

The Predictive Effect of Using Wayground as A Summative Assessment on Senior High School Students' Learning Outcomes

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Abstract: Despite the increasing adoption of digital technology in education, summative assessments in many Indonesian high schools continue to rely on conventional methods that often limit student engagement and timely feedback, potentially affecting learning outcomes. Although, previous studies have explored gamified digital platforms for learning, empirical evidence on the predictive effectiveness of Wayground as a summative assessment tool in senior high school economics education remains limited. Therefore, this study examined the predictive effect of using wayground as a summative assessment on senior high school students' learning outcomes at SMAN 2 Sungai Kakap. A quantitative survey design was employed involving 31 tenth-grade students selected through simple random sampling. Data were collected using validated and reliable questionnaires and documentation of students' summative assessment scores. The data were analyzed using descriptive statistics and simple linear regression with IBM SPSS Statistics 25. This study found that the use of Wayground as a summative assessment is positively and significantly associated with senior high school students' learning outcomes ($p < 0,001$), with an R^2 value of 0,734.

Keywords: Wayground, Summative Assessment, Learning Outcomes, Gamified Assessment, Economics Education.

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INTRODUCTION

The use of digital technology has proliferated and transformed all aspects of life, including education. Technology integration in the classroom serves as both an assessment tool and a learning medium. The use of technology in education has a positive impact, making learning more predictive effective and interactive, which is expected to improve student learning outcomes (Andini et al., 2025). A key factor in raising the caliber of human resources is education with character, broad intellectual capabilities, and noble morals. This is consistent with Law Number

20 of 2003 defining the National Education System's concept of education, "Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential for spiritual and religious strength, personality, self-control, noble character, intelligence, and the skills needed by themselves, society, the nation, and the state."

Learning outcomes are the primary indicator of the extent to which students have achieved learning objectives (Rohana et al., 2024). A crucial aspect of education is knowledge and understanding, reflected in learning outcomes. Learning outcomes are the abilities that students have after receiving learning experiences, which show how proficient they are with the topics they have studied (Aisah, 2023). Learning outcomes reflect the level of mastery of knowledge, attitudes, and skills acquired by students after the learning process (Ramadhani et al., 2026). Sabariah et al., (2024) define learning outcomes as an educational evaluation of student success in various subjects taught in school, including knowledge, expertise, or skills. Enhancing student learning outcomes is the key to raising educational quality, and assessment can help achieve this.

In the context of modern education with an independent curriculum, learning outcomes are measured not only by academic grades but also by student engagement, learning interest, critical thinking skills, and comprehensive understanding of learning concepts. According to Sugihartono (in Wardah et al., 2021) internal and external factors are the two categories of elements that predictive effect learning outcomes. Internal elements include things like interest, drive, and intelligence that come from within the learner. In the other hand, external influences are those that come from outside, such learning quality and media. Through summative assessments conducted by teachers and utilizing the learning outcomes obtained, teachers can create more predictive effective learning in the next meeting or semester (Dwi et al., 2025). However, field research shows that most students' learning outcomes still face various problems. Low student learning outcomes are often influenced by the use of monotonous, less interactive evaluation methods, and the lack of optimal use of technology (Nurfuady & Sri, 2025). The low learning outcomes of students in grade X of SMAN 2 Sungai Kakap as seen in Table 1.

Table 1. Learning Outcomes of Summative Assessment of First Semester Students of Grade X of SMAN 2 Sungai Kakap for the 2025/2026 Academic Year

No	Class	Value Interval		Number of Students
		< 76	≥ 76	
1.	X A	24	5	29
2.	X B	15	14	29
3.	X C	27	2	29
4.	X D	20	7	27
	Total	86	28	114
	Percentage	75%	25%	100%

The condition is also evident at SMAN 2 Sungai Kakap. Initial observations and school documentation indicate that most 10th-grade students have not achieved the expected level of mastery in economics. Of the 114 students, only 28 (25%) met the minimum mastery criteria, while 86 (75%) scored below the required standard. These findings suggest that improved assessment practices are needed to support better student achievement. Because assessment is an integral part of the learning process, selecting appropriate assessment media is expected to create a more engaging learning experience and encourage students to sustained attention during the evaluation.

Many teacher still use conventional paper-based assessments, which quickly make students bored, lose focus, and become unmotivated to participate in the process of evaluating

learning. Low student participation during class and a drop in their learning outcomes are the results of this circumstance. This phenomenon is often found in real-world situations in schools, especially after the implementation of the Independent Curriculum, which demands more interactive, student-centered, and digital technology-based learning.

Learning outcomes can be affected by a number of things, including learning media, learning motivation, evaluation models, student involvement, and the atmosphere created by the teacher. When the learning evaluation process is conducted interactively, in the implementation of the learning approach encourages students to participate more actively in the learning process, thereby contributing to significant improvements in learning outcomes. Ulfa et al., (2026) also explain the predictive effectiveness of the learning process largely depends on evaluation methods that are conducted efficiently and appropriately, as they contribute to continuous quality improvement. Therefore, the transformation of 21st – century education requires teachers to be competent in utilizing technology as a learner-centered digital learning resource that incorporates interactive and innovative features to accommodate and characteristics of contemporary digital-native students. In the implementation of the independent Curriculum, assessments serve not only functioning beyond the measurement of learning outcomes by facilitating instructional improvement and student development crucial component in supporting student-centered learning processes. Technology has been extensively utilized by teachers to support the implementation of learning evaluation processes (Ibadatul et al., 2023).

However, on-the-ground conditions indicate that assessment implementation in most schools is still dominated by conventional methods based on written worksheets (Ariani et al., 2025). The monotonous evaluation process can lead to students being less motivated to face the assessment (Andika et al., 2024). Teachers also often encounter difficulties in providing prompt feedback due to the time-consuming correction process. This can impact student learning outcomes, particularly in terms of student engagement, conceptual understanding, and motivation. These issues align with research on gamification-based digital assessments, which found that conventional learning evaluations were considered less engaging, necessitating the need for more interactive and enjoyable digital assessment innovations (Tri et al., 2023).

One digital assessment innovation that is increasingly being used by schools to improve the quality of learning is Wayground (Annisa & Erwin, 2021). Wayground, formerly known as Quizizz, is a digital learning platform that underwent rebranding while retaining its core features for assessment, formative feedback, and interactive learning activities. Although many previous studies published before the rebranding refer to the platform as Quizizz, they examine the same educational technology. Wayground is a development of the Quizizz platform that provides interactive gamification-based quiz features with engaging visuals, a leaderboard system, automatic scoring, and rapid feedback on student answers (Abroto & Na'iah, 2025). Fazriyah (in Thowijah & Susapti, 2022) explains that the Wayground application supports learning, from creating materials, exercises, and quizzes with engaging visuals. Teachers can add images or videos to questions. Furthermore, teachers can create interactive PowerPoint presentations and videos through Wayground. The use of gamification concepts in assessment makes the evaluation process more enjoyable, thereby increasing student motivation and engagement. The Wayground platform is designed to help teachers create more interactive learning and assessment through the integration of educational games and automatic analysis of learning outcomes (Verawati et al., 2026).

Previous studies have reported that Wayground improves student motivation, class participation, digital engagement, and learning outcomes across a range of subjects and educational levels. Verawati et al., (2026) research on the use of Wayground media showed that

the majority of students achieved a high level of mastery after using Wayground digital quizzes. (Annisa & Erwin, 2021) Showed that the Quizizz application had an predictive effect on the science achievement of fourth-grade students enrolled at SDN Sumur Batu 08, Central Jakarta. According to this study, the Quizizz app makes students more active because it provides interactive learning and provides fun game-based exercises or quizzes. Research by Nurfuady & Sri (2025) shows that the Quizizz application has an predictive effect on student learning outcomes. In addition, research by Ekantini & Damayanti (2023) shows that the use of Quizizz as a learning evaluation medium can improve student concentration, motivation, and understanding of learning materials. Although digital-based assessment has been introduced into educational practice, its potential to enhance students' learning outcomes has not yet been fully realized. Many teachers still prefer conventional evaluation due to limited technological understanding resulting from a lack of training in using digital platforms.

While most schools have now entered the era of digital learning, the implementation of digital assessments remains suboptimal. This is because teachers' technological competency remains relatively low, and many remain confused about Wayground's features (Dwi et al., 2025). Teachers tend to use technology solely as a medium for delivering material, while learning evaluations are still conducted conventionally. However, in the field, students are more interested in using interactive digital media than written tests. Conventional assessments quickly lead to student boredom, and feedback is slow due to manual corrections.

The review of previous studies indicates that an important research gap remains. In particular, limited attention has been given to investigating the effectiveness of Wayground as a digital assessment platform for improving students' learning outcomes. While there are several studies on the use of Wayground from the perspective of student motivation and perception, empirical studies linking it to learning outcomes at the high school level are still very limited, particularly when used as an evaluation tool. Previous research has not specifically examined the extent to which Wayground can improve competency in complex indicators, such as student analytical skills and name writing. Quizizz, however, still lacks features upgrades. Therefore, empirical research linking digital quizzes with student learning outcomes is needed. This step is crucial to demonstrate whether the gamification elements in Wayground not only spark enthusiasm but also predictive effectively strengthen students' understanding and critical thinking skills regarding expository material.

The relevance of examining this limitation is based on Wayground's characteristics, which integrate summative assessment, gamification, and real-time feedback, which are considered capable of helping teachers precisely identify student learning barriers. By assessing learning outcomes through the Wayground platform, this study can reveal Wayground's influence in supporting improved student learning outcomes. The research's novelty lies in its focus on Wayground as a digital assessment platform, its measurement of Wayground's influence on student learning outcomes, its use of a quantitative questionnaire-based approach, its assessment of the actual state of student learning outcomes in schools, and its alignment with the objectives of the Independent Curriculum as well as ongoing initiatives to integrate digital technology into education. Based on this description, this study aims to examine the predictive effect of using Wayground as a summative assessment on senior high school students' learning outcomes through a quantitative explanatory survey. Specifically, the study investigates whether students' use of Wayground significantly predicts variations in their learning outcomes.

This study is also limited by the use of an explanatory survey design, which identifies predictive statistical relationships rather than causal effects. The lack of a control group, random assignment, and pre-test and post-test measurements limits the ability to attribute changes in

learning outcomes solely to the use of Wayground. Future studies using quasi-experimental or experimental designs are recommended to provide stronger causal evidence regarding Wayground's effectiveness as a summative assessment tool.

METHOD

This study employed a quantitative explanatory survey design to examine the predictive effect of using Wayground as a summative assessment on senior high school students' learning outcomes. The explanatory survey design was selected because it enables the examination of statistical relationships among variables within naturally occurring educational settings without manipulating the learning environment. Data were collected using a structured questionnaire to measure students' perceptions of Wayground and documentation of students' learning outcomes. The predictive relationship between the variables was analyzed using simple linear regression to estimate the extent to which the use of Wayground statistically predicts variations in students' learning outcomes. Since the study did not involve random assignment, a control group, or pre-test and post-test measurements, the findings should be interpreted as evidence of a predictive statistical predictive effect rather than definitive causal predictive effectiveness..

The quantitative approach was highly relevant in this study because the focus of the study was on the relationship between variables: the implementation of Wayground as a summative assessment platform served as the independent variable (X), while students' learning outcomes represented the dependent variable (Y). Through this quantitative approach, researchers were able to determine the level of influence, relationship, and significance of using Wayground as a summative assessment tool on student learning outcomes. Sugiyono (in Nugroho, 2024) describes quantitative research as an approach grounded in the positivist paradigm, in which empirical data are collected from selected populations or samples using standardized research instruments. The resulting numerical data are then analyzed statistically to examine hypotheses formulated prior to the study.

The participants in this study comprised 31 tenth-grade students from SMA Negeri 2 Sungai Kakap, representing both male and female students with diverse academic abilities. The study population comprised 114 tenth-grade students distributed across four classes (X A, X B, X C, and X D) at SMAN 2 Sungai Kakap. All students had participated in summative assessments using Wayground during the study period. Therefore, simple random sampling was employed to ensure that every student had an equal probability of being selected. A total of 31 students were randomly selected as the research sample. This sampling technique was considered appropriate because the population shared similar learning experiences and assessment conditions, allowing the selected sample to reasonably represent the characteristics of the target population. The sample size of 31 students was considered sufficient for the statistical analysis employed in this study, while random selection ensured that the sample adequately represented the characteristics of the study population. The research was conducted at SMA Negeri 2 Sungai Kakap, located in Kubu Raya Regency, West Kalimantan Province. The research location was the selection of the school was guided by its relevance to the objectives of the present study had implemented digital-based learning and assessment and had supporting facilities, such as internet access and devices, that enabled the optimal implementation of the Wayground quiz.

This study utilized both primary and secondary data sources. Primary data were collected directly from students through structured questionnaires administered to the selected participants, while secondary data were obtained from relevant literature and supporting documents related to the research topic. Secondary data were obtained through an extensive review of scholarly literature related to the use of Wayground as a summative assessment

medium, and learning outcomes obtained from books, articles, journals, and previous research. To minimize common method bias, the independent and dependent variables were obtained from different data sources. Wayground usage was measured using student questionnaires, while learning outcomes were obtained from questionnaires and official documentation of students' summative assessment scores given by subject teachers.

Data were collected using digital documentation, namely downloading and summarizing the results of questionnaires distributed using Google Forms. This technique was chosen because the researcher knew precisely what variables were being measured and what was expected of them. The learning completion criteria are determined drawing on students' performance in the end-of-semester assessment conducted during the second semester, which uses digital assessments from Wayground. Students are considered to have completed the learning if they meet the minimum score or standard (KKM) of 75. With this procedure, the findings of this study are intended to offer a through understanding of the activities using Wayground as a learning evaluation tool.

RESULTS AND DISCUSSION

Research Results

Based on the distribution of questionnaires to 31 respondents, data showed that the majority of students responded positively to the use of Wayground as a summative assessment tool. Based on the questionnaire results, most students stated that Wayground made the learning evaluation process more engaging and enjoyable.

Table 2. The results of the validity test of the questionnaire on the use of Wayground as a Summative Assessment Media

Item	Level sig 5%	rTable	rCount	Sig	Conclusion
X1.1	0,05	0,355	0,460	0,005	Valid
X1.2	0,05	0,355	0,447	0,006	Valid
X1.3	0,05	0,355	0,654	0,000	Valid
X1.4	0,05	0,355	0,707	0,000	Valid
X1.5	0,05	0,355	0,659	0,000	Valid
X1.6	0,05	0,355	0,641	0,000	Valid
X1.7	0,05	0,355	0,747	0,000	Valid
X1.8	0,05	0,355	0,708	0,000	Valid
X1.9	0,05	0,355	0,693	0,000	Valid
X1.10	0,05	0,355	0,629	0,000	Valid
X1.11	0,05	0,355	0,660	0,000	Valid
X1.12	0,05	0,355	0,695	0,000	Valid
X1.13	0,05	0,355	0,758	0,000	Valid
X1.14	0,05	0,355	0,767	0,002	Valid
X1.15	0,05	0,355	0,745	0,000	Valid

The validity analysis was conducted on 15 questionnaire items measuring the use of Wayground as a summative assessment platform (X) and 15 items measuring students' learning outcomes (Y). Based on responses from 31 participants, the critical r-value at the 5% significance level was 0,355. The analysis indicated that every item produced a Pearson correlation coefficient exceeding the critical value, with significance values below 0.05. These findings confirm that all questionnaire items satisfied the validity criteria and were therefore appropriate for subsequent data analysis.

Table 3. Results of the validity test of the Learning Outcomes questionnaire

Item	Level sig 5%	rTable	rCount	Sig	Conclusion
Y.1	0,05	0,355	0,636	0,000	Valid

Y.2	0,05	0,355	0,691	0,000	Valid
Y.3	0,05	0,355	0,751	0,000	Valid
Y.4	0,05	0,355	0,752	0,000	Valid
Y.5	0,05	0,355	0,702	0,000	Valid
Y.6	0,05	0,355	0,849	0,000	Valid
Y.7	0,05	0,355	0,601	0,000	Valid
Y.8	0,05	0,355	0,652	0,000	Valid
Y.9	0,05	0,355	0,659	0,000	Valid
Y.10	0,05	0,355	0,909	0,000	Valid
Y.11	0,05	0,355	0,799	0,000	Valid
Y.12	0,05	0,355	0,607	0,000	Valid
Y. 13	0,05	0,355	0,737	0,000	Valid
Y.14	0,05	0,355	0,694	0,000	Valid
Y.15	0,05	0,355	0,686	0,000	Valid

The reliability of the research instrument was determined using Cronbach's Alpha with a significance level of 5%. An instrument was considered reliable when the Cronbach's Alpha coefficient > 0.60, whereas a Cronbach's Alpha coefficient < 0.60 indicated that the instrument did not meet the required level of reliability.

Table 4. Reliability Test

Variable	Koefisien Alpha Cronbach	Alpha Cronbach Minimum	Information
Using Wayground as a summative assessment medium	0,907	0,60	Reliable
Learning Outcomes	0,931	0,60	Reliable

Based on the reliability test results in the table above, it is known that the calculated r value for each item of the statement of the variable of using Wayground as a summative assessment medium and learning outcomes is stated to be greater than the minimum Cronbach's Alpha value of 0.60. These results confirm that all questionnaire items demonstrated satisfactory consistency and were therefore considered appropriate for use in data collection.

Table 5. Normality Test Results

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Using Wayground as a summative assessment medium	,184	31	,009	,943	31	,098
Learning outcomes	,144	31	,103	,966	31	,425

a. Lilliefors Significance Correction

The results of the Shapiro-Wilk normality test showed a significance value of 0.098 for the variable using Wayground as a summative assessment medium and 0.425 for the learning outcomes variable. Since both significance values are greater than 0.05, the research data is normally distributed. Therefore, the assumption of normality in this study has been met, allowing for regression analysis.

Table 6. Linearity Test Results

ANOVA Table					
	Sum of Squares	df	Mean Square	F	Sig.

Learning outcomes* Using Wayground as a summative assessment medium	Between Groups	(Combined) Linearity Deviation from Linearity	2348,038 1860,029 488,009	16 1 15	146,752 1860,029 32,534	11,056 140,128 2,451	,000 ,000 ,051
	Within Groups		185,833	14	13,274		
	Total		2533,871	30			

The linearity analysis demonstrated that the Deviation from Linearity significance value was 0.051, exceeding the threshold of 0.05. This finding indicates that the relationship between the use of Wyground as a summative assessment platform and students' learning outcomes satisfies the assumption of linearity. Furthermore, the Linearity significance value of 0.000 ($p < 0.05$) confirms the presence of a statistically significant linear relationship between the two variables.

Table 7. Simple Linear Regression Analysis

		Coefficients ^a			T	Sig.
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta		
1	(Constant)	-1,163	6,551		-,178	,860
	Using Wayground as a summative assessment medium	1,004	,112	,857	8,947	,000

a. Dependent Variable: Learning outcomes

Simple linear regression analysis showed that the use of Wayground significantly predicted students' learning outcomes ($p < .001$). The positive regression coefficient indicates that higher levels of Wayground use were associated with higher predicted learning outcomes. These results indicate that the null hypothesis (H_0) was rejected, while the alternative hypothesis (H_1) was accepted, confirming that the implementation of Wayground significantly contributed to improved student learning outcomes. Furthermore, the regression model was expressed by the equation $Y = -1.163 + 1.004X$, indicating that each one-unit increase in the implementation of Wayground was associated with an estimated 1.004-unit increase in students' learning outcomes. The regression coefficient of the variable of using Wayground as a summative assessment medium is 1.004, the positive regression coefficient value significantly predicts the influence between the use of Wayground as a summative assessment medium, which means that the higher the use of Wayground as a summative assessment medium, the higher the learning outcomes obtained by students.

Table 8. Heteroscedasticity Test Results

		Coefficients ^a			t	Sig.
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta		
1	(Constant)	8,172	4,169		1,960	,060

Using Wayground as a summative assessment medium	-,080	,071	-,204	-1,120	,272
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a. Dependent Variable: Abs_Res

The heteroscedasticity test was performed to evaluate whether the regression model satisfied the assumption of constant residual variance. A significance value greater than 0.05 indicates that the model is free from heteroscedasticity. As shown in table 8, the Wayground variable as a summative assessment tool obtained a significance value exceeding 0.05. These results confirm that the residuals have constant variance, indicating that the regression model satisfies the homoscedasticity assumption.

Table 9. Coefficient of Determination Test

Model Summary					Std. Error of the
Model	R	R Square	Adjusted R Square		Estimate
1	,857 ^a	,734	,725		4,114

a. Predictors: (Constant), Use of Wayground as a Summative Assessment

The coefficient of determination (R^2) analysis was performed to evaluate the extent to which the use of Wayground as a summative assessment platform contributed to variations in students' learning outcomes. The results of this analysis are presented in Table 8. As shown in the table, the R^2 value of 0.734 indicates that the implementation of Wayground explains 73.4% of the variation in student' learning outcomes. The remaining 26.6% is attributable to other variables that were not included in the present study. These may include students' learning motivation, behavioral characteristics, study habits, prior knowledge, family support, instructional strategies, and other internal or external factors that potentially influence academid achievement. Because the independent and dependent variables were obtained from different data sources, this value is unlikely to reflect common method bias. Nevertheless, the coefficient should be interpreted as a measure of predictive association rather than evidence of causal effectiveness.

Discussion

The findings demonstrate that the use of Wayground as a summative assessment significantly predicts students' learning outcomes. This predictive relationship suggests that students who reported more effective use of Wayground also tended to achieve higher learning outcomes. From the perspective of Constructivism, Wayground facilitates active knowledge construction by providing immediate feedback and interactive assessment experiences that encourage students to monitor and regulate their own learning. However, because this study employed an explanatory survey design rather than an experimental approach, the findings should be interpreted as evidence of a statistically significant predictive effect instead of direct causal proof. Similar results were reported by Siahaan et al., (2025), who found that gamified digital assessments increased active participation and a meaningful learning experience, resulting in better academic achievement. Furthermore, Hernanz et al., (2024) found that by creating a more engaging and student-focused assessment environment, interactive assessment platforms improved student academic performance.

These findings can be explained through Constructivism Theory, which argues that students actively construct knowledge through interactions with learning experiences, rather than passively receiving it from teachers. According to constructivists, assessments should help

students think, explore, and reconstruct the ideas they understand rather than simply measuring how much they know. By leveraging these principles, Wayground allows students to receive immediate feedback on their responses, uncover misconceptions, and continually refine their understanding throughout the assessment process. Furthermore, the gamified environment encourages students to cognitive persistence rather than passively receive evaluation. Therefore, the positive results observed in this study suggest that because assessment is an essential part of learning, students can construct knowledge more predictive effectively. This interpretation is consistent with recent studies indicating that technology-enhanced assessment supports constructivist learning by promoting interaction, reflection, and self-regulated learning during classroom activities (Shafira & Sulistyani, 2025).

Wayground aligns with the student-centered learning principles emphasized in the immersive curriculum. Students can interact directly with assessment tasks and receive immediate feedback on their performance through the platform, encouraging continuous learning improvement. Wayground facilitates an iterative learning process where students actively connect their prior knowledge with their new learning. This contrasts with conventional paper-based assessment, which typically offer opportunity for self-correction and delayed feedback. This process enhances conceptual understanding and encourages confident and meaningful learning beyond rote memorization. As a result students become more confident and motivated to complete assessment activities, ultimately contributing to improved learning outcomes. These findings are supported by (Septiana et al., 2025), who reported that Wayground creates a more interactive assessment environment that enhances student' understanding and participation. Similarly, (Hudaya et al., 2025) emphasized that gamified assessment platforms encourage meaningful learning experiences by integrating interactive features with immediate instructional feedback, enabling students to develop a deeper understanding of learning materials.

The positive predictive effect of Wayground on students' learning outcomes can be explained through Cognitive Engagement Theory, which emphadizes that meaningful learning occurs when students actively invest cognitive effort in understanding and processing information. Wayground facilitates this process by providing interactive questions, immediate feedback, and real-time performance displays that encourage students to reflect on their answers and identify misconceptions during the assessment process. Consequently, assessment functions not only as a tool for measuring achievement but also as an opportunity to strengthen conceptual understanding through continuous reflection and self-evaluation. This finding indicates that the improvement in learning outcomes is driven by the quality of students cognitive engagement rather than by the use of digital technology alone. Similar findings were reported by Zhang & Crawford (2024), who found that gamified assessment promotes active learning and enhances students' engagement through immediate feedback and continuous interaction.

The present findings are also consistent with previous empirical studies demonstrating that interactive digital assessment enhances students' cognitive engagement because learners actively monitor their own progress throughout the assessment process. Unlike conventional paper-based tests, Wayground presents visual progress indicators, immediate scoring, and interactive question formats that stimulate students to remain focused until the assessment is completed. These features reduce passive participation and encourage students to regulate their learning strategies independently. Likewise, (Hernanz et al., 2024) interactive assessment platforms such as Wayground enhance students' self-efficacy, intrinsic motivation, and academic performance by promoting active engagement in learning activities.

Another important finding is that cognitive engagement developed through Wayground extends beyond answering questions correctly. Students receive immediate information about their strengths and weaknesses, allowing them to evaluate their own learning and identify cinceots requiring further improvement. This process promotes metacognitive awareness, which is essential for long-term knowledge retention. Previous research on gamified assessment has likewise shown that interactive assessment environments encourage learners to participate more actively, maintain concentration, and engage in reflective thinking throughout the learning process. Therefore, the improvement in learning outcomes observed in this study can be attribute not only to the digital platform itself but also to the quality of cognitive engagement fostered during assessment activities.

From the perspective of Gamification Theory, the predictive effectiveness of Wayground is closely related to its integration of game-based elements, including points, leaderboards, instant feedback, and multimedia features that transform assessment into a more engaging learning experience. These elements stimulate students' curiosity, sustain attention, and reduce the anxiety commonly associated with conventional summative assessments. Nevertheless, the educational benefits of gamification arise not merely from the presence of game elements but from their ability to create meaningful learning experiences that encourage active participation and sustained cognitive effort. Therefore, the findings of this study reinforce previous evidence that gamified assessment can improve learning outcomes when its design aligns with pedagogical objectives and supports students' active involvement throughout the assessment process (Balqis & Andriani, 2024).

The findings also have important practical implications for teachers in implementing technology-based summative assessment. Wayground can be utilized not only to automate scoring and provide immediate feedback but also to support more efficient and learner-centered evaluation practices. However, this study was limited to 31 students from a single senior high school, which restricts the generalizability of the findings. Future studies should involve larger samples, different educational contexts, and additional variables such as learning motivation, self-regulated learning, and digital literacy to obtain a more comprehensive understanding of the predictive effectiveness of gamified assessment. Overall, this study contributes theoretically by supporting the relevance of Cognitive Engagement Theory and Gamification Theory in explaining evidence that Wayground is a feasible and predictive effective summative assessment platform for improving students' learning outcomes.

CONCLUSIONS

This study found that the use of Wayground as a summative assessment is positively and significantly associated with senior high school students' learning outcomes. The results of the simple linear regression analysis indicate that students who reported higher levels of Wayground use tended to achieve better learning outcomes, suggesting that Wayground serves as a significant predictor of learning outcomes in the context of this study. These findings support the potential of digital assessment platforms to enhance assessment practices by providing interactive features, immediate feedback, and opportunities for active student engagement.

The findings also reinforce the view that digital assessment, when designed according to sound pedagogical principles, can function as an integral part of learning rather than solely as a means of measuring achievement. These results enrich the existing evidence regarding the implementation of gamified summative assessment, particularly in senior high school economics learning, where empirical studies remain relatively limited. From a practical perspective, this study provides evidence that Wayground can be considered an alternative summative

assessment platform for teachers seeking to improve the effectiveness, efficiency, and quality of classroom assessment. Nevertheless, the findings should be interpreted within the limitations of the research design. As this study employed a quantitative explanatory survey without a control group or pre-test and post-test design, the results indicate a predictive statistical relationship rather than definitive causal evidence. Future studies using quasi-experimental or experimental designs with larger and more diverse samples are recommended to confirm the causal impact of Wayground on students' learning outcomes and strengthen the generalizability of the findings.

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