

Implementing Games as an Online Assessment Method on Moodle

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Abstract: This study aims to examine the impact of games as assessment methods on student academic performance and engagement compared to traditional assessment methods. A quantitative research design was employed, focusing on group performance scores. The participants were 81 Second-Year University students from the University of Oran 2, Algeria, with 38 students assigned to the experimental group and 43 to the control group. An independent two-sample t-test was conducted to analyze the data. The results indicated no statistically significant difference in academic performance between the two groups. Although the experimental group, which used gamified assessments, achieved slightly higher average scores, the difference was not large enough to be considered meaningful. These findings suggest that while gamified assessment methods may enhance student engagement and motivation, they do not necessarily result in significantly improved academic performance in the short term. Further research could investigate the long-term effects and incorporate qualitative data to gain deeper insights into how gamification influences learning outcomes beyond standardized test scores.

Keywords: Online Learning, Engagement, Gamification, Moodle, Quizizz

Résumé : Cette étude vise à déterminer l'impact des jeux en tant que méthodes d'évaluation sur la performance académique et l'engagement des étudiants, en comparaison avec les méthodes d'évaluation traditionnelles. L'étude utilise une approche de recherche quantitative. La composante quantitative de l'étude s'est concentrée sur les scores des groupes. Les participants étaient constitués de 81 étudiants en deuxième année à l'Université d'Oran 2, en Algérie. Il y avait 38 étudiants dans le groupe expérimental et 43 dans le groupe témoin. Un test t pour échantillons indépendants a été utilisé pour analyser les données quantitatives. Selon les résultats de l'étude, il n'y avait pas de différence significative de performance académique entre les deux groupes. Bien que le groupe expérimental, qui a utilisé des évaluations gamifiées, ait montré des scores

moyens légèrement plus élevés, la différence n'était pas suffisamment importante pour être considérée comme statistiquement significative. Ces résultats suggèrent que, bien que les méthodes d'évaluation gamifiées puissent améliorer l'engagement et la motivation des étudiants, elles ne conduisent pas nécessairement à une amélioration significative de la performance académique à court terme. Des recherches supplémentaires pourraient explorer les effets à long terme et prendre en compte des données qualitatives supplémentaires sur les expériences des étudiants afin de mieux comprendre comment la gamification influence les résultats d'apprentissage au-delà des scores aux évaluations.

Mots-clés : éducation a distance, Engagement, jeux, Moodle, Quizizz

Introduction

Games are universal. They are found in every culture throughout history. They include elements such as objectives, rules, competition, and social interaction. Despite these consistent elements, the meaning and role of games have evolved over time. Games are often associated with enjoyment and leisure, making them distinct from work (Ganguin, 2010). In the ancient world (approximately 800 BC to 400 AD), different perspectives on games emerged. Plato emphasized the connection between play (*paidiá*) and education (*paideia*), viewing childhood games as crucial to shaping the character of future adults. In contrast, Aristotle regarded games as the opposite of learning; associating them with relaxation rather than intellectual effort, framing learning as a form of work while games were seen as mere recreation (Ganguin, 2010).

To Aristotle, games and learning did not go hand in hand, however; with the rise of AI in the 21st century, digital game-based technologies are shaping learning and instruction. In 2025, games have a strong effect on people's psyche. Gamification can motivate and inspire people to engage in educational contexts. It can serve and contribute to their educational growth. In fact, Game-based learning (GBL) has seen substantial growth across educational contexts, especially in higher education largely due to advances in modern interactive technologies. This approach presents educators with valuable opportunities to adopt innovative teaching strategies that enhance the learning process. By incorporating realistic, simulation-based, problem-solving activities, GBL supports the development of key cognitive skills in students, such as critical thinking, logical reasoning, creativity, and effective problem-solving (Prensky, 2007).

In this context, gamification can offer positive outcomes in higher education, as it supports both learning and motivation when applied as an instructional strategy. Although gamification is widely discussed within educational circles, its practical application particularly in higher education remains limited. Therefore, the aim of this study is to evaluate the effectiveness of game-based assessments on student engagement and performance in Moodle. Therefore, this study attempts to answer the following research questions:

1. How does the integration of gamified content in online learning environments affect student engagement and enrollment in higher education?
2. To what extent are game-based assessment tools more effective than traditional ones?

1. Literature review

Studies conducted on games implementation in online learning are numerous and various fields such as science (Moreno & Mayer, 2005; Wrzesien & Raya, 2010; Yu, 2003), mathematics (Ke, 2008; Ke & Grabowski, 2007; Miller & Robertson, 2010; Prendinger, Mori, & Ishizuka, 2005), history (Huizenga, Admiraal, Akkerman, & ten Dam, 2009; Richards, Fassbender, Bilgin, & Thompson, 2008), geography (Virvou, Katsionis, & Manos, 2005), etc. it is believed that the application of game elements' implementation in language learning would necessitate a different approach compared to other fields and that effectiveness of certain game elements might or might not be demonstrated.

Poondej and Lerdpornkulrat (2019) incorporate game elements into an e-learning course hosted on Moodle to explore student satisfaction and engagement with an e-learning course, specifically an Information Literacy Skills course. The authors gathered data from 104 undergraduate students enrolled in the course in Thailand. Additionally, student interaction data from Moodle was used to assess differences in online interaction frequency between students who performed above average and those who performed below average. The results showed that students were highly satisfied with the gamification tools in Moodle and were actively engaged in the gamified e-learning course. The study found a notable difference in the frequency of online interactions between students who performed at an above-average level and those who performed below average. These findings offer valuable insights into the development and implementation of gamification in e-learning. Their study addresses the need for further research into how gamification can be effectively applied in e-learning contexts.

Selirowangi, et al, (2022) argue that the pandemic prompted a shift from face-to-face learning to online learning. They use observation, documentation, and interviews to assess challenges in the implementation of online education. They say that online learning during the pandemic lead to a decline in students' comprehension and academic performance, and increased learner fatigue; therefore, they address these issues, by incorporating games in online learning platforms. It focuses on implementing gamification elements to boost student engagement and motivation, using Moodle. The research adopts a Research and Development (R&D) approach.

Dirgantoro et al, (2022) investigates the effectiveness of Moodle gamification in enhancing students' motivation related to their interest in online learning. Participants were selected using purposive sampling and included students from the 2018 (n=112), 2019 (n=98), and 2020 (n=60) cohorts. A mixed-methods approach was employed, with quantitative data analyzed using two-way ANOVA to assess main and interaction effects, and t-tests to examine simple effects. The findings indicate that gamification features in Moodle such as level progression, activity completion, and activity restrictions are moderately effective in motivating students. Survey responses show that 78% of 2018 students, 83% of 2019 students, and 90.91% of 2020 students answered "yes" when asked if these gamification elements motivated them during their studies. These results suggest that gamification contributes to increased student motivation, which in turn may support the development of students' academic abilities.

Castrillon et al, (2022) analyze the effectiveness of Kahoot as an online game based evaluation tool for programming students by comparing two groups: a control group assessed through traditional written exams and an experimental group evaluated using Kahoot. The Kahoot platform not only provides immediate feedback by displaying grades at the end of the test but also fosters a competitive environment through visible rankings, which can enhance student motivation. The study involved 58 students, and results showed that the test group, which used Kahoot, outperformed the control group by 15.24%. This significant difference indicates that gamified assessments can positively influence student performance. The increased motivation in the experimental group is attributed to the engaging, game-like nature of Kahoot, which promotes active participation and reinforces classroom concepts through repetition and interaction. These findings suggest that incorporating gamification into assessment practices may be a valuable strategy for improving learning outcomes in technical and theoretical subjects like programming.

2. Research Method

2.1. Participants

The population of this study encompasses students from the faculty of foreign languages of the University of Oran 2 Mohamed Ben Ahmed. The sample includes (n=102) undergraduate second- year students enrolled in Spanish language major to participate in the present study. Respondents aged from 18 to 23 years old with an A2 level of English proficiency. They had at least 7 years of English instruction. As for gender, eighty (80%) of these students were females and only twenty (20%) of these students were males. It should be noted that gender was not taken into consideration as a variable in this study.

Age (Years)	Number of Students	Percentage (%)
18	15	14.7%
19	22	21.6%
20	30	29.4%
21	20	19.6%
22	10	9.8%
23	5	4.9%
Total	102	100%

Table 1. Enrolled students

The course ‘English language’ is an online course delivered via the platform MOODLE. It provides a 1-credit hours offered in 2 semesters, 24-week format. It is a continuous evaluation course, in which students are asked to complete online components of the course outside of the classroom before the end of each semester. In addition, the students are able to check their progress on the leader boards at any time during the semester.

2.2. Data collection tools

2.2.1. Activities on Moodle

The course has 12 sections for each semester. Each section includes reading materials, interactive resources, and activities. To complete an activity, students are required to view the reading materials and meet the activity requirements, which are graded on /20. Each activity has a deadline. The researcher teaches this course to five groups who are Spanish major.

The study is conducted in two phases. Phase one studies students' engagement with gamified content. This phase is performed in the first semester. All students act as participants in this phase. It aims to investigate engagement behavior, such as completion rates, time spent, interaction frequency, or satisfaction levels across all participants. All students are exposed to both types of assessments; traditional and gamified content.

As phase two and to effectively study the impact of implementing games as an online assessment method on Moodle, the participants are divided into a control group and an experimental group. This phase is performed in the second semester. This allows for a more accurate evaluation of whether the game-based approach leads to significant differences in student engagement, motivation, or academic performance. Both the experimental (game-based assessment) and control groups cover the same learning objectives to ensure a fair comparison. Both groups are graded on /20. The time taken to complete the assessment for both groups is 30 minutes, and the number of attempts made is one. These metrics will help determine not only the effectiveness of the gamified approach in measuring knowledge but also how students interact with the assessment process. Analyzing the differences in performance and engagement between the two groups provides us with valuable insights into the pedagogical value of integrating games into online learning environments.

The Moodle Mobile app, developed by Moodle Pty Ltd, is the official mobile application for accessing Moodle-based learning platforms. It allows users to browse course content, receive notifications, upload files, and view grades directly from their mobile devices. The latest version of the Moodle Mobile app is 4.5.0. Moodle brings significant enhancements designed to streamline course management, assessment, AI integration, and reporting for educators and administrators. It offers improved tools that save time and simplify daily tasks, giving users greater control over both course creation and site configuration.

Implementing Games as an Online Assessment Method on Moodle

Moodle 4.5.0 empowers educators to focus more on delivering impactful teaching and learning experiences. Moodle is well-established LMS 4.5.0 used by the University of Oran 2, Mohamed Ben Ahmed for online courses and it is flexible for game implementation; the author chose it for the e-learning aspects of this course.

Material	Moodle includes Files (PDFs, Word documents, PowerPoint slides), Pages (HTML pages you write directly in Moodle), Books (multi-page resources with chapters and subchapters), URLs (links to external websites, videos, or articles), Embedded content (YouTube videos, H5P activities, Quizizz games, etc.), and Assignments (file uploads, online text)...
Activity Completion	All the reading material pages and quiz activities are set with the condition to be completed. The system will show the activity as complete (tick box) when all the conditions are met.
Grading	The authors grade activities upon completion of an activity, including providing feedback to Students. Students will automatically be notified by the system. It also shows progress bars and status.
Activities	The authors built several types of online activities: multiple choice, short answers, matching, and others. Students are allowed to have multiple attempts at an activity, and the final grade is the average grade of all the attempts and will be recorded in the grade book. In addition, all grades are automatic and delivered upon completion.
Forums	Forms and chats in Moodle serve as a space for students to interact socially and engage in collaborative learning. In this study, the authors set up forum activities where students were encouraged to post or comment at any time.

Table 2. Features included in Moodle

To implement a gamified learning environment in Moodle, educators can utilize both the platform's built-in gamified features or additional plugins or tools. Moodle includes some native features that support gamification, such as activity completion tracking, conditional access (unlocking content based on progress), and badges that can be awarded for achieving specific milestones. These features help motivate learners by providing clear goals and rewards. We used the Web 2.0

Tool Quizizz as an external gamified assessment tool. Quizizz provides an embed code, which can be pasted it into Moodle, or a link as a *URL resource* in Moodle. Assessments on Quizizz can be shared directly to Moodle, but unfortunately, it has to be bought by the university.



Figure 1. Quizizz login

To include a game-based assessment method with a positive impact, the game should have the necessary elements such as components, mechanics, and dynamics and all of them should be combined to promote a needs oriented procedure of learning (Bicen & Kocakoyun, 2018). Quizizz has the aforementioned game elements including points, test report, leader board, time restriction, profile, and meme (Pitoyo et al., 2019) level of difficulty, reward, and avatar (N. Razali et al., 2020) Immediate feedback, entertainment, interaction (Gokbulut, 2020) cooperation (Mohammadi et al., 2021).

2.3. Data Analysis

Several statistical measurements are used in the study. In order to verify whether the data in each group follow a normal distribution; which is required for the t-test), D'Agostino-Pearson test is employed to check skewness and kurtosis to determine normality. If both groups have p-values $> 0.05 \rightarrow$ they are normally distributed. An Independent (two-sample) T-test is used to determine whether the difference in mean scores between the two groups is statistically significant.

3. Results and Discussion

The study was executed in the academic year 2024/2025 involving L2 Spanish major students from the department of Spanish, faculty of foreign languages, university of Oran 2. Students are enrolled in both semesters of 2024/2025. The course taught by the researcher is 100% online and delivered on the platform MOODLE. As for gender, eighty (80%) of these students were females and only twenty (20%) of these students were males. It should be noted that gender was not taken into consideration as a variable in this study.

The enrolled students in the first semester are (n=102). In order to answer the first question in relation to the integration of gamified content in online learning environments' impact on students' engagement and enrollment in higher education, enrollment was assessed according to activity type and not activity engagement. The key variable under consideration was what kind of activity students were enrolled in, either conventional (non-gamified) or game-based assessments. The participants were not divided into two controlled groups; rather, the analysis observed naturally occurring enrollment patterns in different activity types within the course.

3.1. Students' engagement in gamified content

Gamification, when applied as a pedagogical strategy, has shown promise in enhancing both learning outcomes and student engagement. As we see in figure 3, students' interaction with gamified content has boosted engagement and contributed to increased enrollment rates. Enrollment on moodle increased from 80 to 94 by April 27th (an increase of 17.5%), following the integration of gamified learning content. This suggests that students' interaction with gamified materials not only boosts engagement but also may also positively influence enrollment. By making learning experiences more interactive and rewarding, gamification has the potential to attract and retain students, thereby supporting institutional goals related to student participation and academic success.

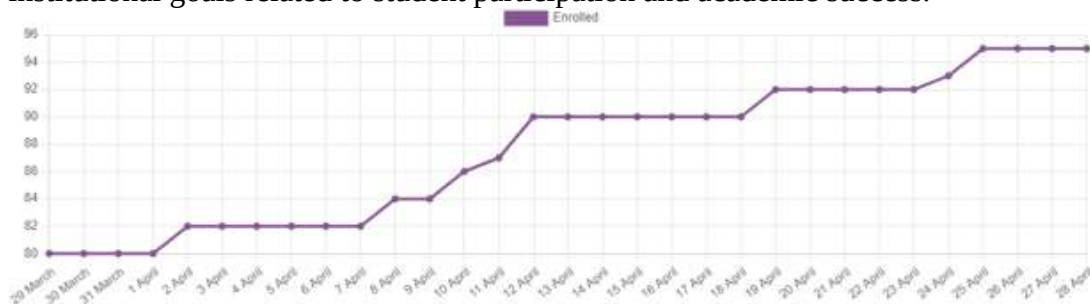


Figure 2. Enrolled students

Research suggests that web-based gamified environments can encourage learners to adopt an online identity and engage with peers in a foreign language (Stevenson & Liu, 2010; Wang & Vásquez, 2012). Additionally, the use of Web 2.0 technologies enhances language-learning motivation, as modern learners tend to spend a significant portion of their time engaged in online activities (Cephe & Balçıkanlı, 2012).

In line with our findings, Wang and Kaburuan (2019) agree that gamification can attract the attention of learners due to the presence of points, badges, leader board

system that shows the order of rankings and some other elements. Gamification in online learning activities offers an alternative approach that positively affects learners' cognitive engagement (Lo & Hew, 2018).

The findings related to the first research question revealed that using selected Web 2.0 tools such as Kahoot!, Socrative, Quizizz, and Mentimeter had a positive effect on participants' test scores, particularly in terms of course interest and motivation. These quantitative results were further supported by qualitative data gathered through semi-structured interviews. For instance, Bawa (2019) involving 96 undergraduates using a mixed-method approach found that incorporating Kahoot significantly improved learner engagement and course performance.

3.2. Comparative Effectiveness of Game-Based vs. Traditional Assessment Tools

To evaluate students' development throughout the academic year, the researcher employed a quantitative approach.

The course, consisting of 12 sections per semester, was delivered to five groups of Spanish major students. Each section contained reading materials, interactive resources, and graded activities (out of 20 points), with deadlines for each task.

To explore the effectiveness of gamified assessments in Moodle (phase two), eighty-one students participated in the study ($n=81$). They are divided into two groups, one is a control group and the other is an experimental group. The control group consists of ($n=43$) students and the experimental group consists of ($n=38$) students. The students enrolled were originally 102, but only 81 were active on the platform.

Both groups followed the same curriculum and learning objectives, with assessments lasting 30 minutes and allowing only one attempt. However, the experimental group completed assessments using *Quizizz*, a gamified platform, integrated into Moodle, while the control group used traditional Moodle-based assessments. Out of fifty enrolled students, only 37 participated in the online game.

Group	Enrolled	Engaged	Scores average
Control group	50	43	17/20
Experimental group	50	37	18/20

Table 3. Scores Average

Initial findings showed a notable difference in engagement levels. Students in the experimental group interacted more frequently with the course content, as

indicated by Moodle activity logs. The gamified group demonstrated higher completion rates for course activities and showed improved time-on-task behavior.



Figure 2. Quizizz scores

When it came to academic performance, final assessment scores measured students’ performance. A two-sample independent T-test was used to evaluate whether there was a significant difference in mean scores between the two groups. It is well recognized that validity which refers to the meaningfulness of research elements (Drost, 2011), and reliability which relates to the consistency of research measurements (Knapp & Mueller, 2010) “lie at the heart of competent and effective study” (Thanasegaran, 35/2009). Therefore, a normality test (D’Agostino-Pearson) was administered. It confirmed that both datasets followed a normal distribution, p-values > 0.05, meeting the assumptions for parametric testing. Since both p-values are greater than 0.05, we fail to reject the null hypothesis that the data come from a normal distribution. Therefore, both datasets are considered suitable for a parametric test like the independent samples t-test.

Group	P-value
Control group	0.3913
Experimental Group	0.9200

Table 4. Normality test

These results suggest that there is not a statistically significant difference between control and experimental group participants’ scores. Therefore, we proceeded with an independent samples t-test to compare the mean scores between the control group and the experimental group. Figure 4 below presents the results of the t-test. The t-value is 1.684 with 79 degrees of freedom, and the two-tailed significance (p-value) is 0.096. Since this p-value exceeds 0.05, there is no statistically

significant difference between the group means. The mean difference is -0.80110, and the 95% confidence interval for the difference ranges from -1.74877 to 0.14567. Because this interval includes zero, it further supports the conclusion that the observed difference in means is not significant. Therefore, based on this analysis, we conclude that there is no significant difference between the scores of the two groups in comparison.

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
score	Equal variances assumed	-1.684	79	.096	-.80110	.47565	-1.74787	.14567
	Equal variances not assumed	-1.666	72.728	.100	-.80110	.48075	-1.75930	.15710

Figure 3. Independent Samples t-Test Results

Despite the increased engagement in the experimental group, statistical analysis indicated that the difference in academic performance was not significant. Although the average score for the experimental group (18/20) was slightly higher than that of the control group (17/20), the independent samples t-test yielded a p-value of 0.096, above the 0.05 threshold for statistical significance. Additionally, the confidence interval for the mean difference included zero, further supporting the conclusion that the observed score differences were not statistically significant. These results contradict the findings of Castrillon et al., (2022) where they analyzed the use of Kahoot as an evaluation system for programming students. Students tested with this game obtained a superior performance of 15.24% over the control group, demonstrating that the students who used Kahoot feel more motivated, due to the process that generates a game, where they compete with each other, and to the methodology of the platform that permits repeating concepts seen in the classes.

Although the study did not find any significant differences in students' performance using game-based activities as assessment, others such as Mei et al. (2018) indicated that computer-based game activities can effectively stimulate

students' thinking. In a similar vein, Razali, et al. (2020) found that the use of gamification via Quizizz is indeed effective. Students perceived Quizizz as a beneficial tool in supporting their learning motivation and consequently, their performance. Similarly, Munuyand et al. (2021) emphasize that games play a significant role in teaching and learning, arguing that they may be one of the most effective ways to channel young learners' energy, as they are naturally inclined to be active participants.

Conclusion

The results suggest that while gamification may enhance student engagement and subjective learning experiences, it does not necessarily lead to a significant improvement in measurable academic performance, at least in the short term. These findings support the notion that gamified learning environments may be more effective at influencing learner behavior and attitudes rather than raw performance metrics.

Several limitations should be acknowledged. The sample size was relatively small, and participation in the gamified assessments was voluntary, potentially introducing selection bias. Additionally, only one gamification tool (Quizizz) was used, limiting generalizability. Future research should explore the long-term effects of gamification, its impact across diverse disciplines, and its influence on different types of learners.

In conclusion, the study reinforces the value of gamified assessments in enhancing student engagement, though it stops short of confirming a direct improvement in academic outcomes. As educational technologies evolve, integrating gamification should be seen as a complementary strategy aimed at improving the learning experience rather than solely academic results.

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