Quizziz: A Game-based Formative Assessment Tool for Enhancing Students Self-Regulated Learning

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ABSTRACT

The primary purpose of this study is to determine whether Quizizz as a formative assessment tool enhances self-regulated learning among grade eight (8) Science learners of Sta. Catalina National High School, Candelaria, Quezon Province, Philippines. The study utilizes a mixed-methods research design to investigate whether Quizizz has the intended effect on the study samples. The study employs purposive sampling to identify the participants of the study. The experimental group (n=24) used Quizizz as an intervention before taking the formative test, while the control group (n=24) was not. The results reveal that the learners from the experimental group perform better than those from the control group. The findings suggest that using Quizizz improves learners' test scores resulting from self-regulated learning. The researcher identifies the grade 8 participants based on their capabilities to access the Quizizz platform.

Keywords:

Quizizz, Formative Assessment, Game-Based Assessment, Self-Regulated Learning.

ABSTRAK

Tujuan utama dari penelitian ini adalah untuk menentukan apakah Quizizz sebagai alat penilaian formatif meningkatkan self-regulated learning di antara peserta didik IPA kelas delapan (8) Sta. Sekolah Menengah Nasional Catalina, Candelaria, Provinsi Quezon, Filipina. Studi ini menggunakan desain penelitian metode campuran untuk menyelidiki apakah Quizizz memiliki efek yang diinginkan pada sampel penelitian. Penelitian ini menggunakan purposive sampling untuk mengidentifikasi peserta penelitian. Kelompok eksperimen (n=24) menggunakan Quizizz sebagai intervensi sebelum mengikuti tes formatif sedangkan kelompok kontrol (n=24) tidak. Hasilnya mengungkapkan bahwa peserta didik dari kelompok eksperimen tampil lebih baik daripada peserta didik dari kelompok kontrol. Temuan

menunjukkan bahwa penggunaan Quizizz meningkatkan nilai tes peserta didik yang dihasilkan dari belajar mandiri. Peneliti mengidentifikasi peserta kelas 8 berdasarkan kemampuan mereka untuk mengakses platform Quizizz.

Kata kunci:

Quizizz, Asesmen Formatif, Asesmen Berbasis Permainan, Self-Regulated Learning.

1.   Introduction

Formative assessment is a tool used in education to guide the process of teaching and learning (Kruger, 2020). The assessment provides information teachers, and students can use to plan and enhance upcoming educational activities. According to several studies, formative assessment increases learning, has a favorable impact on teacher development, and improves student outcomes. Zhang (2018), for example, stated that formative evaluation in class is a habit that leads both the teacher and the student in teaching and learning. When used effectively, formative assessment can significantly improve student achievement and increase teacher effectiveness (Moss and Brookhart, 2020). Ozan and Kincal (2017) asserted that teachers and students evaluate formative assessment positively. The perceived use of formative evaluation relates to higher autonomy, competence, and autonomous motivation (Leenknecht et al., 2020). With the advent of current educational technology, formative assessment enhances the learning process by improving student engagement, saving learning time, ensuring equal participation chances, and providing an engaging and stimulating learning environment (Elmahdi et al., 2018).

Formative assessments can change the classroom culture into one that celebrates learning success. Prashanti and Ramnarayan (2019) provided ten maxims to understand better, appreciate, and implement formative assessments. The defining characteristics of formative assessment can be summed up in the following 10 Fs, listed in the next order of importance: faceless, supports learning, feedback, feedforward, learning-focused, flexibility, quick, frequent, friendly, and fun. The successful teaching and learning process has significantly benefited from formative assessment and the use of technology. Monitoring student progress is the aim of formative assessment, which gives teachers feedback to help them enhance the teaching and learning process. A cutting-edge assessment method called gamified-based assessment incorporates game mechanics into non-game settings to boost student engagement. The critical aspect of game concepts is how they contain enjoyment, zeal, and competition. The theory is that many students, aged around 14-15 years old, who are believed to be at grade 8 level, use different gaming platforms.

Conversely, self-regulated learning (SRL) is the capacity to manage and comprehend students' learning by mastering their learning environment (Zimmerman, 2015). Panadero (2017) claimed that SRL is a crucial paradigm for understanding the cognitive, motivational, and emotional aspects of learning. Several studies have demonstrated the link between formative evaluation and self-regulated learning. SRL and academic achievement have been shown to have a strong and favorable

association. Several studies have found that people with more vital metacognitive awareness perform better in the long run than those without (Tang and Kay, 2014; Broadbent and Poon, 2015; Vanslambrouck et al., 2016). According to Xiao and Yang (2019), the students appear to be developing into self-regulated learners because they actively participate in formative assessment under the teacher's supervision. The practice of formative assessment, according to Granberg et al. (2021), SRL has a significant impact on students' perceptions of their autonomy. Furthermore, SRL of time management, metacognition, critical thinking, and effort regulation were discovered to have strong positive associations with academic success in online contexts and boost students' satisfaction and learning persistence (Raleiras et al., 2020).

The Department of Education Order No. 31 s. 2020 "Interim Guidelines for Assessment and Grading in Light of the Basic Education Learning Continuity Plan" aims to provide direction for the grading system and student learning assessments in the Philippine Educational landscape. With the introduction of contemporary educational technology, formative assessment supports the learning process by increasing student participation, cutting learning time, ensuring equal participation opportunities, and producing an enjoyable and engaging learning environment (Elhamdi et al., 2018). The benefits of incorporating game-based formative assessments into learning have been discovered through numerous studies. According to Liu et al. (2020), the integration of game-based learning and gamification has increased motivation and interest in education; students have put more effort into assimilating the material they are studying and demonstrated noticeably higher learning outcomes. Icard (2014) claims that playing digital games in the classroom helps students develop their ability to deal with success and failure, think critically, and solve problems. A study by May (2020) showed that using technology to generate gamified or game-based learning has positive effects. It has helped establish a learning environment where students are encouraged to work with their peers, engage with the subject, and maintain motivation. According to research, leaderboards, badges, and other game components help create a fun learning environment for kids. The engagement, self-efficacy, and enjoyment of learning among students were all boosted by gamification and game-based learning.
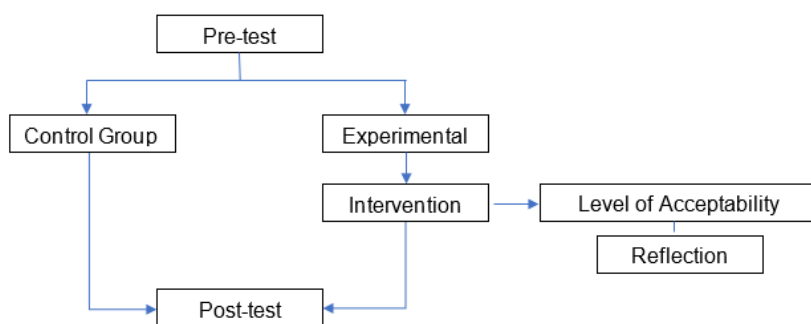
1.1 Conceptual Framework

Figure 1. *The conceptual framework of the study.*

A pre-test/post-test control group design was employed where participants were randomly assigned to either receive an intervention (experimental group) or not (control group). It was ensured

that both groups had the same conditions except that, in addition, the experimental group experienced the treatment. The dependent variables are measured before the intervention (pre-test) and after the intervention (post-test) in single-group pretest-posttest designs. Pre-test and post-test measures are often the same, and changes in the dependent variable from pre-test to post-test are taken to reflect the success of the intervention (Shek & Zhu, 2018). The post-test was administered to the participants in both groups to assess the change in the dependent variable's value from the pre-test to the post-test for each group. Participants from the experimental group answered questionnaires via Google form to evaluate the level of acceptability of the students and their reflection on using Quizizz.

1.2 Research Questionsz

This study aimed to determine whether Quizizz, a game-based formative assessment tool, can enhance self-regulated learning among grade 8 Science learners. Specifically, the research seeks to answer the following questions:

(1) What is the performance level of the learners before and after the intervention?
(2) Is there a significant difference between the control group and the experimental group?
(3) What is the story of the acceptability of grade 8 learners in utilizing Quizizz?
   a. perceived utility and
   b. perceived ease of use; and
(4) How do students feel about Quizizz as a form of formative assessment?

2. Methods

2.1 Research design

The researcher used the pre-test/post-test control group design, the type of experiment where participants are randomly assigned to either receive an intervention (experimental group) or not (control group). A mixed methods research design was employed to identify whether the formative assessment tool Quizizz had the intended effect on the study samples.

2.2 Sampling Technique

Purposive sampling was carried out to identify the respondents of this study. Before conducting the study, the researcher informed the student of the purpose of the experiment through Facebook Messenger. A text message was also sent to their parents informing them of the study. The data gathered was treated with the utmost confidentiality.

2.3 Respondents of the study

The study comprised 48 grade eight (8) students from a total population of 452. The researcher conducted the study at the grade 8 level of Sta. Catalina NHS because the researcher teaches that level at the said school, and the respondents belong to her class.

2.4   Research Procedure

This study had two phases. The first phase used localized pre-test and post-test questionnaires to assess the performance level of the participants in Science. The second phase used a survey questionnaire via Google Forms to determine the student's perceived level of acceptability in using Quizizz. The survey form includes reflection questions to help the researcher understand how the learners felt when using the platform. The master and head teachers in the Science department validated these instruments.

Both groups were given the same lesson content in Science. The learners in the experimental group utilized the Quizizz platform for their formative assessment. They were given a link to join the game via Facebook Messenger or text. The quiz was assigned as an assignment with a specific deadline. The data collected were tabulated and analyzed, and statistical treatment was applied. To determine the significant difference in the level of student performance, a dependent t-test was utilized. This study focused on integrating the Quizizz platform as a formative assessment to enhance students' self-regulated learning. The participants of this study are composed of forty-eight (48) grade 8 learners of Sta. Catalina National High School, Candelaria, Quezon, enrolled in Modular Distance Learning. The study was conducted in the fourth grading period of the school year, 2020-2021. The researcher identified the grade 8 participants based on their willingness and capabilities to access the Quizizz platform. The selection was based on their academic performance in Science 8, internet access capability, and desire to participate in the study. The scope of the lessons used in this study was taken from the grade 8 Science fourth quarter topics in Digestive System, Biodiversity, Interactions, and Cellular Reproduction and Genetics.

3.   Results and Discussion

The mean of the tests administered to both groups is shown in Table 1. The control group's mean score on the pre-test was marginally higher than its mean on the post-test (M=13.83, SD 5.39) (M=13.46, SD 4.85). However, the mean post-test score for the experimental group is higher than the mean for the pre-test (M=15.63, SD= 5.1) (M=18.88, SD= 2.52). The standard deviation indicates that scores in the post-test are more evenly distributed than pre-test scores, which can be attributable to the delivered intervention.

Table 1. Summary of data between the pre-test and post-test scores.

Test	N	CONTROL GROUP				EXPERIMENTAL GROUP				Interpretation
		Mean	SD	Difference between means	t-value	Mean	SD	Difference between means	t-value	
Pre-test	30	13.83	5.39			15.62	5.1			
				-0.37	-1.063			3.26	2.47	Significant
Post-test	30	13.46	4.85			18.88	2.52			

The usefulness of Quizizz in raising test scores is supported by numerous research. For instance, Zhao (2019) reported higher scores on the satisfaction of using this app and higher scores on the instructor's teaching evaluation after doing class exercises using Quizziz. The game significantly enhanced student performance and learning because it increased students' interest in education (Setyaningsih, 2022). Another study by Hidayati et al. (2021) used Quizizz as a pre-test and post-test to assess the efficacy of small-group learning. The results showed that post-test scores were significantly higher than pre-test scores, reported improved concentration, and increased understanding of subject matter among participants.

The summary in Table 2 shows that the mean difference between the experimental and control groups' post-test is 4.85. The p-value is < .00001. Therefore, based on the analyzed data, there is a significant difference between the control group and the experimental group. The findings support Nikolaou et al.'s (2019) study, which found that game-based assessments can predict academic performance better than personality and cognitive ability tests. The survey by Sanchez- Rivas et al. (2018), which found that game-based examinations offered considerable benefits related to enhanced motivation and greater capacity of the assessment activities to continue the learning process, is also in line with the conclusion. The data also backs up the assertion of Nietfeld (2017) that gamification of assessment increases the chance of promoting SRL skills as outcomes. Students who received the Quizziz intervention indicated they were more driven and enthusiastic about learning physics, and their performance in a particular unit improved (Capinding and Tangonan, 2022).

Table 2. Summary of data between the experimental and control group

Post-test	N	Mean	Standard Deviation	Mean Difference	t-value		Interpretation
					Computed	Tabular	
Experimental Group	30	18.88	2.52	5.42	4.85	.000015	Significant
Control Group	30	13.46	5.85				

Game-based formative evaluations have been shown to enhance self-regulated learning efficiently. Patisung and Koowuttayakorn (2020) found that game-based formative evaluations improved students' capacity to control their education. The technique increased their involvement and motivation, and students focused better on the subject. According to the study, these evaluations can be used to assist learners in developing self-regulatory learning practices. Yuniarto (2021) believed that Quizizz has a favorable impact on student engagement and learning outcomes.

The second survey phase asked students about their experience using the Quizizz platform. On a four-point scale, from strongly disagree (1) to strongly agree (4), respondents were asked to indicate in the first section of the survey questionnaire. Table 3 shows their opinions on the acceptability rating of the perceived utility and perceived ease of use of the Quizizz application. Participants were also asked to provide feedback about their experience in utilizing the game-based activity.

"I always want to win when I play Quizizz games. I enjoy live games where I can play against my classmates. I get excited whenever I top the leaderboard. The colors are appealing to me." - *Student A*

"Playing Quizziz with my classmates unleashed my competitive nature. I've been wanting to play something like this." - Student B

"Quizziz is interesting and fun to do. It has an attractive theme and is easy to play, and you can't cheat while doing the game." – Student G

Table 3. Summary of the level of acceptability in using the Quizizz platform

Level of Acceptability	Mean	Interpretation
A. Perceived Usefulness of Quizizz		
1. Quizizz improves my test scores in Science.	3.4	Agree
2. Quizizz allows me to review the questions I missed.	2.8	Agree
3. Quizizz provides me with immediate feedback.	2.88	Agree
4. Quizizz helps me remember Science concepts.	3.44	Agree
5. Quizizz shows my progress.	3.4	Agree
B. Perceived Ease of Use of Quizizz		
1. I can play Quizizz easily.	3.04	Agree
2. I can easily access the Quizizz platform.	2.84	Agree
3. I find the user interface of Quizizz engaging.	2.8	Agree
4. I can easily customize the game settings.	2.84	Agree
5. I find the Quizizz platform easy to use (user-friendly).	2.92	Agree

The acceptance of grade 8 students is generally advantageous. Based on the collected data, ninety-five percent (95%) of the respondents enjoyed playing the game-based activity. The background music and leaderboard contribute to the competitive mood of the participants. Ninety percent (90%) of the respondents thought Quizizz's graphics and gameplay were appealing. The themes and the memes incorporated in the game provided additional excitement to the students while playing. Quizizz is simple to use, entertaining, and increases motivation; there are signs that students plan to utilize the tool in the future.

"My teacher allowed me to repeat the game, which made me remember the lesson. I can also do the activity at home, any time." – Student C.

"I can see the results right away. The game shows me how I perform compared to my classmates." – Student F

While 95% of respondents thought that game-based evaluations may improve self-regulated learning, the Quizziz platform is not only used for live assessments. Activities can be assigned as synchronous classes and homework where students can repeat the action. This is aligned with the study by Jannah et al. (2020), which revealed that students perceived online assessments as more

effective and time-saving because they can do their evaluations anywhere and anytime, not only in classrooms. Zuhriyah and Pratolo (2020); Nguyen (2022) reiterated that students were highly grateful for Quizizz's feedback feature, which encouraged them to review and comprehend their mistakes chosen responses. Quizizz assisted students in developing self-regulated learning and enhancing their memory of materials.

"It's frustrating! The game keeps loading. My cell phone load is not enough to complete the game." – Student D

"My connection was slow. I can't join the live game. Good thing I can still play the offline game." – Student E.

However, 75% of respondents would advise teachers not to use Quizizz due to their erratic internet connections, Alvarez (2020), leading to anxiety-inducing game timers and inability to save their progress (Rotas & Cahapay, 2020) and unable to submit outputs on time, Culajara et al. (2022). According to Cakrawati (2017), the most common obstacle experienced during online learning is a need for more Internet access. Cakrawati's claim that studying through internet materials is not always easy has been proven correct.

The responses provided by the participants in their reflections are comparable to those of Zhao (2019), whose research found that Quizizz is simple to use, beneficial for increasing engagement, and encourages users to review and comprehend the flaws in the chosen answers (Zuhriyah and Pratolo, 2020), Further study by Ju and Adam (2018) revealed that Quizizz as a teaching tool makes students more interested and more focused on the class. Additionally, a survey by Ju and Adam (2018) found that using Quizizz as a teaching tool increases students' interest and concentration in class. According to Suharni and Asty (2021), students respond favorably to using Quizziz in their studies. Students are more engaged and believe Quizizz makes the usually tedious task of learning grammar more enjoyable, Febriani et al. (2022) and efficiently ignites students' enthusiasm, Basuki and Hiyadati (2019). Most students agree that Quizizz improves online learning (Yanti et al. al. (2021).

4. Conclusion

The study focused on using Quizizz as a formative assessment tool to enhance self-regulated learning among Sta's grade eight (8) Science learners. Catalina National High School. Based on the findings, the following conclusions were made: (1) The test scores of the experimental group are higher than the control group in the post-test. Based on the scores of the learner's pre-test and post-test, Quizizz contributed to the increased test scores; (2) Results and discussion showed that there is a significant difference between the academic performance of the control group and the experimental group; (3) The learner's responses to the level of acceptability in terms of perceived usefulness and perceived ease of use are both positive. Hence, the integration of game-based assessment in the class aroused interest and promoted self-regulated learning among the experimental group; (4) The

learner's reflection revealed Quizizz enhances students' self-paced learning through game-based activities.

However, the study was only used in teaching Science in the fourth quarter, a timespan of 10 weeks. As a result, this research might not reflect other classroom practices that use the application Quizziz as a part of their learning and assessments. Additionally, all respondents were selected from only two sections. Therefore, studies should be carried out with more students across year levels to generalize the findings.

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