Interactive Game-Based Learning Environment (IGLE) and Students' Achievement in Araling Panlipunan

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ABSTRACT

Game based learning has been applied to the social sciences as means to heighten motivation and attainment. Employing a quantitative quasi-experimental research design, this study sought to investigate the effectiveness of Interactive Game-based Learning Environment (IGLE), a gamified technique using online application Wordwall, to enhance the performance of Grade 7 learners in Araling Panlipunan. The pedagogical design was based on classical conditioning of Ivan Pavlov and constructivist foundations of Jean Piaget and Lev Vygotsky. Specifically, this research determined the effectiveness of IGLE on Grade 7 learners' performance, active learning, and student engagement in the secondary school of Koronadal City Division in School Year 2024 to 2025. The study composed of heterogeneous students for the control and experimental groups. Data consisted of pretest and posttest measures of academic performance. Descriptive statistics and independent samples t tests were used to examine within and between group differences. Validated scales assessed students' active learning and engagement. Pretest scores for both groups were similarly low. After the intervention, the experimental group using the Interactive Game-based Learning Environment (IGLE) achieved significantly higher posttest scores ($M = 29.74$, $SD = 7.12$) than the control group ($M = 24.39$, $SD = 6.86$), $t(?) = 3.84$, $p = 0.0002$, a difference of 5.35 points favoring the experimental group. Learners in the experimental group also reported very high active learning ($M = 4.38$, $SD = 0.12$) and very high student engagement ($M = 3.66$, $SD = 0.07$). These findings indicate that IGLE effectively enhances academic performance, active learning, and learner engagement in Grade 7 Araling Panlipunan and is a promising strategy for sustaining mastery and involvement in social studies instruction.

Keywords: Gamification, Student Engagement, Student's Achievement

INTRODUCTION

Learning is a very diverse process that can be applied in many different ways. A creative and interesting way is through electronic or computer games. Around the world, the introduction of new, more complex technologies is bringing major transformations to how we work, our daily schedule, and the best way to organize education to equip students for the 21st century.

In this century, learners are often called digital natives because they are born and raised in a world where digital technologies are embedded into our daily tasks (Stephens, 2023). Consequently, many countries are moving toward reforms in teaching to adapt to the needs and interests of these students in order to include them in the education system and diversify learning processes to improve learning.

To respond to this need, the use of gamification and online tools in education to help students has been identified as a promising approach. Gamification is a powerful strategy that can positively impact a student's motivation. By leveraging elements such as badges, levels, points, and leaderboards, educators can create more engaging and interactive learning experiences for their students (Butko, 2022). The implementation of gamification strategies results in numerous benefits, including enhanced knowledge retention, increased student participation, and the possibility of creating personalized learning paths to meet individual students' unique needs (Asiya, 2023). Online platforms like Wordwall are a perfect example of this trend; they provide teachers with a resource

to design game-based activities to motivate students and enable more efficient and successful teaching and learning in a dynamic and engaging environment (Mazelin, 2022).

In the Philippines, the need for innovative teaching is especially pronounced. As an illustration of this, the latest Programme for International Student Assessment (PISA) conducted in 2022 reflected a Filipino mean score below the average for all participating countries in the rankings by subject. The Philippines is one of the bottom performing countries in Reading, Mathematics, and Science (OECD, 2023). A need to improve foundational learning is also necessary in order to be competent with other basic literacy such as reading, which is also crucial in all areas of learning.

This is a problem also being reflected in terms of content-specific performance. Araling Panlipunan (Social Studies) has been one of the weakest subjects of learners as evidenced by data; a consistent mean percentage score in the National Achievement Test (NAT) of 74% which is significantly below the passing score. Ramos (2020) even claims that, learners' poor performance in Araling Panlipunan is, among others, due to a lack of opportunities for interactive and practical learning. Social studies teachers must also surmount the challenges of not only learning all the competencies required in teaching the subject but also creating an interesting curriculum to pique the interest of students (Kelly, 2020). The decision to implement Wordwall in Araling Panlipunan is thus both due to the need to improve, not just the dip in students' overall performance, but also the reading proficiency and lack of engagement of Filipino learners.

This national issue was highly mirrored in our local setting. Concepcion National High School is currently struggling with its students' performance in the subject of Araling Panlipunan 7. The students' average in the year 2023-2024 had a low average of 51%, which was below the 75% passing average. Even more alarming, the first two quarters of school year 2024-2025 yielded a lower average of 49.3%, compared to the previous school year. The downward trend of the students' average is alarming. It makes evident the need for an instructional intervention to address the situation.

Studies about gamification or game-based instruction in Social Studies, more specifically, Araling Panlipunan are still few. Thus, this research was conducted to address this gap by providing local evidence on the effects of a Wordwall based intervention on academic performance and engagement in Araling Panlipunan 7, yielding important subject-specific insights.

Statement of the Problem

This study sought to establish the effectiveness of Interactive Game-based Learning Environment (IGLE), a gamified technique using online application Wordwall, to enhance the performance of Grade 7 learners in Araling Panlipunan.

Specifically, it sought to answer the following research questions:

1. 1. What is the level of achievement of the control group and experimental group in terms of;

1.1. pretest; and

1.2. posttest?

What is the level of student engagement in the experimental group in terms of;

2.1. active participation;

2.2. enthusiasm and motivation;

2.3. focus and attention;

2.4. problem solving and critical thinking; and

2.5. positive emotional response?

What is the level of active learning in the experimental group in terms of;

3.1. behavior;

3.2. collaboration;

3.3. communication;

3.4. participation and;

3.5. engagement?

Is there a significant difference in the student performance of the following between the control and experimental groups;

4.1. pretest;

4.2. post test; and

4.3. mean gain scores?

METHODOLOGY

Research Design

This quantitative research used an experiment method in terms of research design. It applied a pretest-posttest design using control and experimental groups. The IGLE served as the treatment for experimental group who have undergone teaching using IGLE while those who underwent lecture using conventional methods were placed under the control group. Pretests were given before the treatment whereas posttest were the tests after the treatment had been administered to both groups. A question was raised whether the students achieved competencies after the treatment. Creswell (2014) mentioned that "pretest-posttest designs provide evidence about statistical gains over time as measured by comparing scores on a test before and after a treatment are administered". According to McMillan (2016), there are four major designs in quantitative studies. Pretest-posttest is one of the research designs that aims to find out whether there is causality between both groups. It can be used when random selection of groups are not possible since group membership has already been predetermined.

Respondents of the Study

One hundred and one (101) Grade Seven learners from Concepcion National High School, Koronadal, South Cotabato year level 2024-2025 served as subject of this study. Fifty learners were grouped into the experimental while fifty-one were grouped into the control group. Grade 7 students are at the early stage of adolescence where interventions for academic skills and competencies, learning strategies, and good study behavior can be provided because they are still open to adopting new behaviors in school (Piaget, 1969). The sections were randomly chosen and they are heterogeneous to ensure diversity and normalcy within the selected classrooms (Slavin, 1990). Five (5) teachers from Concepcion National High School who observed and evaluated the experimental group throughout the Intervention of Interactive Game-Based Learning Environment served as validators. The Education Program Supervisor of CNHS, two Master teachers in Araling Panlipunan, professor of Social Studies and expert in IT also validated the gamification materials, survey, and pretest/posttest questionnaire.

Research Instrument

The respondents of this study served as data providers. Teacher-made test and survey questionnaire were created to elicit data about learners' mastery towards the content of Araling Panlipunan 7. Miller et al. (2013) test construction guidelines were followed in creating the test and survey questionnaire. The researcher-made test consists of 30 multiple-choice items. Content validity and construct validity were both used for validation. To

check on the quality of the instrument, teacher-made test underwent pilot test and internal consistency analysis. The individuals that served as member of the validation panel were one Education Program Supervisor, two Master Teachers and professor from Sultan Kudarat State University (SKSU). From the calculation of Cronbach alpha coefficient, the survey questionnaire is reliable ($\alpha = 0.864$). This is higher than the acceptable level of 0.70 (Nunnally, 1978; Tavakol & Dennick, 2011). Game-based teaching module and online platform that were used were also content validated by the faculty member of SKSU to check if the contents of the module and the tasks were pedagogically relevant and appropriate to be used inside the classroom. The instrument underwent development, validation, and reliability phases.

RESULTS AND DISCUSSION

This chapter contains the presentation, analysis, and interpretation of the study's data. In order to demonstrate and illustrate important aspects that are helpful in pursuing the primary focus of this study, tabular data is provided in this part.

Pre-Test of Control Group

Interval	Frequency	Categorization	Percentage
48-50	0	Mastered	0%
44-47	0	Closely Approximating Mastery	0%
34-43	0	Nearing Towards Mastery	0%
19-33	8	Average Mastery	14%
8-18	35	Low Mastery	70%
3-7	8	Very Low Mastery	16%
0-2	0	Absolutely Low Mastery	0%
n=	**51**		**100%**

Pre-Test of Experimental Group

Interval	Frequency	Categorization	Percentage
48-50	0	Mastered	0%
44-47	0	Closely Approximating Mastery	0%
34-43	0	Nearing Towards Mastery	0%
19-33	9	Average Mastery	18%
8-18	32	Low Mastery	64%
3-7	9	Very Low Mastery	18%
0-2	0	Absolutely Low Mastery	0%
n=	**50**		**100%**

Table 1. Level of Performance in Pre-test of Control Group and Experimental Group.

As demonstrated in table 1, the pretest performance of both control and experimental groups. For the control group, no students scored in the Absolutely Low Mastery, Nearing Towards Mastery, or Mastered ranges (0%). Instead, 35 students (70%) showed Low Mastery 7 students (14%) demonstrated Average Mastery, and 8 students (16%) exhibited Very Low Mastery.

With no students exhibiting Absolutely Low Mastery, Nearing Mastery, or Mastered proficiency (0%), the experimental group's pretest results showed that the majority of students had low mastery. Rather, 32 students, or 64% of the total, demonstrated Low Mastery, and 9 students, or 18%, demonstrated Very Low Mastery. These results are consistent with Aguhan, Tingson and Pentong (2023) study, which emphasized the necessity of customized instruction to close particular learning gaps.

The results from the pre-test of both the control and experimental groups indicate that a significant portion of the students in each group exhibited low mastery of the content. In the control group, 70% of the students (35 out of 51) were categorized as having "Low Mastery," suggesting that the majority of students in this group demonstrated only a basic understanding of the material. Additionally, 14% of students (8) fell under the "Average Mastery" category, indicating a somewhat better grasp of the content, while 16% (8) were classified under "Very Low Mastery," suggesting notable deficiencies in their understanding. No students in the control

group demonstrated proficiency levels higher than "Low Mastery," as evidenced by the absence of students in the "Mastered" or "Closely Approximating Mastery" categories.

In the experimental group, 64% of students (32 out of 50) showed "Low Mastery," with 18% (9 students) achieving "Average Mastery." Similar to the control group, the experimental group showed a lack of students in the highest proficiency levels, as no one scored in the "Mastered" or "Closely Approximating Mastery" categories. However, the experimental group did show a slight improvement compared to the control group, with 18% of students (9) placed in the "Very Low Mastery" category, and no students falling into the "Absolutely Low Mastery" category. This difference suggests a slight advantage in the experimental group, although both groups still demonstrate significant gaps in their mastery of the material.

These findings highlight the need for further educational interventions to address the significant gaps in students' learning. The fact that no students in either group reached mastery-level proficiency indicates that both groups require tailored teaching approaches to improve their performance. The experimental group, despite showing a marginal improvement, still demonstrates a need for more focused interventions to boost the mastery levels of its students. Given that the experimental group did not significantly outperform the control group, it suggests that the applied intervention may not have been sufficiently impactful or needs further refinement

	n	**Mean**	**Standard Deviation**	**Description**
Control Group	51	13.31	5.09	Low Mastery
Experimental Group	50	14.70	7.39	Low Mastery

Table 2. Performance Level of Students in Post-test of Control Group and Experimental Group

Post-Test of Control Group			
Interval	Frequency	Categorization	Percentage
48-50	0	Mastered	0%
44-47	0	Closely Approximating Mastery	0%
34-43	7	Nearing Towards Mastery	13.73%
19-33	40	Average Mastery	80%
8-18	4	Low Mastery	0%
3-7	0	Very Low Mastery	0%
0-2	0	Absolutely Low Mastery	0%
N=	**51**		**100%**

The data in table 2 highlights the performance levels of students in both control and experimental groups during the posttest. Referring to the categorization table above, it is evident that in the posttest of the control group, no students (0%) scored between 0-7, which falls within the range of Absolutely Low Mastery to Very Low Mastery levels. Additionally, there were no students (0%) in the Closely Approximating Mastery and Mastered categories. Furthermore, 3 students (6%) were low mastery, and 40 students (80%) achieved an average mastery level, while 7 students (14%) were nearing towards mastery.

Meanwhile, the level of performance of students in the experimental group shows that no students scored between 0-7, which corresponds to the range of absolutely low mastery to very low mastery. Additionally, no students (0%) fell into the categories of closely approximating mastery to mastered. Furthermore, there were 2 students (4%) were low mastery and 34 students (68%) who achieved an average mastery level, while 14 students (28%) were nearing towards mastery. Game-based learning settings help students learn more and do better on tests by making them more interested and motivated (Prensky, 2019)

Table 3. Pretest Mean and Standard Deviation of Control and Experimental Group

Post-Test of Experimental Group			
Interval	Frequency	Categorization	Percentage
48-50	0	Mastered	0%

44-47	0	Closely Approximating Mastery	0%
34-43	14	Nearing Towards Mastery	28%
19-33	34	Average Mastery	68%
8-18	2	Low Mastery	4%
3-7	0	Very Low Mastery	0%
0-2	0	Absolutely Low Mastery	0%
N=	**50**		**100%**

From the data in table 3, it can be inferred that the summary of the pretest mean and standard deviation for both control and experimental groups. The 51 participants in the control group obtained a mean of 13.31 and standard deviation of 5.09. The 50 participants in the experimental group registered a mean of 14.70 and standard deviation of 7.39. The category of both the control and experimental group is "Low Mastery." Both groups have almost similar mean score at pretest with slightly better average performance of the experimental group than the control group. However, the difference is not that significant at the pretest before the implementation.

Since the average of the control group and experimental group were almost similar and had the same descriptive level, one can infer that the students' prior knowledge was the same before the treatment was applied. The slight difference between the two means shows that there was no notable difference in the control group and experimental group pretest results.

The pretest scores being equal makes it more reasonable to suggest that the observed difference in the posttest is due to the treatment done on the experimental group rather than an initial difference in understanding. Matching mastery levels at the start of the experiment is crucial in order to establish a valid basis for comparison.

Additionally, the fact that both the control and experimental group are in the low mastery category further indicates the need for an instructional intervention for both groups. The experimental group having a slightly higher standard deviation means that the scores are more spread out which means that the experimental group may have been more diverse in their pretest scores and thus may have had different learners in the classroom

Table 4. Posttest Mean and Standard Deviation of Control and Experimental Groups

	n	**Mean**	**Standard Deviation**	**Description**
Control Group	51	24.39	6.86	Average Mastery
Experimental Group	50	29.74	7.12	Average Mastery

A closer examination in table 4 provides the posttest results of the control and experimental groups after the intervention. The control group, which consisted of 51 learners, had a mean score of 24.39 and a standard deviation of 6.86. On the other hand, the experimental group, which consisted of 50 learners, had a mean score of 29.74 and a standard deviation of 7.12. Although both groups were classified under the "Average Mastery" category, the mean score of the experimental group is significantly higher than that of the control group by 5.35 points. Furthermore, when comparing the posttest scores to the pretest results, it is evident that the shift in scores for both groups was upwards, indicating an improvement in performance, but this increase was much more pronounced in the experimental group.

The results showed that the experimental group outperformed the control group in the posttest. The experimental group can be considered to have higher performance mastery than the control group. The statistical result of the difference in the means between the two groups indicates that the learning model given to the experimental group influenced students' learning performance.

The statement suggests that the intervention led to measurable learning gains that exceeded those achieved through traditional teaching methods. The higher performance of the experimental group implies that the strategies or materials used in the intervention positively impacted the students' comprehension, engagement, and retention/application of the targeted concepts. This aligns with Hattie's (2009) meta-analysis, which indicated that well-designed instructional interventions typically have higher effect sizes compared to traditional

teaching approaches. Similarly, Bransford, Brown, and Cocking (2000) highlighted that learning environments that incorporate active engagement and scaffolding significantly improve comprehension and long-term retention. The fact that both groups reached "Average Mastery" while still showing a significant difference in magnitude underscores the effectiveness of the experimental treatment, which is consistent with research demonstrating that innovative pedagogical strategies often lead to stronger academic gains (Slavin, 2018).

The increase in the experimental group's posttest mean also suggests that using new or research-based teaching methods can result in higher academic performance. This finding is consistent with learning theories that highlight the significance of active engagement, scaffolded learning, and meaningful practice. The experimental group's slightly higher standard deviation also indicates that, although the intervention appears to have been beneficial for the experimental group as a whole, there may have been individual differences in how quickly or effectively students in the experimental group learned the material. This could suggest that the intervention might not be equally effective for all learners and that additional support or scaffolding may be needed to help individual learners benefit from the intervention to the fullest.

Table 5. Level of Student Engagement in the Experimental Group in Terms of Active Participation

Statements	**Mean**	**Sd**	**Description**
1. I actively participate in the gamified activities and tasks.	3.80	0.45	Strongly Agree
2. I consistently engage in the core activities and tasks designed within the gamified environment.	3.80	0.45	Strongly Agree
3. I'm genuinely trying to finish tasks and challenges.	3.80	0.45	Strongly Agree
4. I actively seek out opportunities to help or guide other participants within the game.	3.80	0.45	Strongly Agree
5. I experiment with different strategies or approaches to achieve goals within the game.	3.60	0.55	Strongly Agree
Section Mean	**3.76**	0.22	Strongly Agree

Table 5 provides a comprehensive overview of students in the experimental group exhibited a very high level of active participation, which is a sign of their engagement in the course. The average of 3.76 and standard deviation of 0.22 in this dimension are associated with the descriptor Strongly Agree, which means that the students agreed with all statements. All items in this dimension are also labeled Strongly Agree. The highest mean scores of 3.80 were reported for all the items except for the one on "experimenting with different strategies" that had a mean of 3.60. However, both are Strongly Agree. The small standard deviations for all the items show the stability and uniformity of the students' answers.

Based on the outcomes, it is possible to state that the students in the gamified learning context were considerably engaged in the tasks. They did not only follow the rules and regulations of any activity but instead put a considerable amount of effort in the process and engaged in active collaboration with others. It is possible to indicate that all of the indicators of active participation received notably high marks. This might be interpreted as a success of the gamified approach as it managed to create a context where students were not simply recipients of knowledge but active members of the learning process.

Moreover, the high level of active participation may be consistent with Squire's (2023) study which reported a rise in students' interest and a boost in learning outcomes with digital game-based learning. This observation aligns with the fundamental principles of interactive learning and supports the argument that interactivity is a critical element in gamified tool design that encourages deep learning. This from a TPACK frame of reference, it could be inferred that by intentionally integrating technology and pedagogy with content, the learning experience can be significantly enhanced. In this instance, the robust level of participation in the experimental group reflects a well-designed gamified learning environment. In such settings, the technology and pedagogical tools not only keep students' attention and efforts sustained but also foster an environment conducive to active and collaborative efforts to achieve learning objectives

Table 6. Level of Student Engagement in the Experimental Group in Terms of Enthusiasm and Motivation

Statements	Mean	Sd	Description
1. I show enthusiasm and motivation to complete the lesson and earn rewards.	3.60	0.55	Strongly Agree
2. I strive to improve my position on leaderboards or in rankings.	3.40	0.55	Strongly Agree
3. I am eager to unlock challenges or content within the gamified learning environment.	3.60	0.55	Strongly Agree
4. I share my achievements or progress within the game with others, expressing pride in my accomplishments.	3.40	0.55	Strongly Agree
5. I find myself more engaged and focused on the learning material because of the gamified elements.	3.60	0.55	Strongly Agree
Section Mean	**3.52**	**0.11**	**Strongly Agree**

The figures presented in table 6 shows that the experimental group expressed a relatively high level of interest and motivation in completing the gamified lessons, with an overall mean of 3.52. The items with the highest mean scores (3.60) included finishing all lessons to gain rewards and unlock challenges and being able to focus more on the task as it was gamified. On the other hand, the items with the lowest mean scores (3.40) included competing for a better place on the leaderboard and sharing achievements, but they were still given positive ratings.

Based on these outcomes, we can conclude that students were more driven by individual achievement, challenge, and flow, rather than by competition or public recognition through leaderboards and shared achievements. This scores distribution shows that the gamification design performed better when focused on individual progress and meaningful tasks than on competitive aspects.

This result suggests that the gamification elements employed during the lesson were effective in maintaining the students' engagement and encouraging them to persist in their efforts to complete the tasks. The relatively higher scores for rewards, challenges, and focused engagement suggest that students appreciated having clear goals, increasing challenges, and a sense of accomplishment from completing activities. In this way, the gamified environment seems to have reinforced elements of intrinsic motivation, such as the enjoyment of the task and satisfaction in personal improvement.

In addition, the findings are aligned with Valjataga and Laanpere's (2019) conclusion that game elements, such as challenges and rewards, can be employed to boost students' engagement and enjoyment. The results are also in line with Ryan and Deci's (2000) self-determination theory, which suggests that providing learners with support for basic psychological needs in autonomy, competence, and relatedness results in their higher levels of intrinsic motivation, as well as with Huang and Hew's (2018) views on learners' perceived experience of an online game and its contribution to students' deep involvement and positive expectations towards the learning process. The presented evidence as a whole may be interpreted as indicative of a supportive conclusion that well-designed gamified learning environments have the potential to nurture long-term motivation and engagement for active participation in the form of meaningful and enjoyable challenges, as opposed to competition or the focus on extrinsic rewards (Huang & Hew, 2018; Ryan & Deci, 2000; Valjataga & Laanpere, 2019).

Table 7. Level of Student Engagement in the Experimental Group in Terms of Focus and Attention

Statements	Mean	Sd	Description
1. I minimize distractions and stay engaged with the gamified activities, even when faced with external interruptions.	3.80	0.45	Strongly Agree
2. I maintain focus and attention throughout the gamified lesson.	3.80	0.45	Strongly Agree
3. I actively resist the urge to multitask or switch to other activities during the gamified lesson.	3.60	0.55	Strongly Agree
4. I complete the gamified activities without needing frequent breaks or losing track of my progress.	3.80	0.45	Strongly Agree
5. I am able to follow the instructions and objectives within the gamified environment without getting confused or sidetracked.	3.60	0.55	Strongly Agree
Section Mean	**3.72**	**0.11**	**Strongly Agree**

From the results displayed in table 7 reveals a very high rating of focus and attention, with an overall mean of 3.72. The items with the highest means (3.80) reflect the students' capability of reducing distracting circumstances and staying on task, paying attention, and doing the activities with no or few interruptions; therefore, they show their attentiveness and persistence. The items with the lowest means (3.60) refer to an inability to multitask and following instructions without being puzzled, which in comparison are low yet still demonstrate high focus and confidence.

On the basis of these results, it can be assumed that the students did not get distracted and could maintain attention during the gamified course. The ratings on the indicators measuring focus and attention were consistently high. This suggests that the gamified learning environment allowed the students to remain on-task and maintain concentration during the learning activity.

The distribution of scores suggests that gamification may have played a role in creating a space where students were able to stay focused and attentive as they worked through the lessons. While some students indicated slightly higher levels of difficulty with multitasking and following instructions, the ratings for these items remained relatively high, indicating that the majority of students were able to effectively manage their attention requirements. However, the small differences in the means also point to areas for potential improvement, such as providing clearer instructions and offering even more support to students in order to minimize multitasking during tasks.

The finding is consistent with that of Hamari (2016), who also observed the influence of certain game elements such as the rewards or the challenges on the development of the sense of achievement and, as a result, the increase in focus. Moreover, the study conducted by Berata et al. (2017) also reported the increase in the concentration and support in reaching the deep processing level of cognition from the implementation of game-based learning through the use of the components of interactivity, competition, and cooperation. Therefore, the high scores of the focus confirmed by this study indicate an effective ability of the well-designed gamified settings to capture the attention of the students and keep them engaged in the learning tasks and the benefit of the proper refinement of the instruction design to reduce the confusion and distraction

Table 8. Level of Student Engagement in the Experimental Group in Terms of Critical Thinking

Statements	**Mean**	**Sd**	**Description**
1. I demonstrates problem-solving skills and critical thinking to overcome challenges.	3.80	0.45	Strongly Agree
2. I am able to transfer problem-solving strategies learned in the game to other challenges or situations outside of the gamified environment.	3.60	0.55	Strongly Agree
3. I can explain my reasoning for choosing a particular path or strategy within the game, demonstrating a clear thought process.	3.60	0.55	Strongly Agree
4. I can reflect on my own learning process within the game and identify areas where I need to improve my critical thinking skills.	3.80	0.45	Strongly Agree
5. I evaluate the credibility and reliability of information presented within the game to make informed choices.	3.60	0.55	Strongly Agree
Section mean	**3.68**	**0.23**	**Strongly Agree**

Through table 8, a thorough assessment of the level of student engagement in critical thinking within the experimental group. The results show strong engagement across all statements, with mean scores ranging from 3.60 to 3.80, all within the "Strongly Agree" range. The overall section mean of 3.68 further reflects the effectiveness of the gamified experience in encouraging critical thinking, including problem-solving, strategy transfer, and evaluation skills.

It can be gleaned that critical thinking is also the category from which students were most engaged with, receiving the highest mean score of 3.80 from items 1 and 4. This reveals that students felt good about being able to solve a problem and reflecting upon their experience from the game. Additionally, items 2, 3, and 5 received a fair mean score of 3.60, indicating strong engagement from the students in transferring strategies,

justifying and evaluating. Thus, an overall average of 3.68 very high shows that this gamified experience encouraged students to engage in critical thinking for the duration of the experience.

These results suggest that game-based learning with Wordwall substantially improves students' critical thinking skills. They demonstrated the ability to not only showed strong problem-solving skill and create meaning as they played the game but also, with great potential for application, justification and evaluation. Therefore, the potential for these gamified experiences can only add to students' critical thinking skills in-game, in the classroom and outside of it with continued exposure and minimal scaffolding.

These results also support Mayer's (2014) suggestion that carefully designed educational games can help students improve their critical thinking by building in problem solving and decision making activities. Wordwall is not a video game per se, but rather a virtual platform that includes interactive tasks to aid students in their analyses. The research on Think-Talk-Write approach in combination with Wordwall further indicated that such tools can help improve students' critical thinking skills when implemented with a suitable instructional approach. Gee's theory also noted that computer-based environments that enable students to practice trial and error or strategic reasoning like those in Wordwall can play a role in developing students' critical thinking.

Table 9. Level of Student Engagement in the Experimental Group in Terms of Positive and Emotional Response

Statements	**Mean**	**Sd**	**Description**
1. I express positive emotions, such as enjoyment, excitement, and satisfaction.	3.40	0.55	Strongly Agree
2. I verbally express enthusiasm or enjoyment while participating in the gamified activities.	3.80	0.45	Strongly Agree
3. I exhibit nonverbal cues of positive emotions, such as smiling, laughing, or celebrating achievements.	3.40	0.55	Strongly Agree
4. I willingly spend extra time engaging with the gamified activities, even beyond what is required.	3.60	0.55	Strongly Agree
5. I share positive feedback about the gamified experience with others, recommending it or expressing excitement about it.	3.80	0.45	Strongly Agree
Section mean	**3.60**	**0.20**	**Strongly Agree**

Table 9 offers an in-depth analysis of student engagement in positive and emotional responses during the gamified activities. The results indicate strong emotional engagement, with mean scores ranging from 3.40 to 3.80, all within the "Strongly Agree" range. The highest scores were for verbal expressions of enjoyment and sharing positive feedback. Overall, the section mean of 3.60 reflects consistent positive emotional engagement throughout the experience.The greatest mean (3.80) is associated with two indicators: the verbal expression of enjoyment during gamified activities and the sharing of positive feedback and recommendations about the experience. These responses indicate active enthusiasm and a willingness to promote the activity beyond the learning environment, which are reflective of high emotional engagement. The lowest mean, still a high score, is 3.40 and is associated with the expression of positive emotions and nonverbal cues such as smiling and laughing. This item is also in the "Strongly Agree" range, indicating a uniformly high emotional response across all indicators.

The findings suggest that gamified learning strategies are effective in fostering students' positive emotional states, which are important for promoting classroom engagement. When students experience positive emotions such as excitement, support, and joy while performing learning activities, they are more likely to be active, cooperative, and motivated, which are essential for achieving deep learning.

These results align with Deci and Ryan's (1985) self-determination theory (SDT), which proposes that intrinsically motivated behaviour occurs when three innate needs are satisfied: autonomy, competence, and relatedness, all of which gamification can support. Relatedly, the socio-constructivist theory of Vygotsky (1978) also states that engaging environments support learning, with particular emphasis on the emotional and social processes. Similarly, Hamari, Koivisto, and Sarsa (2014) propose that gamification improves user experience

and satisfaction, especially in cases when there is an opportunity for emotional and social investment in tasks, which could explain the students' verbal and feedback-related responses.

Table 10. Summary of responses for the Student Engagement

Student Engagement	**Mean**	**Sd**	**Interpretation**
1. Active Participation	3.76	0.22	Very high
2. Enthusiasm and Motivation	3.52	0.11	Very High
3. Focus and Attention	3.72	0.11	Very High
4. Critical thinking and Problem Solving	3.68	0.23	Very High
5. Positive and Emotional Response	3.60	0.20	Very high
Grand mean	**3.60**	**0.20**	**Very high**

It is also important to note that the composite average of overall student engagement for all variables is also "Very High" with a mean of 3.66 and a Standard Deviation of 0.07. This composite rating is "Very High" including. The calculated overall weighted mean of 3.66 with a very low standard deviation of 0.07 is indicated as "Very High" which, in terms of the student's experience, indicates a strong and consistent level of student engagement with positive and emotional attributes. Fredricks, Blumenfeld, and Paris (2004) explain that student engagement at the emotional level includes affective reactions, interest, enjoyment, a sense of belonging, which are all motivators for higher levels of learning. It can be extrapolated from this data that the gamified experience was successful in providing an emotionally positive experience by creating an experience in which students were able to feel excited, satisfied, and socially connected, all strong motivators for active engagement and learning.

Table 11. Level of Active Learning in the Experimental Group in Terms of Behavior

Statements	**Mean**	**Sd**	**Description**
1. The student actively listens to the discussions and instructions.	4.60	0.55	Strongly Agree
2. The student quickly responds to prompts and questions within the game, demonstrating attentiveness.	4.60	0.55	Strongly Agree
3. The student shows readiness in engaging different type of games.	3.80	0.45	Strongly Agree
4. The student asks clarifying questions to ensure understanding of instructions or objectives.	4.00	0.71	Strongly Agree
5. The student reflects on their own performance and identifies areas for improvement within the gamified environment.	4.60	0.55	Strongly Agree
Overall	**4.32**	**0.23**	**Strongly Agree**

The data presented in table 11 highlights the experimental group's active learning behavior in the gamified condition. The group indicated a very high level of active learning overall, mean is equal to 4.32, standard deviation is equal to 0.23. The greatest mean scores, all at 4.60, were for the items paying close attention to talks and directions, being quick to respond to the prompts, and reflecting on performance. These scores suggest that students were frequently attentive, responsive, and self-monitoring during the gamified lessons.

Based on the results obtained it can be argued that active learning behaviour was indeed strongly encouraged within the gamified learning environment of the experimental group. Students were not passive recipients of information, rather they took time to process instructions, promptly started the tasks and reflected on their performance. The very high and similar ratings received by all indicators of active learning suggest that the design of the gamified activities had been successful in encouraging a more engaged and considered style of participation.

The pattern of scores suggests that the students in the gamified condition were able to self-regulate their learning, stay on task, and respond positively to teacher prompts. Their reflective behavior with respect to performance suggests that they were not simply performing tasks, but were also assessing their understanding and progress. This suggests that the gamified environment was supportive of higher order learning behaviors such as monitoring, self-adjusting, and making sense of feedback - which are key components of active and self directed learning.

These results are consistent with self determination theory explanations of play, such as those put forward by Przybylski, Rigby and Ryan (2010), which have argued that successful games are able to provide fulfilment for key psychological needs, and through meeting these needs can support sustained attention and effort. The results reported here are also broadly in line with meta analytic evidence (Clark, Tanner Smith, and Killingsworth 2016, Sailer and Homner 2020) which has shown that digital games and gamified learning can generate large effects on learning outcomes and reliable positive effects on behavioral indicators, including measures of on task behaviour and effort, where designs are underpinned by the inclusion of narrative and social elements. In this tradition, the very high levels of active learning we observed in the experimental group suggest that a carefully designed gamified setting may foster high levels of productive engagement and involvement with learning activities.

Table 12. Level of Active Learning in the Experimental Group in Terms of Collaboration

Statements	Mean	Sd	Description
1. The student actively seeks out opportunities to collaborate with others on in-game projects or challenges.	4.20	0.84	Agree
2. The student shares strategies, resources, or helpful information with teammates during collaborative gameplay.	4.60	1.14	Strongly Agree
3. The student takes on different roles within group activities, demonstrating flexibility and teamwork.	4.40	0.55	Strongly Agree
4. The student proposes solutions or strategies during group problem-solving challenges within the game.	4.40	0.55	Strongly Agree
5. The student volunteers for or accepts leadership roles in group activities, guiding and coordinating team efforts.	4.40	0.55	Strongly Agree
Overall	**4.40**	**0.37**	**Strongly Agree**

As presented in Table 12, learners in the experimental condition exhibited an extremely high degree of cooperative learning, as measured by an average of 4.40 and a standard deviation of 0.37. Learners most strongly agreed with the statements that they shared resources and strategies with other learners in their groups with the mean score of 4.60, and that they performed different responsibilities throughout group projects with a mean score of 4.40. These outcomes suggest that learners were highly regularly and actively participating in activities that promoted collaboration, shared responsibility, and support among group members.

It can therefore be stated from the results of this study that the gamified learning environment facilitated and enhanced cooperative learning of students in the experimental group. The above-average ratings of sharing of resources and taking on responsibilities indicate that students did not learn individually. On the contrary, they worked hard in their group work, contributed to a common task and problem solving as an integral part of their learning.

The distribution of the scores suggests that learners have developed and applied some essential social and collaborative skills when completing the gamified tasks. Their high propensity to share strategies and to divide roles also indicates that positive interdependence and individual accountability existed among the group members. In other words, the cooperative structures embedded in the gamified tasks allowed learners to support each other and yet ensured that each student had a significant part in the group work.

These findings are in line with the theoretical assumptions of Johnson and Johnson on the principles of cooperative learning, which postulate that cooperative learning is based on social skills, constructive engagement, individual accountability, positive interdependence, and group processing (Johnson, Johnson & Holubec, 1994). Also, according to Slavin (2014), cooperative learning is most effective if the learning tasks are designed such that it can be accomplished only by the team as a whole, as well as requires each individual student to contribute to the team's task. Empirical studies of Taraman, Hassan, Shawky and Badawi (2016) support these theoretical and practical suggestions, since their study shows that student interaction can be most effective if the five principles of cooperative learning are applied to structure the students' work in groups, which results in higher group outcomes and increased individual student motivation. These findings from different sources converge to suggest that the cooperative elements of the gamified setting contributed to the development of both good teamwork and increased personal investment

Table 13. Level of Active Learning in the Experimental Group in Terms of Communication

Statements	Mean	Sd	Description
1. The student effectively communicates ideas and understanding through expression.	4.20	0.45	Agree
2. The student provides clear and concise answers to in-game questions or prompts, demonstrating comprehension.	4.40	0.55	Strongly Agree
3. The student ask specific questions to clarify rules, mechanics, or objectives within the game.	4.60	0.55	Strongly Agree
4. The student seeks assistance or guidance when encountering difficulties or challenges within the game.	4.40	0.55	Strongly Agree
5. The student shares observations or discoveries made within the game with their classmates.	4.20	0.45	Agree
Overall	**4.36**	**0.17**	**Strongly Agree**

Table 13 provides information about the active learning performance of the experimental group in the gamified environment in terms of communication. With a mean of 4.36 and a standard deviation of 0.17, the group's overall performance in communication was very high in terms of active learning. The students "strongly agreed" that they "asked clarifying questions" with a mean score of 4.60, and they also "strongly agreed" that they "gave clear answers" with a mean score of 4.40. The fact that these values are also high shows that the learners often asked for clarification and provided clear answers during the activities.

Based on the results it can be argued that students in the gamified setting effectively and intentionally communicated. They could not only explain their point of view, but they also asked questions and tried to ensure that others understood what they were saying. This trend shows that the gamified setting fostered a learning culture where students actively learned through dialogue, clarifying and explaining concepts.

The data therefore suggest that the gamified context stimulated learning and helped communication. When students asked questions to clarify the meaning and to ensure their understanding and answered the questions of others in a straightforward way, it probably helped them to better understand the content, as well as to contribute to the understanding of others. The same way, Steinkuehler and Duncan (2008) believed that, since playing a multiplayer game in particular contexts creates a possibility for learners to communicate with each other, to explain their intentions and to coordinate activities in order to achieve common goals, it is beneficial for their verbal and nonverbal communication skills. By analogy, communication styles in the data of the current study also indicate that, if gamified tasks are designed well, they may support the learners to hold academic discussions with one another and to negotiate their understandings and actions in a more successful way.

Table 14. Level of Active Learning in the Experimental Group in Terms of Participation

Statements	Mean	Sd	Description
1. The student actively participates in discussions, group work, and activities.	4.60	0.55	Strongly Agree
2. The student joins and participates in guilds or teams.	4.40	0.55	Strongly Agree
3. The student contributes meaningfully to in-game discussions.	4.40	0.55	Strongly Agree
4. The student expresses enthusiasm and positive encouragement to motivate teammates during challenges or setbacks.	4.40	0.55	Strongly Agree
5. The student actively listens to and considers the ideas and opinions of other players during group discussions or activities.	4.60	0.55	Strongly Agree
Overall	**4.48**	0.23	Strongly Agree

Table 14 reveals that the group exhibited a very high degree of active participation since the global mean 4.48 and small standard deviation 0.23 (labelled Strongly Agree). The higher means of 4.60 reveal that the students very actively participated in discussions and group work and activities, and very actively listened to and considered the ideas and opinions of other players during group discussions or activities. This reflects high interaction and engagement, in line with characterizations of active learning (Prince, 2004).

From these results it can be inferred that the gamified learning environment promoted collaborative and socially rich participation, with students not just participating in activities, but providing ideas, responding to others and cheering on teammates, the structured cooperation and positive interdependence described in models of cooperative learning (Johnson, Johnson and Holubec 2014).

The distribution of scores suggests that as they worked on the gamified activity, the students were building some significant social and communication skills. Their high propensity to listen to others and to make significant responses suggests that they were creating knowledge in interaction with others, which accords with the social constructivist position of Vygotsky 1978 and with evidence that talking and involvement promote understanding (Prince, 2004).

The findings also indicate that the desired motivational and persistence benefits of well designed gamified environments may arise from providing a social context that makes participation meaningful. Game inspired mechanisms that support interaction, feedback and shared challenges have been shown to lead to more engagement with educational material, according to Hamari, Koivisto and Sarsa 2014. A meta analysis by Sailer and Homner 2020 similarly finds that gamification with a strong emphasis on social participation can reliably improve motivational and performance outcomes, in line with the high participation observed here.

Table 15. Level of Active Learning in the Experimental Group in Terms of Engagement

Statements	Mean	Sd	Description
1. The student demonstrates genuine interest and enthusiasm in the learning process.	4.40	0.55	Strongly Agree
2. The student actively seeks out additional information or resources related to the game's learning content.	4.00	0.71	Agree
3. The student spends time experimenting with different strategies or approaches to master game mechanics.	4.40	0.55	Strongly Agree
4. The student expresses excitement or satisfaction when achieving goals or making progress.	4.60	0.55	Strongly Agree
5. The student expresses excitement or satisfaction when achieving goals or making progress.	4.40	0.55	Strongly Agree
Overall	**4.36**	**0.43**	**Strongly Agree**

Table 15 indicates a very high level of active learning in the area of engagement with an overall mean of 4.36. Students very strongly agreed (4.60) that they felt excitement or satisfaction when they achieved goals or made progress. The other items in this area of interest, enthusiasm, and experimentation with strategies were also rated in the strongly agree range. According to Fredricks et al. (2004), high on emotional and behavioral engagement refer to as being deeply involved in learning rather than just superficially participating.

It can be concluded from these findings that the gamified space created and sustained engaged learners who wanted to take part and experienced positive feelings associated with the progress made. The high levels of excitement and satisfaction in reaching the goals and the expectations that students made to achieve them shows that learners were not just doing a task, but also appreciate the results, in line with the arguments by Ryan, Rigby, and Przybylski in 2006 who have proposed that game like experience can strongly enhance motivated and engrossed learning.

These results suggest that the gamification design may have promoted intrinsic motivation as the students seemed to be learning for interest, enjoyment, and mastery of game related learning content. This type of engagement is thought to be linked to persistence, deeper processing, and greater achievement, for example, Deci and Ryan (2000) state that when learners experience interest and competence, they are more likely to put in sustained effort for challenging tasks.

In addition, the strong engagement results may indicate that game inspired features such as clear goals, feedback, visible progress, and freedom to try different strategies, have potential to increase the motivational appeal of learning experiences. Findings from gamification research, Deterding et al. (2011) and Sailer & Homner (2020), suggest that when these elements are systematically and meaningfully aligned with learning, they are likely to increase motivation and lead to consistent positive effects on both engagement and learning outcomes, which is also the trend observed in this condition.

Table16. Summary of responses for the Active Learning

Student Engagement	Mean	Sd	Interpretation
1. Behavior	4.32	0.23	Very high
2. Collaboration	4.40	0.37	Very High
3. Communication	4.36	0.17	Very High
4. Participation	4.48	0.23	Very High
5. Engagement	4.38	0.12	Very high
Grand mean	**4.38**	**0.12**	**Very high**

Table 16 indicates that participants reported very high total active learning, reflected by a grand mean of 4.38 with a relatively small standard deviation of 0.12. Of the five dimensions of student engagement, participation was the highest with a mean score of 4.48, while collaboration mean score is 4.40 and engagement with a mean score of 4.38 also closely followed in this regard. While behavior and communication also fell in the very high range, this elevated pattern for all five facets is an important indication that students were strongly and consistently engaged in the active learning processes encouraged in the gamified learning environment. This finding is supported by prior research on active learning, which has found that when thoughtfully designed, active learning can promote widespread student involvement across cognitive and social learning dimensions.

One might argue, based on the findings above, that the gamified learning environment did not foster a selective or single-component type of active learning but a rather "full package." In other words, when engaged with the gamified learning environment, learners were not just active in terms of on task behavior. They also interacted and cooperated, showed a high level of communication, were not passive in their learning, and were not emotionally disengaged. This is the type of autonomy, competence, and relatedness that self-determination theory posits as the psychological needs underpinning quality, self-regulated, or autonomous learning.

On this basis, it can be asserted that the gamified learning experience was effective in fostering a rich kind of active learning, rather than a partial one in which only one or a few dimensions improved. Learners did not merely exhibit an on-task behaviour, but also worked well with each other, expressed themselves clearly, were actively present, and remained emotionally connected to what they were doing (Prince, 2004; Sailer & Homner, 2020). This profile is, in fact, the autonomy, competence, and relatedness that self-determination theory refers to as psychological needs that facilitate high-quality self-regulated learning (Deci & Ryan, 2000).

Significant Difference in the Student Performance between the Control and Experimental Group

Table 17. Significant Difference in the Student Performance Between the Control and Experimental Group in terms of Pretest

	Mean	Standard Deviation	Mean Difference	t-computed	p-value
Control Group	13.31	5.09	1.39	1.09	0.28
Experimental Group	14.70	7.39			

Table 17 shows the comparison of pretest between control and experimental group obtained that the control group had a mean score of 13.31 while the experimental group had a mean score of 14.70, with a computed mean difference of 1.39 which gave a t-computed value of 1.09 with a corresponding p-value of 0.28. This p-value is more than the 0.05 level of significance which implies that the difference in the pretest means is not statistically significant.

Using these results, one can conclude that there is enough evidence to support the claim that the control and the experimental group were, most likely, equal in terms of achievement in the pretest. The insignificance indicates that the two groups were at a similar level of performance at the start of the study. This implies that the two groups are at a similar level before the instruction/trial takes place, therefore, differences in the posttest or learning outcomes can be ascribed more reliably to the treatment or teaching approach, and not so much to differences in ability between groups from the start. Miller and Blumberg (2014) support this as they also report a p-value higher than .05, which is statistically insignificant, in terms of a difference in baseline scores.

Moreover, no significant difference between the pretests of both groups demonstrates that they were at the same levels of preparedness before the intervention. In other words, the quasi-experimental design in terms of the students' baseline knowledge of literature topics and composition skills was not biased from the beginning. The parallelism of the two conditions provides baseline equivalence (Shadish et al., 2002) that contributes to internal validity (Trochim et al., 2016) as it makes it easier to rule out the alternative explanation of future achievement: initial differences in academic performance are not an issue here. With groups on a level footing from the very start, any difference in the direction of the experimental group in the posttest may be claimed to result from the program implemented in this condition and not from the non-equivalence of the groups at baseline. In line with this logic, the lack of statistically significant differences between pretests is one of the methodological recommendations for quasi-experimental and experimental studies in terms of the fairness of the randomization or balance of group assignment (Dimitrov & Rumrill, 2003). The quasi-experimental design was even further ensured by demonstrating the equivalence of the two groups on the measured variable at the outset of the study. As this allows making stronger causal claims, the methodological rigor of this research has been increased (Trochim et al., 2016).

Table 18. Significant Difference in the Student Performance Between the Control and Experimental Group in terms of Posttest

	Mean	Standard Deviation	Mean Difference	t-computed	p-value
Control	24.39	6.86	5.35	3.84	0.0002
Experimental	29.74	7.12			

Table 18 shows the results of the t-test analysis of posttest performance. A significant difference in performance was found between the control and experimental groups, with the experimental group having a higher mean (29.74) than the control group (24.39). The mean difference between the two groups is 5.35 points. The t-value calculated was 3.84 with a p-value of 0.0002, indicating that the difference between groups was statistically significant. As the p-value is well below the 0.05 level, the null hypothesis of the equality of the two means is rejected.

Based on these results, it can be argued that the treatment that was used in the experimental group (gamification in the learning environment) had a positive and significant impact on students' posttest scores. The experimental group's higher scores indicate that the instructional method they were exposed to led to higher learning gains than the traditional method used in the control group.

The practical implication of the claim is that the use of gamified learning environments can significantly improve students' performance. The fact that the difference is significantly in favor of the experimental group suggests

that the use of game elements such as points, badges, levels, and leaderboards could increase students' motivation, engagement, and active participation. This is consistent with the existing body of literature that shows gamification to be associated with a deeper understanding of the material, as it makes learning more interactive, rewarding, and goal-oriented (Butko, 2022).

In general, this study also supports the impact of gamified environments on the learning experience. For example, instructors may be motivated to gamify their courses to support a sense of achievement and progress to help students increase their intrinsic motivation and effort. In addition, educational institutions may be persuaded to develop and incorporate gamified instructional tools to promote curriculum innovation and respond to heterogeneous learners and motivate classroom engagement. The two practical implications are highly supported by the current study, which shows that gamification can promote both cognitive and affective learning (Koivisto & Hamari, 2019). In conclusion, the significant improvement of the experimental group in the current study further endorses the gamification of learning as an effective pedagogical strategy for student learning and motivation.

Table 19. Mean Gain Scores

	Mean	Standard Deviation	Mean Difference	t-computed	p-value
Control	11.10	8.93	4.04	2.07	0.04
Experimental	15.14	10.35			

Table 19 presents the mean gain scores of the control and experimental groups, showing that both groups improved from pretest to posttest. The experimental group obtained a higher mean gain score of 15.14 compared to the control group's mean of 11.10, indicating greater overall improvement. Although the computed mean difference is the same for both groups at 4.04, the standard deviation values show greater variability in the experimental group, which has a standard deviation of 10.35, compared with the control group's standard deviation of 8.93. The statistical analysis yields a t-computed value of 2.07 and a p-value of 0.04, demonstrating that the difference in performance between the two groups is statistically significant.

From these results, it can be stated that the treatment introduced to the experimental group was more effective in producing learners' achievements as compared to the control group. The significantly higher posttest mean for the experimental group, as verified by the p-value, indicates that the treatment received, which involved the use of digital game-based learning, was more efficacious in increasing students' academic gains.

This assertion can be interpreted to mean that digital game-based learning allowed for relevant progress in the learners' comprehension and conceptualization of the lesson. The existence of a meaningful difference in the mean gain scores shows that the experiment introduced levels of engagement, conceptual retention, and motivation, which were not present among the participants in the control group. In other words, these results suggest that technology-integrated strategies may promote the development of enhanced learning outcomes.

The above implications have significant impact for educational practice as well. The positive outcomes align with the work of Bakhsh et al. (2022), supporting the effectiveness of digital game-based learning as an instructional strategy that can maintain students' motivation and learning achievement. While the higher variance in the experimental group might signal a certain degree of inconsistency in individual learning, the general positive impact still suggests that with well-designed support and scaffolding, digital game-based learning can be integrated into the set of strategies useful for teachers today.

CONCLUSION

Based on the findings, the following conclusions are presented:

The interactive game-based learning settings clearly improved active learning in the experimental group. A significant level of general student involvement accompanied this increase in active learning, marked by favorable emotional reactions. These results imply strongly that the intervention produced a learning environment that was both actively interesting and supportive of good student affect.

The findings show that both regular and gamified teaching enhanced learners' achievement. However, IGLE produced better results in terms of the difference in achievement from the pretest to the posttest. In the achievement test, the experimental group had greater gains than the control group. The experimental class had similar low mastery as the control class in the pretest but ended with higher mastery in the posttest. Thus, it is concluded that the Interactive Game-based Learning Environment using Wordwall was a more effective way to improve the achievement of Grade 7 learners in Araling Panlipunan compared to traditional teaching.

The ratings for all dimensions of engagement being consistently very high indicate that IGLE did not just make lessons fun; it produced intense behavioral, cognitive, and emotional engagement. The learners were not only active, highly motivated, focused, and emotionally positive, but also worked inside the gamified space. This result suggests that the Interactive Game-based Learning Environment effectively provides excellent student engagement in Araling Panlipunan.

The trend of results showed that IGLE promoted a total level of active learning. The learners were not only on-task; they collaborated, communicated, interacted, discussed and were highly engaged in learning activities. Thus, the study was able to conclude that the Interactive Game-based Learning Environment promoted a high level of behavioral, social and cognitive active learning to Grade 7 students as it provided an enriched context of participation and collaboration in Araling Panlipunan.

RECOMMENDATION

The following recommendations were made based on the results and conclusions of the research:

1. Teachers may use the Interactive Game-Based Learning Environment as an alternative pedagogical approach to enhance student performance.

2. Araling Panlipunan teachers may use the procedural approaches under the Matatag Curriculum to improve the students' performance.

3. Teachers may use an Interactive Game-Based Learning Environment (IGLE) to foster learning and encourage students to investigate and uncover novel opportunities in an enjoyable and interactive manner.

4. The school may develop and implement professional development programs for teachers on how to effectively integrate interactive game-based learning environments into their Araling Panlipunan instruction since the results demonstrate the effectiveness of such approaches in enhancing teaching and learning outcomes.

5. Other researchers may conduct further studies about interactive game-base learning environments in other subjects areas to improve the 21st century skills such as creativity and critical thinking.

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