some learners' pedagogical needs and distracts students from their learning with pointless activities. Despite a growing number of empirical studies and literature reviews that may shed light on this debate, the value of gamification in education is still up for debate (Rabah et al., 2018).

Student engagement is the behavioral, cognitive, and emotional facets of a student's academic experience in teaching, learning, and research through interaction with other students, teachers, and the community (Kassab et al., 2021). The concept of "student engagement" is often founded on the notion that learning tends to benefit when students are curious, interested, or inspired and that learning tends to suffer when students are bored, disinterested, disillusioned, or otherwise "disengaged."

Gamification revolutionizes the learning experience by infusing it with excitement and motivation. When engaging in gamified learning, students find it enjoyable and become more deeply involved in their lessons. The heightened engagement translates into increased active participation, making learning a dynamic and fulfilling endeavor (Helvacilar, 2023). Recent studies by Mazarakis (2021) and Kleszczyński (2019) have highlighted the significant impact of gamification on student active participation in the learning process. Both studies found that by integrating gamification techniques into education, students exhibited heightened degrees of engagement, enthusiasm, and involvement. Gamification made learning fun and inspired students to actively participate in discussions, group projects, and other classroom tasks.

This study was anchored on the Theory of Gamified Learning by Zaric (2021). Individuals enjoy and retain educational competency when they engage with game-like elements. Since game components frequently offer immediate feedback, educators can monitor their progress and spot learning gaps without waiting for final exams or quizzes. Following Astin's (1984) theory of Student Involvement, student involvement leads to several positive outcomes, including increased academic achievement, greater satisfaction, and higher retention and graduation rates. Relating gamification to student engagement, specifically in the field of learning, employed these methods, making this theory ideal for the study.

Despite the potential benefits suggested by existing research in other fields, there is a lack of comprehensive examination within the field of education. By examining whether gamification concepts can influence or correspond to student engagement and interest in learning, this study aimed to close this knowledge gap and provide significant insights into both the disciplines of gamification and student engagement in the educational sector.

2.0 Methodology

2.1 Research Design

This study employed a quantitative research design that utilized descriptive correlation. Bhat (2018) stated that descriptive-correlational research tried to explain the link between two or more variables without establishing a cause-and-effect relationship. Additionally, Canonizado (2020) cited that the descriptive-correlational method aimed to understand and assess the statistical relationship between the two variables. The main goal of this research design was to give a comprehensive account of the variables and how they related without changing

them or assuming that one thing caused another. This approach was helpful in the study since it attempted to explain the relationship between gamification and student engagement among Leininger and Peplau students.

2.2 Research Locale

The study was conducted in one of the medical schools in Davao City, from the province of Davao Del Sur, Region XI. The school, located at General Malvar Street, has operated for 45 years since 1975. Among many academic institutions in Davao, this school was known for producing top notchers from different courses, especially from the medical field, exhibiting high-quality education and a sense of value for its associates. The school's medical nature makes it a suitable setting for examining the correlation between gamification and student engagement. Furthermore, the research data collected came from senior high school students. These were in line with the type of data the researchers were trying to collect and analyze, thus making it the ideal research locale for descriptive correlational research about gamification.

2.3 Research Respondents

The researchers employed the Purposive Sampling technique to identify the research respondents for the study. Foley (2018) defined purposive sampling as a form of non-probability sampling in which the researchers relied on their judgment when choosing participants to partake in the study. This sampling method was employed to assess a particular subset of people, where all the study's participants were selected because they fit the specific criteria. The respondents were 37 students from grade 11 Leininger and 39 from grade 11 Peplau, forming 76 grade 11 students. The respondents met the eligibility criteria for the study because these students from section Peplau and Leininger were grade 11 students from one of the medical schools in Davao with prior knowledge and experience regarding gamifying elements inside the classroom settings. Moreover, the survey responses were tallied and tabulated using appropriate statistical tools.

2.4 Research Instrument

To gather accurate data on the independent variable, which was the effects of gamification, the researchers adapted the Gamification and Learning Engagement Questionnaire (GLEQ). This survey questionnaire was employed to measure the effects of Gamification on the student's learning experience. In assessing the impacts of gamification on student engagement, the respondents used the following in answering the questionnaire: 5 for strongly Agree, 4 for Agree, 3 for Neither, 2 for Disagree, and 1 for strongly Disagree.

Furthermore, the researchers adapted the Student Course Engagement Questionnaire (SCEQ) to obtain accurate data on student engagement. This survey questionnaire, used to measure student engagement, was based on the Gamification Acceptance Model (GAM). In evaluating student engagement, the respondents answered the questionnaire: 5 for Always, 4 for Often, 3 for Sometimes, 2 for Rarely, and 1 for Never.

In summary, the research instrument consisted of 40 items. The independent variable had four indicators, each with five questions, for 20 items, and the dependent variable also had four indicators, each with five questions, for 20 items.

2.5 Data Gathering Procedure

This study employed a systematic approach to data collection. Before the researchers began collecting data, they sought permission from the head of the institution where the study was conducted. After receiving approval, they began accumulating the data. The primary means of gathering data for this study was through online surveys. In selecting respondents, the researchers used purposive sampling to acquire relevant results. This study involved the participation of 79 Grade 11 students studying at one of Davao's medical schools. Initially, subject teachers applied game-like features to their lessons, which served as the stimulus before administering the survey questionnaires. The researchers adapted the following survey questionnaires to measure the level of the variables: Gamification and Learning Engagement Questionnaire (GLEQ) by Cahyani (2016) for the perceived effects of gamification and Student Course Engagement Questionnaire (SCEQ) by Handelsman et al. (2005) to measure the student engagement. Afterward, respondents were approached individually, and informed consent was obtained before proceeding with the data-collecting process. Data collection sessions were held in each of the respondents' perspective places. Throughout the data-collecting process, regular monitoring was performed to maintain data quality and validity.

2.6 Data Analysis

To analyze the study's results, the researchers used several statistical tools. First, they calculated the Mean, which represents the central value of a set of numbers and indicates the average for a group of responses. This was done by summing all the values in the data set and dividing by the total number of values. Next, they used Pearson's Product Moment Correlation Coefficient to measure the linear relationship between two variables on interval or ratio scales. This coefficient, denoted by r , ranges from -1 to 1 and shows the strength and direction of the relationship between the variables. Finally, they calculated the Standard Deviation to assess how much individual responses varied from the mean, providing insight into the variation or dispersion within the data set.

2.7 Ethical Considerations

The research study followed ethical guidelines to uphold its credibility and objectivity. It aimed to enhance education by exploring the effectiveness of game-like elements in high school learning, potentially improving teaching methods and student engagement. The study acknowledged risks such as technical disruptions during online data collection and prioritized safeguarding participant confidentiality and privacy through robust data protection measures and informed consent procedures. Participants were assured of voluntary participation without repercussions, and their rights were upheld throughout the study. Methodologically, the study utilized statistical tools like Mean, Pearson Product Moment Correlation Coefficient, and Standard deviation to ensure data validity while strictly adhering to the Data Privacy Act of 2012 for data confidentiality. The researchers maintained transparency regarding conflicts of interest, providing impartiality in their findings and fostering trust by communicating results honestly.

3.0 Results and Discussion

3.1 Impact of Gamification on Grade 11 Students

As presented in Table 1, the level of effects of Gamification among grade 11 students obtained an overall mean of 4.18 (SD = 0.62), indicating a high positive impact.

Table 1. Descriptive statistics of the perceived level of effects of gamification on Grade 11 students

Effects of Gamification	Mean	SD	Interpretation
Academic Achievement	4.22	0.69	High
Motivation	4.19	0.70	High
Retention and Recall	4.04	0.67	High
Enjoyment and Contentment	4.29	0.69	High
Overall	4.18	0.62	High

Legend: 4.50 – 5.00 = Very High, 3.50 – 4.49 = High, 2.50 – 3.49 = Moderate, 1.50 – 2.29 = Low, 1.00 – 1.49 = Very Low

This aligned with findings from other studies that demonstrated the potential of gamification in enhancing students' academic achievement, motivation, and engagement (Kalogiannakis et al., 2021; Zainuddin et al., 2020). Our research further supported the notion that gamification elements could make learning fun, motivating, and meaningful, leading to better academic outcomes for all students. In line with this, Delizo et al. (2019) highlighted gamification as a unique alternative to raise and improve the learners' engagement, productivity, competence and enthusiasm, and their personality and diverse learning outcomes. These resonated with our findings, suggesting that gamification could have a holistic impact on students' development, fostering various skills and attributes.

Specifically, among the four effects of gamification on grade 11 students, the mean score for enjoyment and contentment was 4.29 (SD = 0.69), making it the highest of all the indicators. This finding suggested that the students found the gamification experience highly engaging and enjoyable. This finding was significant because students who enjoyed learning were more likely to be motivated to learn. Gamification elements such as points, badges, and leaderboards could make learning fun and rewarding. Additionally, gamification could create a sense of community and collaboration among students, further enhancing the enjoyment of learning. This finding substantiated the ideas of Mosallanejad and Mansouri (2023), who posited that gamification positively impacted student enjoyment and consent, thus enhancing their learning capacity and satisfaction. This alignment with existing research further strengthened our argument for gamification's potential as a powerful tool in fostering student enjoyment and contentment within educational settings. When thoughtfully implemented and strategically designed, gamification could transform the learning environment into a more engaging and supportive space.

To further describe the results, the second-highest indicator was the academic achievement of grade 11 students, with a mean score of 4.22 (SD = 0.69), which is characterized as high. These results indicated that the gamified learning experience effectively enhanced student learning outcomes. Students who participated in the gamified activities demonstrated better understanding and knowledge retention than those who did not. There were several possible explanations for this finding. First, as stated by Betts et al. (2021), gamification elements such as points, badges, and leaderboards could motivate students to complete tasks and learn new material. Second, gamification could make learning more engaging and enjoyable, leading to better retention of information. Finally, gamification could help create a more active and meaningful learning experience, potentially leading to improved academic achievement.

The third highest indicator was motivation, with a mean score of 4.19 (SD = 0.70) or described as high. These results suggested that the gamification elements used in the study effectively boosted student motivation. This increase was likely because gamification could make learning more fun and engaging. Students are more likely to be motivated to learn when they enjoy themselves and find the learning process challenging and rewarding. This finding aligned with the study by Nadeem et al. (2023), which highlighted students' natural affinity for games and demonstrated how this tendency can be leveraged to create a more engaging and motivating learning environment. As Nadeem et al. (2023) stated, by incorporating game elements such as points, badges, and leaderboards, we could tap into this intrinsic motivation and encourage students to engage actively in learning activities. The combined insights from this study, alongside our findings, provided strong evidence that gamification could be a powerful tool for optimizing the learning experience for students. By capitalizing on their natural affinity for games and the inherent motivational properties of gamified elements, educators could create a more engaging and stimulating learning environment that fostered deeper understanding, knowledge retention, and academic success.

The mean score for the fourth indicator, retention and recall, was 4.04 (SD = 0.67), which was ranked as high. This suggested that gamification could help students to remember information better. This might be because gamification elements could help create a more active and meaningful learning experience. For example, gamification elements such as quizzes, challenges, and puzzles could require students to recall and apply information to achieve success actively. This could help to strengthen the neural pathways associated with the information, making it more likely that students will be able to remember it in the future. Additionally, gamification could make learning more engaging and enjoyable, leading to better retention of information. Students were more likely to remember information they were interested in and that they had learned in a positive and supportive environment.

3.2 Student Engagement in Gamified Learning Environment

As shown in Table 2, the overall mean rating of the level of student engagement among grade 11 students was 4.21 (SD = 0.57), which was labeled as high.

Table 2. Descriptive statistics of the level of engagement of Grade 11 students in a gamified learning environment

Student Engagement	Mean	SD	Interpretation
Attendance and Punctuality	4.37	0.64	High
Active Participation (Responsiveness)	4.05	0.66	High
Peer Interaction and Collaboration Progress	4.27	0.69	High
Feedback and Communication	4.15	0.72	High
Overall Assessment	4.21	0.57	High

This result indicated that when exposed to gamifying elements, the students displayed high levels of engagement when analyzed in terms of attendance and punctuality, active participation, peer interaction, and feedback communication. This positive relationship between the use of gamification and its effects on student engagement is in line with the findings from the study by Kassab et al. (2021), which stated that engagement depends on the student's academic experience in learning and interaction with peers. This research further supported the concept that learning benefits when students are curious, inspired, and interested.

Among the four indicators under the variable of student engagement, attendance, and punctuality achieved the highest mean range, which was 4.37 (SD = 0.64). From this result, the students find gamification helpful in increasing interest in attending classes and avoiding absences and tardiness. Through the proper use of gamifying elements, students viewed classes more positively, which contributed to a higher attendance rate. This was a crucial factor that plays a vital part in student development because perfect attendance reflects the student's enthusiasm and persistence in learning. This substantiated the idea presented by Kasinathan et al. (2019), who stated that gamification involves nurturing and developing students through their attendance and interactions with lecturers.

To further analyze the results, peer interaction and collaboration progress was the second highest indicator with a mean score of 4.27 (SD = 0.69) or described as high. This suggested that engagement had positively influenced the interaction and group collaboration between students through gamified learning activities. Gamifying elements that include team-based challenges and leaderboard setups provide a social feature that encourages students to work together to solve problems and achieve objectives. This requires combined efforts, promoting collaboration and community as students rely on each other's strengths and skills to navigate various tasks. Multiplayer-based gamified learning also promotes strategizing, sharing of ideas, and critical thinking, regardless of whether it is cooperative or competitive. This further contributed to the importance of gamifying elements because when learners actively communicate and interact with peers, they attain collaborative engagement and cohesion. This complemented the study from Dindar et al. (2021), which stated that gamification could support individuals to make social connections, establish social bonds, and cultivate social relatedness (e.g., via features that connect users, motivate common goals, allow for communication, or that establish otherwise common ground between its participants). The study also revealed that group cohesion was higher in a gamified scenario compared to a non-magnified group setting. Further, team leaderboards motivated group cohesion, indicating that cohesion is achieved if a cooperating group competes with another group. This suggested that the concept of competitiveness adds excitement and fuels motivation among the students, enhancing their focus and cooperation.

The third highest indicator was feedback and communication, with a mean score of 4.15 (SD = 0.72), which was indicated as high. With this, students showed classroom feedback and communication because they were engaged and interested in the learning setup. The students displayed high levels of engagement with the class by effectively communicating with the instructors and peers. This also encouraged them to ask questions that they feel are necessary to enhance their learning experience. Furthermore, the results indicated that students efficiently responded to inquiries and completed tasks because of high engagement and focus levels. According to Spates (2020), student feedback revealed high satisfaction with gamification strategies and an increased grasp of the material. This finding aligned with the study's results as students are engaged in a gamified discussion, providing and receiving feedback, leading to a better grasp and understanding of the material. When students were actively committed to class discussions and activities, they willingly asked for clarifications and input. This indicates that intrinsic motivation, driven by personal interest and curiosity, is propelled by a high capacity of student engagement.

The lowest indicator, although still described as high, was active participation, with a mean score of 4.05 (SD = 0.66). This suggested that high student engagement positively influences active participation. When students are engaged, they are more likely to approach learning with enthusiasm and curiosity. This positive mindset contributes to this indicator as students see learning as an enjoyable and rewarding experience. Engaged students often feel a sense of ownership over their learning experience. When students believe they have a stake in their education, they are more inclined to participate in class activities, take responsibility for their learning, and contribute to discussions. Recent studies by Mazarakis (2021) and Kleszczyński (2019) have highlighted the significant impact of gamification on student active participation in the learning process. Both studies found that students exhibited improved engagement, enthusiasm, and involvement when this technique was introduced into education. Gamification made learning fun and inspired students to actively participate in discussions, group projects, and other classroom tasks. The findings of these studies agree with our research since, as mentioned, engaged classrooms often incorporate varied learning styles and activities. These may include interactive discussions, group projects, hands-on activities, and gamified elements. Offering diverse ways to engage with the material encourages students to participate according to their preferred learning styles. The indicator failed to

garner a very high mean score due to other possible reasons. Students may feel motivated on a certain level from gamifying elements and group collaborations, but this may be limited and insufficient to make the students actively participate in class on an excellent level. Students may also dislike specific learning elements that do not align with their personality traits and behaviors.

3.3 Relationship Between Impact and Student Engagement in Gamified Learning Environment

Table 3 revealed the relationship between the Perceived Level of Effects of Gamification and Student Engagement of Grade 11 Students. The Pearson Product Moment Correlation was used to test the relationship at a 0.05 significance level.

Table 3. Analysis of the relationship between impact and student engagement in a gamified learning environment

Variables	Mean	SD	R	R ²	Degree of Relationship	p-value	Decision @ a 0.05 Level
Impact of Gamification	4.18	0.62	0.72	0.518	High	0.00	Significant (Reject Ho)
Student Engagement	4.21	0.57					

The results showed a significantly High Relationship (R: 0.72, $p < 0.05$) between the Perceived Level of Effects of Gamification and Student Engagement of Grade 11 Students at a 0.05 significance level. Thus, the null hypothesis stated that “There is no significant relationship between the Perceived Level of Effects of Gamification and Student Engagement of Grade 11 Students at a 0.05 level of significance” was rejected. The results implied that the Perceived Effect of Gamification contributed to developing Student Engagement among Grade 11 Students. Moreover, the results showed that 51.8% (R^2 : 0.518) of the variances or changes in student engagement among Grade 11 students can be accounted for or related to their gamification.

Several previous studies supported the findings of this study. According to Khaleel et al. (2020), gamification could be a compelling approach to increasing student engagement in learning. The study found that applying game elements such as achievement points, virtual gifts, reward schedules, leaderboards, and status to the main page of their website can lead to enhanced engagement and motivation for learning. The findings showed that all game elements affected engagement in the experimental group and had high acceptance based on evaluations. Therefore, gamification can be an effective strategy to enhance student engagement in learning. The outcomes of this research provide a more comprehensive picture of what happens when gamification is implemented, particularly in student motivation, engagement, and learning outcomes, even though there is little study on gamification in education.

4.0 Conclusion

The study's findings demonstrated that gamification has a relatively high perceived effect on student engagement. When researchers analyzed gamification in terms of academic achievement, they found that learning outcomes improved, making learning more engaging for students and ultimately strengthening their capacity to retain and recall knowledge successfully. Furthermore, the level of student engagement positively influences students' attendance and punctuality. It appeared that students would attend classes more on time. As students actively participate in class activities, their responses are influenced. It also affects communication, feedback, peer interaction, and collaboration progress. In conclusion, findings suggest that among students in grade 11, the Perceived Effect of Gamification plays a role in fostering a sense of student engagement. Furthermore, the findings demonstrate that gamification can explain or relate to variations in Grade 11 students' Student Engagement.

5.0 Contributions of Authors

C.N.N. Casia: intro, lit review, database search
C.J.O. Angga: lit review, data collection, results & discussion, ethics, revisions
L.C.B. Bayron: data collection, conclusions, reference accuracy
A.N.A. Caralos: data gathering, methodology, conclusions
E.J.S. Guinto: results & discussion, research comparison, conclusions
J.S.Z. Iligan: methodology, results & and discussion, data interpretation, lit review, revisions
K.B. Lunasin: sentence clarity, grammar, coherence
I.T. Palacio: lit selection, data collection, revisions, methodology
S.M. Tampus: lit review, instrument development, results & discussion, revisions
M.V. Goc-Ong: topic suggestion, grammar, proofreading, reference editing

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The authors have disclosed that there are no conflicts of interest regarding the publication of this paper.

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