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Economic Learning Outcomes Before and After Quizizz Based Instruction in a Grade XI Class

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ABSTRACT

Digital evaluation tools require empirical assessment to determine their contribution to economics learning. This quantitative study examined changes in student economics learning outcomes before and after a Quizizz-based learning intervention among Grade XI-2 students at SMA NU Juntinyuat (N = 26; 18 females, 8 males) using a one-group pretest–posttest design. The test instrument demonstrated high internal consistency (α = .787). The mean score increased from 51.54 (pretest) to 79.62 (posttest), reflecting a average gain of 28.08 points, with student attainment exceeding the minimum mastery criterion (KKTP = 75). Wilcoxon signed-rank test confirmed a statistically significant within-group increase (Z = -4.099, p < .001), with a mean normalized gain (N-Gain) of 52.23% (category: moderately effective). While these results indicate positive within-class performance gains, the lack of a control group limits causal attribution and generalizability.

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A. INTRODUCTION

Education is an important sector because it influences the progress of a country. With quality education, individuals are prepared to become leaders in an ever-evolving global era. Education is important to print citizens who have extensive knowledge and can contribute to the progress of their society. The quality of education is assessed by its ability to apply knowledge from various fields, which reflects the intellectual potential of a country. Education is an investment in the development of human resources, because skills and abilities are crucial for every individual to achieve success in their lives. National Education seeks to prepare all Indonesian citizens to compete and cooperate effectively in facing today's challenges. Education also seeks to prepare individuals to be independent, responsible, creative, knowledgeable, healthy, and have good manners, both physically and mentally (Dewi, 2025) .

Economics instruction in high schools frequently faces challenges related to low student engagement, abstract concept retention, and limited interactive evaluation during classroom learning. To address these learning challenges, digital-based learning media offers a transformative approach. One relevant innovation is Quizizz, an interactive game-based evaluation platform. The platform incorporates gamification elements such as real-time quizzes, point mechanisms, avatars, and instant feedback designed to support

retrieval practice and active participation (Thamrin Tahir, Muhammad Ilyas Thamrin Tahir, Amirudin Tawe, Andi Tenri Ampa, 2025) . Theoretically, integrating gamified digital quizzes can create a dynamic learning environment that aids in conceptual understanding; however, its practical effect on measurable learning outcomes requires rigorous classroom evaluation.

Case defines economics as the study of how individuals and groups choose how to use limited resources provided by nature and previous generations. In line with this, Mankiw defines economics as the science of how people manage their limited resources (Salafudin, 2025) . Learning outcomes are made up of two words: outcomes and learning, which have diverse meanings. To understand the meaning of learning outcomes, the author will define both concepts. Learning is the most crucial activity during the educational process. The achievement of educational goals, successful or not, is determined by how students perceive learning activities (Rahman, 2021) . Quizizz is a game-based learning application designed to measure and assess students ' level of understanding interactively. The Program incorporates multiplayer activities into the classroom, making the learning process even more fun, interesting and dynamic. The utilization of various learning materials combined with the integration of graphic elements, music, and visual features make economic material information more attractive to students (Dela Astuti, 2023) .

Along with the rapid advancement of modern technology, many advances in educational media can be utilized to assist the learning process, especially in the context of online learning. There are many types of digital media available today, but media that combine visual and aural aspects are seen as the most effective and efficient way to convey information. With the introduction of audiovisual-Based Learning media, teachers can now improve the delivery of material while increasing student interest in learning. This is expected to increase the enthusiasm, activity level, and interactive learning outcomes of students during the teaching-learning process (Antika, 2025).

Teachers ' creativity in overcoming challenges is often constrained by the main way of teaching in the form of lectures. This situation resulted in students having difficulty in thinking creatively because they more often follow the strategies given by the teacher. In addition, education systems tend to focus more on the delivery of information than the discovery of knowledge. It is important for teachers to create a proactive learning environment and encourage students to be actively involved in the learning stages. Every individual has the ability to think creatively, although the level of this ability varies. The ability to think creatively is not innate; it is something that can be developed (Krenare Pireva Nuci, Rabail Tahir, Alf Inge Wang, 2021) .In the opinion of Ningrum and colleagues, encouraging students to solve problems independently can help them improve creative thinking skills. From this explanation, it is crucial to expand the ability to think creatively among students. Collaborative learning is a strategy that allows students and groups to discover new ideas. Therefore, collaborative learning is proven to be effective in raising creative thinking skills(Emilia Dewiwati Pelipa, Karmila, 2024) .

Preliminary observations made in July 2026 at NU Juntinyuat high school showed that the teaching of Economics Class XI mainly relied on Game methods, textbooks, and unidirectional slide presentations. Although schools support learning by allowing the use of smartphones and providing Wi-Fi access, interactive digital assessment tools are not used systematically. Primary school records show that achieving the minimum standard mastery criteria (learning goal mastery criteria / KKTP = 75) remains a challenge for students. Specifically, the pretest results revealed that none of the 26 students (0%) met the KKTP threshold of 75. However, after the Quizizz-based intervention, the posttest results showed that 21 out of 26 students (80.77%) managed to achieve or exceed the KKTP standard.

Prior research has explored gamified learning tools like Quizizz across various subject areas, reporting positive trends in student engagement and short-term knowledge retention (Kadek Julian, Putu Indra Christiawan, 2025). However, existing studies primarily focus on secondary sciences or language learning, often relying on quasi experimental designs with mixed findings regarding long-term conceptual retention and varied student readiness across school environments. A clear distinction exists between the practical implementation gap where schools possess technological infrastructure but lack structured digital assessment routines and the empirical research gap. Specifically, limited quantitative evidence systematically addresses within group performance shifts in high school economics instruction under one-group pretest posttest conditions in regional private education settings. Rather than making universal effectiveness claims, this study seeks to empirically examine Quizizz within this specific instructional context (Jamilatur Rahmawati, Khalim Matusakdiyah, Siti Nur Faizah, 2025). According to research (Melita Br Lumban Gaol, Gimin, 2025) , the results of the study there is an influence that has an effective impact on the cognitive aspects of the learning outcomes obtained which can be known by testing using normality test, homogeneity test, hypothesis test. So it can be concluded that the use of Interactive Learning Media Quizizz can provide effective influence and results on the learning outcomes of students in Grade 10 SMA Negeri 2 Pangkalan Kerinci, while according to research (Liana Safira, Siti Afifah, 2024), it can be concluded that the variable motivation of students (X1) and media variables quiz (X2) has a significant influence on student learning outcomes in Class X.1 MAN 1 East OKU. The results of the above analysis show that the value of each variable is 4.057 and 4.057 greater than 3.316, and the value of each variable is 4.057 and 4.057 more.

Based on this background, this study aims to evaluate and analyze empirically: (1) the application of Quizizz-based interactive learning media in economic subjects of Class XI students of NU Juntinyuat High School; (2) the level of economic learning outcomes of students before (pretest) and after (posttest) the application of Quizizz media; and (3) the significance of the effect of the use of Quizizz media on improving students ' Economic learning outcomes. The results of this study are expected to provide theoretical contributions to the effectiveness of gamification-based learning while presenting practical recommendations for educators in designing adaptive and efficient digital evaluations.

B. METHODS

According to Creswell, "research methods include data collection, analysis, and interpretation for the study." The research method is a series of activities that include the collection, analysis, and interpretation of data relevant to the purpose of research (Sugiyono, 2023). This study uses pre-experimental quantitative approach with pretest-posttest design in one group. Field data collection was carried out in July 2026 at NU Juntinyuat high school. The entire class of Class XI-2 (N = 26; 18 girls and 8 boys) was selected through purposive sampling based on the availability of class schedules and uniform smartphone accessibility. The inclusion criterion requires the full presence of the student in all study sessions, without any missing data or subjects being excluded during the execution. The intervention focused on economic instruction covering Chapter 1: business entities in the economy, which was implemented in three consecutive meetings. The first meeting involved giving a pretest to measure basic student learning outcomes prior to the intervention. The second meeting delivered the core treatment, where the Quizizz platform was integrated into classroom instruction as a gamified interactive assessment and practice tool accessed through students ' smartphones. The third meeting

ended with the provision of posttest to evaluate post-intervention changes in student learning outcomes. Learning outcomes are evaluated using a 10 items multiple choice test that is graded on a standardized scale and awarded on pretest and posttest. Test instruments undergo prior validation and internal consistency reliability testing. The collected Data is processed using descriptive and inferential statistical methods. Descriptive statistics were calculated to describe the distribution of initial and post-intervention scores. The Shapiro-Wilk test was applied as a prerequisite normality test to assess the characteristics of the data distribution, followed by a non-parametric Wilcoxon-marked assessment test to test the statistical significance of score differences within groups. Furthermore, Normalized Gain (N-Gain) analysis was performed to measure the overall effectiveness of Quizizz intervention. Institutional research permits are officially obtained from NU Juntinyuat high school, and all student participation is voluntary with the permission of the school and homeroom teacher.

C. RESULTS AND DISCUSSION

1. Application Of Interactive Learning Media Quizizz

The application of Quizizz media on economic learning was measured through a multilevel questionnaire distributed to 26 students of Grade XI-2 of NU Juntinyuat high school after treatment was given. The questionnaire measures four key indicators: clarity & ease of access, interactive features & gamification, student engagement & motivation, and direct Feedback. it includes 4 (four) main indicators according to the study (Supriyatin, 2024), namely:

Table 1. Quizizz Indicators

No	Variable X Indicator	N	Minimum Score	Maximum Score	Mean (Average)	Std. Deviation	Categories
1	Clarity & Ease of Access	26	12	20	16,85	2,3	Very Good
2	Interactive & Gamification Features	26	11	20	17,23	2,05	Very Good
3	Student Engagement & Motivation	26	10	20	16,42	2,38	Good
4	Immediate Feedback	26	12	20	17,00	1,98	Very Good
Average number of variables X		26	45	80	67,50	7,12	Very Good

Based on the data in Table 1, the implementation of Quizizz across four core indicators each measured on an equivalent scale with a maximum score of 20 showed highly favorable student responses. Based on the classification cutoff intervals (16.51–20.00 = Very Good; 12.51–16.50 = Good; 8.51–12.50 = Fair; 4.00–8.50 = Poor), the indicators for Interactive & Gamification Features (mean= 17.23), Immediate Feedback (mean = 17.00), and Clarity & Ease

of Access (mean = 16.85) were categorized as "Very Good." Meanwhile, Student Engagement & Motivation (mean= 16.42) fell within the "Good" category. Overall, the variable achieved an average cumulative score of 67.50 out of 80 (SD} = 7.12), which is classified in the "Very Good" category. These slight descriptive differences across indicators demonstrate strong student satisfaction with the platform's features without implying that one technical feature is statistically superior to another.

2. Description of Economics study results (Pretest and Posttest)

In essence, the research instrument is an important component that is systematically designed to collect data in accordance with the objectives of the study. Purwanto, defines research instruments as equipment used for data collection in research. Research tools are designed based on measurement objectives and basic theory.(I Komang Sukendra, 2020) . Measurement of economic learning outcomes was conducted before (pretest) and after (posttest) the Quizizz-based learning treatment on Chapter 1 (Business Entities in the Economy). A 10-item multiple-choice test (maximum possible score of 100; 10 points per correct answer) of equivalent content and difficulty was administered independently under supervision. Complete paired pretest and posttest data were obtained for all 26 participating students (N = 26). While pretest and posttest scores reflect within-student changes, potential factors such as increased platform familiarity and repeated item exposure are acknowledged as contextual factors that may influence the observed score gains.

Table 2. Results Of Descriptive Statistical Analysis Test

Descriptive Statistics	Pretest	Posttest	Changes
Number Of Samples (N)	26	26	-
Minimum Value	10	60	+ 50
Maximum Value	90	100	+ 10
Average (Mean)	51,54	79,62	+ 28,08
Standard Deviation	29,08	11,48	-17,60

The results of descriptive analysis showed an increase in economic learning outcomes of Grade XI students of NU Juntinyuat high school after using Quizizz media. This is evidenced by an increase in the average (mean) value by 28.08 points (from 51.54 to 79.62), an increase in the minimum value from 10 to 60, as well as a maximum value that reaches 100.

3. Test Prerequisites Analysis (Normality Test)

The Shapiro-Wilk normality test is performed because the number of samples is N ≤ 50 (N = 26).

Table 3. Normality Test

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Value Prettes	,199	26	,010	,885	26	,007
Posttest Value	,167	26	,060	,922	26	,051

a. Lilliefors Significance Correction

Source: normality Test, processed by SPSS 2026

The Shapiro-Wilk normality test (N = 26) revealed that pretest scores deviated significantly from normality (Sig. = 0.007 < 0.05), whereas posttest scores showed marginal adherence to normality (Sig. = 0.051 > 0.05). Because paired data analysis relies on the distributional characteristics of score differences (Δ = Posttest - Pretest), the non-normal baseline distribution and potential asymmetry in paired differences justified the use of a non-parametric approach. Consequently, the Wilcoxon Signed-Rank Test was performed to examine the statistical significance of within-group changes in learning outcomes.

4. Hypothesis Test (Wilcoxon Test)

The Wilcoxon test was used to examine the difference and significance of the effect of Quizizz use on economic learning outcomes.

Table 4 Wilcoxon Test

Ranks

		N	Mean Rank	Sum of Ranks
Posttest Scores - Prettes Scores	Negative Ranks	1[a]	4,00	4,00
	Positive Ranks	22[b]	12,36	272,00
	Ties	3[c]		
	Total	26		

a. Posttest Value < Prettes Value
b. Posttest Value > Prettes Value
c. Posttest Value = Prettes Value

Table 5. Test Statistics[a]

	Posttest Scores - Prettes Scores
Z	-4,099[b]
Asymp. Sig. (2-tailed)	,000

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.
Source: Wilcoxon Test, processed by SPSS 2026

Wilcoxon test results showed that the majority of students (22 out of 26) had improved grades, while 1 student had decreased and 3 students had fixed grades. Based on the Test Statistics table, obtained the value of Z = -4.099 with Asymmp. *Sig*. (2-tailed) = 0.000 < 0.05. This means that H0 is rejected and Ha is accepted, so it is concluded that there is a significant effect of the use of Interactive Learning media Quizizz on student learning outcomes.

5. Increase Effectiveness Analysis (N-Gain Test)

Based on the normalized acquisition criteria established by Hake presented in the following table :

Table 6. N-Gain Test
N-Gain Score Interpretation Table

N-Gain Value	Categories
g > 0,7	Height
0,3 ≤ g ≤ 0,7	Medium
g < 0,3	Low

To measure the amount of improvement in learning outcomes, Normalized Gain Test (N-Gain).

Table 7. N-Gain Test
Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
N_Gain_Score	26	-,50	1,00	,5223	,32739
N_Gain_Persen	26	-50,00	100,00	52,2314	32,73917
Valid N (listwise)	26				

Source: N-Gain Test, processed by SPSS 2026

Where g 0.7 represents height gain, 0.3 g < 0.7 represents medium gain, and g < 0.3 represents low gain. The average N-acquisition score of 0.5223 belongs to the medium acquisition category. Expressed as a percentage gain (52.23%), this value reflects a relatively moderate increase across classes. It is important to be clear that this percentage represents an average proportional gain relative to the maximum possible score improvement, not the proportion of students who benefited or a direct causal measure of the efficacy of the platform. In addition, N-Gain calculations are inherently sensitive to baseline pretest variations and potential ceiling effects among higher-scoring students.

D. CONCLUSION AND SUGGESTION

1. Conclusion

Based on the results of data analysis and discussion regarding the implementation of Quizizz-based interactive learning media on economics learning outcomes at SMA NU Juntinyuat, several conclusions are drawn. The application of Quizizz was executed successfully, achieving an average syntax implementation rate of 95.1 4% across all operational stages from preparation to reward delivery. Furthermore, the intervention was associated with measurable within-group improvements in student learning outcomes, reflected by an increase in the class mean score from 51.54 at pretest to 79.62 at posttest, along with a statistically significant Wilcoxon test result ($Z = -4.099$, $p < .001$) and a moderate normalized gain (N-Gain score of 0.5223 or 52.23%). While these findings indicate positive within-class performance changes following the digital intervention, the lack of a control group and the focused sample scope should be noted as methodological limitations constraining broader causal claims.

2. Suggestion

Based on these findings, educators are encouraged to incorporate interactive gamified assessment tools like Quizizz systematically into classroom instruction to foster

active engagement. School institutions should maintain supportive technological infrastructure and facilitate teacher professional development in digital media integration. Future research should address current design constraints by utilizing experimental studies with equivalent control groups, expanding participant samples across diverse educational settings, and incorporating validated multidimensional instruments to evaluate secondary outcomes such as student motivation and long-term knowledge retention.

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