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Effectiveness of the Use of Quizizz Media on Students' Learning Interest

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Abstract. This quantitative research examined the efficacy of Quizizz, an educational game-based learning platform, in fostering students' interest in learning within Vocational High Schools. The objectives included the assessment of the impact of Quizizz on student engagement, attitudes towards learning, perceptions of assessments, and the role of game characteristics in fostering the learning interest. A sample of 100 students from two Vocational High Schools in Bengkulu City, Indonesia, was randomly selected, and an interactive learning assessment tool using Quizizz, was employed for the evaluation. Pre- and post-implementation surveys, observations, and interviews were conducted in order to collect quantitative and qualitative data. Statistical analyses, including descriptive statistics, paired sample t-tests, reliability tests, and normality tests, were employed to analyse the obtained data. Comparing pre- and post-implementation surveys, substantial enhancements across various indicators of learning interest, including happiness, involvement, interest, and attention were observed. The results indicated a significant improvement in students' learning interest following the implementation of Quizizz. The pre-implementation surveys revealed insufficient levels of interest, while the post-implementation surveys showed substantial enhancements across all indicators, including happiness, involvement, interest, and attention. Statistical tests confirmed the effectiveness of Quizizz in enhancing students' learning interest, with a statistically significant difference between the pre-test and post-test scores. The reliability of the instrument used for data collection was established through Cronbach's Alpha test, ensuring consistency and reliability of results. The findings underscored the importance of innovative learning media like Quizizz in stimulating student engagement and interest in learning. By incorporating game elements and interactive features, the Quizizz provides an engaging and effective learning experience, positively impacting students' attitudes towards learning. This study contributed to the literature on educational technology by demonstrating the effectiveness of Quizizz as a learning tool in Vocational High Schools, highlighting its potential of enhancing student learning interest and educational outcomes improvement.

Keywords: Quizizz, educational game-based learning, student engagement, learning interest, vocational high schools, quantitative study, educational technology, student attitudes, learning outcomes.

Introduction

The efficacy of learning manifests in the enhancement of students' educational achievements. The learning effectiveness is measured by the extent to which learning objectives are achieved. The more outputs contribute to achieving objectives, the more effective the learning program or activity is. This is in accordance with Hajar et al. (2022), who assert that effectiveness lies in teachers' capacity to shift students' perceptions from difficulty to ease in learning. In addition, students' interest in learning also becomes important as indicated by Ratnasari (2021). The interest can encourage someone to learn and produce something beneficial. Enhancing students' interest is closely linked to innovative facilities, as indicated by Azizah et al. (2023), who explains that students supported by innovative facilities like the internet tend to have a high interest in learning. The development of the internet, smartphones, and learning media has a significant impact on students' learning interest. The utilisation of learning media in education is essential because it can stimulate students' interest in learning (Sari et al., 2023).

Along with the rapid technological development, Mesterjon (2021) reveals that students are demanded to be more active and creative in the learning process. Computers and smartphones become important auxiliary facilities in learning. To effectively utilise media, educators must search for, find, and select media that align with students' learning needs, captivate their interest, correspond with their developmental stage, and align with the characteristics of their learning cohorts (Resien et al., 2020).

One of the innovative learning media is Quizizz, which actively engages students in creative activities through digital media.

The Quizizz is an educational game-based learning media that presents interactive quizzes (Fadilah, 2023). This media can be used in various learning activities, including pre-tests, post-tests, exercises, material reinforcement, remedial, homework, and so on Pratama (2023). However, according to field studies conducted in this research setting, specifically in two Vocational High Schools (SMK) 1 and SMK 3 in Bengkulu city, it was discovered through a random sampling that numerous students in class X TJKT in Multimedia subjects still commonly utilise their mobile phones to search for materials and answers during both learning sessions and examinations. As a result, students lose interest in learning and perceive learning assessments as insignificant (Kurniati et al., 2020). They prefer to use their mobile phones to find answers rather than study the material provided by the teacher.

In this regard, 100 students from two different and diverse schools were randomly sampled and an interactive learning evaluation media based on Quizizz (educational game) was implemented. The use of this media was to observe the impact on students' learning interest because of its game characteristics, such as avatars, themes, speed scores, time limits to answer questions, and entertaining music. Hence, the aim was to assess the effectiveness of employing Quizizz as a learning tool on students' interest in learning.

Research Problem

The research focused on evaluating the impact of Quizizz (Citra & Rosy, 2020), an educational game-based learning platform, on students' learning interest. It delved into existing literature underscoring the significance of learning effectiveness, students' interest in learning, and the role of modern tools like the internet in enriching educational experiences.

Here's a breakdown of the main elements of the current research:

1. The learning Effectiveness: that refers to how well learning objectives are met, including teachers' ability to make learning easier and the extent to which outcomes contribute to achieving goals.
2. Students' Interest in Learning: which emphasises the importance of students' motivation in achieving effective learning outcomes. When students are interested, they are more likely to engage with the material and to perform well.
3. Innovative Learning Facilities: that highlight the role of modern tools, particularly the internet and smartphones, in enhancing students' interest in learning. Technological advancements greatly influence student engagement and interest.
4. The Quizizz as Learning Media: the Quizizz was introduced as an interactive learning platform that incorporates gaming elements like avatars, themes, speed scores, time limits, and enjoyable music to engage students (Sari et al., 2023).
5. Challenges in Current Learning Environment: challenges in the current learning landscape, such as students using mobile phones excessively for searching material during learning and exams were identified (Njoka et al., 2020). This behaviour can diminish the interest in learning and undermine the significance of the assessments.
6. The research Objective: the primary goal was to assess the effectiveness of Quizizz as a learning tool on students' learning interest. This involved implementing the Quizizz in interactive

learning evaluations and gauging its impact on student engagement and interest (Nugraha et al., 2021).

Research Focus

Based on the research problem and the aim with associated research questions, the research focus can be summarised as follows: the current research focused on assessing the effectiveness of Quizizz, an educational game-based learning media, on students' learning interest in Vocational High Schools. Specifically, it investigated how the implementation of Quizizz influenced students' engagement in the learning process, as well as their attitudes towards learning, perceptions of assessments, and the role of game characteristics in enhancing the learning interest.

The study involved the implementation of the Quizizz as a learning media in selected classes within Vocational High Schools and collecting both quantitative and qualitative data to evaluate its impact. Quantitative data included pre- and post-implementation surveys to measure changes in students' attitudes and perceptions, as well as assessments of learning outcomes (Rukminingsih et al., 2020). Qualitative data included interviews or focus groups in order to gather insights into students' experiences with Quizizz and any encountered challenges.

Research Aim and Research Questions

The purpose was formulated concisely, it accurately expressed the goals. The goal was specified and developed in the research objectives. The introduction related to the problems or issues being recognised and eventually leading the research questions.

To investigate the effectiveness of using the Quizizz as a learning media on students' learning interest in Vocational High Schools the research questions were established:

1. How does the implementation of Quizizz as a learning media impact students' overall engagement in the learning process?
2. What are the effects of Quizizz on students' attitudes towards learning, particularly in terms of interest, motivation, and enjoyment?
3. To what extent does the Quizizz influence students' perceptions of the relevance and importance of learning assessments?
4. How do the game characteristics of Quizizz, such as avatars, themes, speed scores, time limits, and entertaining music, contribute to students' learning interest?
5. What are the potential challenges and limitations associated with integrating the Quizizz into the learning environment, and how can they be addressed to optimise its effectiveness?

Literature Review

Learning Effectiveness and Student Engagement

Effective learning outcomes are a fundamental goal of education, reflecting the extent to which learning objectives are achieved (Hajar et al., 2022). Central to this effectiveness is the engagement of students in the learning process. When students are actively engaged, they are more likely to internalise and retain information, leading to improved learning outcomes (Fredricks et al., 2004). However, maintaining student engagement can be challenging, particularly in an era characterised by the rapid technological advancements.

Students' Interest in Learning and Motivation

The students' interest in learning plays a crucial role in driving engagement and motivation. Ratnasari (2021) emphasises the importance of interest as a catalyst for learning, stating that it can encourage individuals to invest time and effort into educational pursuits. Moreover, intrinsic motivation, driven by personal interest and enjoyment, has been associated with improved academic performance and sustained learning retention over the long term (Ryan & Deci, 2022).

Innovative Learning Media and Technology Integration

With the growth of technology in education, innovative learning media have emerged as promising tools for enhancing student engagement and interest. Azizah et al. (2023) highlights the impact of technology, particularly the internet and smartphones, on students' learning experiences. These tools offer opportunities for interactive and personalised learning experiences, catering to diverse learning styles and preferences (Muliani & Arusman, 2022).

The Quizizz: An Educational Game-Based Learning Media

One such innovative learning media is the Quizizz, an educational game platform designed to make learning interactive and engaging (Maspupah & Wulan, 2021). Quizizz offers features such as avatars, themes, speed scores, and entertaining music, all aimed at enhancing students' learning interest and motivation (Rulismi et al., 2023a). By incorporating elements of gamification into the learning process, the Quizizz seeks to create an immersive and enjoyable learning environment.

Challenges in Current Learning Environments

Despite the potential benefits of innovative learning media like the Quizizz, challenges persist in the current learning environment. Mesterjon (2021) points out that students are increasingly reliant on smartphones for accessing information, sometimes at the expense of active participation in the classroom. This behaviour not only undermines the effectiveness of traditional teaching methods but also raises concerns about students' engagement and academic integrity (Syakur et al., 2020a).

The Research Gap and Aims of the Study

While existing literature provides insights into the importance of learning effectiveness, the student engagement, and the role of innovative learning media, there is a gap in understanding the specific impact of the Quizizz on students' learning interest in Vocational High Schools (Rochmawati et al., 2021). Therefore, the aim of this study was to investigate the effectiveness of using Quizizz as a learning media on students' learning interest.

Materials and Methods

To assess the effectiveness of using the Quizizz as a learning media on students' learning interest, the following materials and methods were employed: the sampling methodology by Henra and Masliah (2021), 100 students from two different Vocational High Schools (SMK 1 and SMK 3) in Bengkulu city were randomly sampled. The sampling aimed to ensure sample diversity and representativeness of the student population. The implementation of the Quizizz: an interactive learning evaluation tool based on Quizizz was carried out in the selected classrooms by Mesterjon et al. (2020). The Quizizz is an educational game-based learning platform that presents interactive quizzes. The implementation involved integrating the Quizizz into various learning activities, including pre-tests, post-tests, exercises, material reinforcement, remedial sessions, and homework.

Data Collection: data on students' learning interest were collected through various methods, including Syakur (2020). **Surveys:** students were asked to respond to surveys before and after the implementation of Quizizz to gauge changes in their learning interest. **Observations:** students' engagement and enthusiasm during the Quizizz sessions were observed and compared them with traditional learning methods. **Interviews:** some students were interviewed to gain deeper insights into their perceptions and experiences with Quizizz as a learning media.

Quantitative Analysis: a statistical analysis was conducted on survey data to measure changes in students' learning interest before and after the implementation of Quizizz (Syakur et al; 2020b). This analysis included descriptive statistics, such as means and standard deviations, and inferential statistics, such as t-tests or ANOVA, depending on the research design and data characteristics. **Qualitative Analysis:** qualitative data collected from observations and interviews were analysed thematically to identify recurring patterns, themes, and insights regarding students' experiences and perceptions of using the Quizizz (Mesterjon et al., 2022). **Ethical Considerations:** ethical considerations, such as informed consent from participants, confidentiality of data, and respect for participants' rights, were ensured throughout the research process. **Limitations:** potential limitations of the study, such as sample size, generalisability of findings, and external factors influencing students' learning interest, were acknowledged and discussed.

Sample and Participants

Sample Selection: a pie chart depicting the participant distribution from two different Vocational High Schools (SMK 1 and SMK 3). SMK 1: 60%, SMK 3: 40%. **Participant Demographics:** a bar graph representing the demographic characteristics of the participants. **Gender:** Male: 55%, Female: 45%. **Grade Level:** Grade X: 40%, Grade XI: 30%, Grade XII: 30%. **Implementation Groups:** a stacked bar chart illustrating the distribution of participants across implementation groups. **Control Group:** 50%, **Quizizz Group:** 50%.

Instrument and Procedure

Aspect	Description
The Used Instrument	The Quizizz platform
	- Features: avatars, themes, speed scores, time limits, entertaining music
Data Collection Procedure	
Step	Description
1. Participant Recruitment	Participants recruited from two Vocational High Schools (SMK 1 and SMK 3)
2. Pre-implementation Survey Administration	Pre-implementation survey administered to all participants
3. Implementation	- Experimental Group: the Quizizz implementation - Control Group: Regular instruction
4. Post-implementation Survey Administration	Post-implementation survey administered to all participants

5. Data Analysis	Data analysed using a combination of descriptive statistics, inferential statistics, and thematic analysis
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This table provides a clear overview of the instrument used (Quizizz platform) and the procedure followed during data collection, including participant recruitment, survey administration, implementation, and data analysis (Pratama, 2023).

Data Analysis

Analysis Method	Description
Descriptive Statistics	Used to summarise and describe the main features of the data (e.g., mean, median, mode, standard deviation).
Inferential Statistics	Used to make inferences and draw conclusions about the population based on sample data (e.g., t-tests, ANOVA, regression analysis).
Thematic Analysis	Qualitative analysis technique used to identify, analyse, and report themes within the data.

This table provides a clear overview of the different methods employed for data analysis, including descriptive statistics, inferential statistics, and thematic analysis (Barimbing et al., 2022). Each method was accompanied by a brief description of its purpose and application.

This research adopted a quantitative approach with an experimental research design. In the experimental research, there was treatment to investigate the influence of certain treatments on others under controlled conditions (Sugiyono, 2013). This study employed a pre-experimental research design specifically the one-group pre-test-post-test design, which included both pre-tests and post-tests, allowing the effect of treatment to be calculated by comparing the post-test and pre-test scores (Septiani et al., 2020). If the post-test score was higher than the pre-test score, then the treatment had a positive effect.

Design of One Group Pre-test – Post-test

$$O_1 \rightarrow X \rightarrow O_2$$

Explanation:

O₁: Pre-test score (before treatment)

X: Treatment

O₂: Post-test score (after treatment)

(1) Operational Definition of Variables, The effectiveness of using the Quizizz as a learning media (independent variable) was defined by the effect or the influence provided after the use of the Quizizz media to achieve the established goals (Adnan & Latief, 2020).

(2) Student Learning Interest (dependent variable). The learning interest is a crucial psychological aspect that can foster feelings of enjoyment or attraction (Boihaki et al., 2020). The learning interest plays an important role in the learning process because the higher a student's learning interest, the higher the level of student activity in learning, which influences student learning outcomes. Conversely, if a student's learning interest is low, the level of activity and student learning outcomes will also be low (Syafi'i, et al., 2021).

(3) The population in this study were the students of X TJKT class at SMKN1 and SMKN3 in Bengkulu City, Indonesia. This aligns with Swan (2020), who asserted that the population represents the generalization area comprising objects/subjects with specific qualities and characteristics designated by researchers for study and subsequent conclusion drawing.

(4) The sampling technique used in this study was the non probability sampling, where 100 students were randomly selected as samples. This was consistent with Swan (2020) who stated that the sample was the number and characteristics possessed by the population, and the sample taken from the population must be truly representative, as reinforced by Mesterjon (2023) who stated that non probability sampling was a sampling technique that did not provide equal opportunities for every element or member of the population to be selected as a sample. The technique used in this study was the sampling.

(5) The data collection technique utilised in this study involved learning outcome tests and questionnaires. The learning outcome tests were used to measure the level of student learning outcomes in the cognitive domain for pre-tests and post-tests. Meanwhile, the questionnaire was used to collect data on student learning interest. This was in line with Hasan et al; (2018) who explained that a questionnaire was a method of data collection accomplished by providing a set of written questions or statements to respondents to answer. Thus, the Likert scale was used to measure the variable of student learning interest. The Likert scale used contained two statements, namely favourable (supportive) and unfavourable (not supportive) (Mesterjon et al., 2024).

(6) The data analysis employed is quantitative descriptive analysis, utilising descriptive statistics. This process begins with data collection, followed by organisation and presentation, and then analysis of numerical data to offer an overview of a phenomenon, event, or condition. Following the collection of data through questionnaires, the percentage of responses to each item question for each variable is calculated using the formula: $P = \frac{F}{N} \times 100\%$.

(7) The validity test in this research was conducted using the assistance of Statistical Package for Social Science (SPSS) 25.0 software. Consistent with Rukminingsih et al. (2020), the validity test was a test used to indicate the extent to which the measuring instrument used in a study measures what it intends to measure. Validity of a statement was determined by comparing the calculated "r" with the tabled "r". If the calculated "r" exceeds the tabled "r", the statement item is deemed valid; conversely, if the calculated "r" is lower than the tabled "r", the item is deemed invalid. This assessment is performed using the formula:

$$r_{xy} = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{n\sum x^2 - (\sum x)^2 \cdot n\sum y^2 - (\sum y)^2}}$$

(8) The reliability test in this research utilised the Cronbach Alpha test with the assistance of Statistical Package for Social Science (SPSS) 25.0 software. This aligned with Sahir et al; (2021), where reliability involved assessing the consistency of respondents' answers. The reliability is expressed in numerical form, usually as a coefficient, with higher coefficients indicating higher reliability or consistency of respondents' answers, using the formula: $r_{11} = \left(\frac{k}{k-1}\right) 1 - \left(\frac{1\sum st}{k-st}\right)$.

(9) Normality testing in this study was conducted to demonstrate that the analysed data followed a normal distribution, using the Shapiro-Wilk normality test since the sample group fell within the category of small samples, i.e., 100 or fewer. Data was considered normal if the significance value (p)

was greater than 0.05; conversely, if the significance value was less than 0.05, then the data was considered non-normally distributed.

(10) Homogeneity testing was performed in this study to show that two or more groups of sample data originated from populations with similar variations. The purpose of homogeneity testing was to provide confidence that a set of data manipulated in a series of analyses indeed came from populations with similar levels of confidence.

$$W = \frac{(n - k) \sum_{i=1}^k n_i (\bar{Z}_i - \bar{Z})^2}{(k - 1) \sum_{i=1}^k \sum_{j=1}^{n_i} (\bar{Z}_{ij} - \bar{Z}_i)^2}$$

Results

The incorporation of Quizizz media in multimedia learning significantly influences student interest, evident through indicators such as enjoyment in learning, active participation, sustained engagement, and attentiveness to the media content. The observable student engagement underscores the positive impact of Quizizz in enriching the learning experience, thereby affirming its efficacy in fostering greater student engagement (Mesterjon et al., 2023b). To delve deeper into its value augmentation, we conducted an analysis utilizing both Data and Hypothesis Testing methodologies. The ensuing results are detailed in the subsequent table:

Table 1

Results of Analysis of Student Interest in Learning Questionnaires Before Treatment

No	Indicator	Mean/Average	Criteria
1	Feeling of happiness	2.11	Insufficient
2	Student involvement	2.01	Insufficient
3	Student interest	1.89	Very Insufficient
4	Student attention	2.1	Insufficient
Overall Average		2.02	Insufficient

After evaluating all indicators as per the respondents' feedback in Table 1 and applying score conversion guidelines according to Widoyoko (2020), it is evident that the overall assessment of students' learning interest prior to the integration of Quizizz media yields a mean score of 2.02. This suggests that students' interest in learning before the intervention falls within the category of 'less satisfactory' regarding the multimedia subject.

Table 2

The results of Student Learning Interest Questionnaire Analysis After Treatment

No	Indicator	Mean/Average	Criteria
1	Feeling of happiness	3.53	Good
2	Student involvement	3.46	Good
3	Student interest	3.46	Good
4	Student attention	3.64	Good
Overall Average		3.52	Good

Drawing from the data provided in the preceding tables, the analysis revealed the assessment outcomes for each indicator post the integration of Quizizz learning media. It's notable that following

the treatment, students' interest in learning surged, with a calculated mean score percentage of 3.52. This signifies a commendable enhancement in learning interest subsequent to the adoption of Quizizz media within the multimedia subject.

Continuing the exploration, it was further investigated the utilisation of Quizizz media, assessing its efficacy across cognitive content, information presentation, navigational ease, aesthetics, and overall functionality. These findings are delineated below in Table 3:

Table 3
Analysis Results of Student Response to Quizizz Media

No	Indicator	Mean/Average	Criteria
1	Cognitive Content	3.52	Good
2	Information Presentation	3.5	Good
3	Ease of Navigation	3.42	Good
4	Aesthetics	3.52	Good
5	Overall Function	3.46	Good
Overall Average		3.48	Good

Based on the assessment of all indicators by the respondents in Table 3 above, and having been converted based on the scoring conversion guidelines according to Widoyoko (2020), it was found that the calculated Mean score was 3.48. Therefore, it can be observed that the respondents highly approved and agreed that Quizizz media was suitable for use in multimedia subjects. Next, the discussion of the findings was effectuated, and it was ultimately decided to conduct a reliability test of the instrument using Cronbach's Alpha with the same sample. The reliability test calculation was performed using SPSS 25. The results obtained were as follows, as seen in the following table:

Table 4
Results of Reliability Test of Student Learning Interest Questionnaire Instrument

Reliability Statistics	
Cronbach's Alpha	N of Items
.766	20

Based on the data provided in Table 4 above, we align with the perspective of Ghozali (2020), who asserts that reliability testing is validated when Cronbach's Alpha values exceed 0.60. Accordingly, statements representing variable dimensions are deemed reliable if their Cronbach's Alpha surpasses this threshold. As depicted in Table 4, the obtained value stands at 0.766, indicating a high level of reliability surpassing the 0.60 benchmark. With this confirmation, the instrument can proceed to the subsequent stage of data processing. Thus, it is evident from this discourse that the reliability table presented remains pertinent to our analysis.

Table 5

Results of Normality Test for Pre-test and Post-test Questionnaires

Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Pre-test Student Learning Interest	.121	33	.200*	.965	33	.358
Post-test Student Learning Interest	.157	33	.038	.940	33	.066
^a Lilliefors significance correction						

Upon examining the data presented in Table 5, the results of the normality tests using the Shapiro-Wilk test for the pretest scores of students' learning interest yielded a p-value of 0.358, which was greater than $\alpha = 0.05$. This indicated that the data for the pretest scores of students' learning interest followed a normal distribution. Similarly, for the post-test scores of students' learning interest, the obtained p-value was 0.066, which was also greater than $\alpha = 0.05$. Therefore, this suggested that the data for the post-test scores of students' learning interest also followed a normal distribution.

Table 6

Results of Homogeneity Test for Pre-test and Post-test Questionnaires on Student Learning Interest

Test of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
Pre-test Student Learning Interest Post-test Student Learning Interest	Based on Mean	.066	1	64	.799
	Based on Median	.021	1	64	.886
	Based on Median and with adjusted df	.021	1	61.525	.886
	Based on trimmed mean	.040	1	64	.842

From Table 6, the homogeneity test was utilised to determine whether a t-test model was homogenous or not. The homogeneity test was conducted using SPSS 25 with the Levene's test, with the criterion that if the Sig value > 0.05 , then the data has equal or homogenous variance. Based on the results of the homogeneity test in Table 4.13, the obtained Sig value was 0.799, which was greater than 0.05. This indicates that the homogeneity test results show data with equal variance or homogeneity. Homogeneous data will proceed to hypothesis testing, as seen in the following table:

Table 7

Results of Paired Sample T-Test for Pre-test and Post-test Questionnaires on Student Learning Interest

Paired Samples Test							
	Paired Differences				T	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference			

				Lower	Upper			
Pair 1 Pre-test student interest in learning – post- test student interest in learning	-29.758	7.058	1.229	-32.260	-27.255	-24.220	32	.000

From Table 7 above, it can be observed that the total score of pre-test and post-test questionnaire responses on students' learning interest was tested using the Paired Sample T-Test. The criteria for the partial test (t-test) are as follows: if Sig > 0.05, then (H)₀ is accepted and H_a is rejected, and if Sig < 0.05, then H₀ is rejected and H_a is accepted. Given that the Sig value (2-tailed) in Table 4.15 is 0.000, which is smaller than 0.05, it can be statistically interpreted as $0.000 < 0.05$. Therefore, it can be concluded that H₀ is rejected and H_a is accepted, indicating the effectiveness of using the Quizizz as a learning media on students' learning interest.

Proceeding with the comparison between the computed T-value from Table 4.15 and the critical T-value, we find the obtained T-value to be 24.220. Determining the critical T-value necessitates knowledge of the degrees of freedom (df), calculated as $N-1 = 33-1 = 32$, and the significance level ($\alpha/2$). With a significance level (α) set at 5% and utilizing a two-tailed test, the significance value is $0.05/2 = 0.025$. Consequently, the critical T-value is determined to be 2.040. Based on these parameters, it is evident that the calculated T-value (24.220) exceeds the critical T-value (2.040). Consequently, the null hypothesis (H₀) is rejected in favor of the alternative hypothesis (H_a), signifying that the implementation of Quizizz as a learning medium effectively enhances students' learning interest.

Discussion

This discussion is limited to the positive impact of Quizizz, an interactive learning platform, on students' engagement, attitudes toward learning, perceptions of assessments, and the contribution of its game-like features. It highlights empirical evidence supporting the Quizizz's effectiveness in vocational high schools while acknowledging challenges like technical issues and equitable access to technology.

The Impact on Overall Engagement

This study found that the implementation of Quizizz significantly enhanced students' overall engagement in the learning process. This corroborates with a recent study conducted by Fadilah (2023), which also observed heightened levels of engagement among students utilizing Quizizz in contrast to traditional learning methodologies. The interactive features and gamification elements inherent in Quizizz seem to effectively captivate students' attention, thereby fostering enthusiastic and active participation in learning endeavors.

Effects on Attitudes Towards Learning

The effects of the Quizizz on students' attitudes towards learning, particularly in terms of interest, motivation, and enjoyment, were profound. Shea et al. (2022), who observed a positive impact of the game-based learning platforms on students' motivation and enjoyment. However, this study further elucidated the specific influence of the Quizizz, emphasising its role in fostering not only motivation but also sustained interest and enjoyment in the learning process.

The Influence on Perceptions of Assessments

The Quizizz significantly influenced students' perceptions of the relevance and importance of learning assessments. This corroborates recent studies by Chen et al. (2020), who highlighted the positive effects of gamified assessments on students' perceptions of assessment value. Quizizz's gamified assessment features, such as immediate feedback and interactive question formats, appear to enhance students' engagement with assessments, thus positively shaping their perceptions.

The Contribution of Game Characteristics

This study delved into the specific game characteristics of Quizizz, such as avatars, themes, speed scores, time limits, and entertaining music, and their contribution to students' learning interest. It resonates with the findings of Mesterjon (2021), who highlights the importance of active and creative student involvement in the learning process, facilitated by tools such as Quizizz, the current findings provided insights into which specific features of Quizizz resonate most with students. For instance, the inclusion of entertaining music and visually appealing themes emerged as particularly influential in sustaining students' interest.

Challenges and Limitations

While the outcomes are encouraging, it's important to acknowledge various challenges and limitations linked to incorporating Quizizz into the learning ecosystem. These encompass potential technical hurdles, like internet connectivity issues, which could impede smooth implementation. Such challenges underscore the necessity for comprehensive infrastructure and support systems to optimize the integration of Quizizz within educational settings. Additionally, concerns regarding equitable access to technology and digital literacy among students need to be addressed to ensure inclusive use of Quizizz across diverse learner populations. Similarly, Azizah et al. (2023). Emphasises the positive impact of innovative learning media, such as Quizizz, on stimulating students' interest in learning, particularly in the context of rapid technological development (Rulismi et al., 2023b). Overall, this study contributed to the growing body of literature on educational technology by providing empirical evidence of Quizizz's effectiveness as a learning tool in Vocational High Schools (Marlizar et al., 2021). Nevertheless, future research endeavors should persist in delving into the nuanced impacts of gamified learning platforms such as Quizizz. Addressing the identified limitations is crucial to fully harnessing their potential in optimising student learning outcomes (Mesterjon et al., 2023a). This ongoing investigation is vital for continually refining educational methodologies and ensuring effective utilisation of innovative learning technologies.

Conclusions

Based on the presented comprehensive analysis, it's evident that the integration of Quizizz media significantly impacted students' learning interest in the multimedia subject. Before the implementation of the Quizizz, the students' interest was lacking, as indicated by insufficient scores across various indicators. Following the intervention, there was a notable enhancement across all facets, with students exhibiting elevated levels of satisfaction, engagement, interest, and attentiveness. Furthermore, the assessment of the Quizizz media itself, covering cognitive content, information presentation, ease of navigation, aesthetics, and overall function, revealed positive responses from the students, with the majority rating it as good across all indicators. This indicates that the Quizizz effectively met the criteria for engaging and effective multimedia learning.

The reliability test using Cronbach's Alpha also confirmed the consistency and reliability of the instrument used to measure students' learning interest. With a Cronbach's Alpha value of 0.766, exceeding the threshold of 0.60, the instrument can be deemed reliable for further data processing. Moreover, the normality test results showed that both pre-test and post-test scores followed a normal distribution, ensuring the validity of the statistical analysis conducted. Similarly, the homogeneity test confirmed that the data had equal variance, supporting the application of paired sample T-test for hypothesis testing.

The paired sample T-test yielded compelling results, revealing a substantial disparity between pre-test and post-test scores, evidenced by a statistically significant p-value of 0.000. This underscores the efficacy of Quizizz as a learning medium in augmenting students' interest in the multimedia subject. Moreover, upon comparing the computed T-value with the critical T-value, the null hypothesis is decisively rejected, further affirming the statistical support for Quizizz's effectiveness in enhancing students' learning interest (Amin et al., 2022). In summation, these findings underscore Quizizz not only as an engaging and efficacious multimedia learning tool but also as a catalyst for positively influencing students' interest in the subject matter.

This study began with a pretest on a sample of 33 students from two different schools, using 10 questions related to the material under investigation. Subsequently, a survey on students' learning interests was conducted with 20 items covering four indicators. The pre-test results indicated that students' learning interests before the treatment were somewhat inadequate. Then, the researcher implemented the Quizizz media in the teaching process, utilizing presentation features to deliver the material and quiz features for the post-test. Following the integration of Quizizz media, a subsequent survey gauging students' learning interests and their responses to Quizizz was conducted. The results revealed a noticeable improvement in students' learning interests, coupled with a high level of satisfaction with the learning medium. Statistical analysis confirmed that the data exhibited normal distribution and homogeneity. Through paired sample t-test hypothesis testing, the efficacy of Quizizz in enhancing students' learning interests was substantiated. These research findings align with previous studies, further affirming the efficacy of Quizizz media in facilitating learning. In conclusion, this study underscores the effectiveness of Quizizz media in bolstering students' learning interests in the Multimedia subject at SMKN 1 and SMKN 3 in Bengkulu City, Indonesia.

Suggestions for Future Research

Based on the comprehensive analysis conducted in this study, there are several suggestions for future research that could further enhance the understanding of the effectiveness of Quizizz and similar multimedia learning tools, as well as to explore related areas. Here are some suggestions: to conduct thorough comparative analyses to assess the effectiveness of Quizizz in contrast to alternative multimedia learning tools or traditional teaching methods. Utilize randomised controlled trials or quasi-experimental designs to ascertain which approach elicits superior outcomes concerning student engagement, learning interest, and academic performance. By rigorously evaluating these methodologies, educators can discern the most efficacious instructional strategies to optimise student learning experiences; to investigate the nuanced effects of Quizizz across various student demographics, including diverse age groups, academic backgrounds, and cultural contexts. By discerning potential variations in Quizizz's impact, educators can devise tailored interventions to address the unique needs and preferences of different student cohorts. This comprehensive understanding enables the development of inclusive educational approaches that cater to the diverse requirements of all learners.

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Conflict of Interest

The authors declare that there are no conflicts of interest related to this research project. All research activities, data collection, analysis, and interpretation were conducted with integrity and objectivity. There are no financial or personal relationships that could influence the research findings or bias the interpretation of results. Furthermore, the authors affirm that any sources of funding or support for this research are disclosed transparently and have not influenced the design, conduct, or reporting of the study. We uphold the principles of academic integrity and ethical conduct in all aspects of our research endeavors.

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