

Content lists available at [Indonesia Academia Research Society](http://IndonesiaAcademiaResearchSociety.com)

International Journal of Sustainable Development & Future Society

Journal homepage: ejournals.indoacademia-society.com

Original Article



The Effect of Quizizz Media Usage on the Learning Interest of Grade Students in Biology

Dini Rusfita Sari ^a, Venita Anggraeni ^a and Henny Suharyati ^{a,*}^a Postgraduate Program of Educational Management, Pakuan University, Bogor Tengah, 16129 Kota Bogor, Jawa Barat, Indonesia.* Correspondence: henny.suharyati@unpak.ac.id (H.S.)

Article History

Received 16 August 2024

Revised 22 October 2024

Accepted 6 November 2024

Available Online 30 November 2024

Keywords:

Quizizz

Media usage

Learning interest

Biology education

Student engagement

Abstract

This study investigates the impact of Quizizz media on students' interest in Biology at SMA Negeri 1 Parungpanjang, Bogor Regency. Employing a quantitative approach with a survey method, this study focused on 107 class XII students specializing in biology, selected through simple random sampling from a population of 146 students. Data collection was conducted using an online questionnaire, and an analysis was performed using simple regression to assess the influence of Quizizz media on student learning interest. The results revealed a significant effect of Quizizz media usage on students' learning interest. The coefficient of determination (R square) of 0.327 indicated that Quizizz media accounted for 32.7% of the variance in learning interest. The findings demonstrate that Quizizz media significantly enhances students' interest in biology. Game-based learning, which combines visual and verbal elements, shows promising potential as an effective learning method. Quizizz media have been shown to increase student engagement and learning interest, addressing various conventional learning challenges in the digital era. Based on these results, educators are encouraged to consider incorporating digital learning resources such as Quizizz to enhance students' motivation and interest in learning. This study contributes to the growing body of evidence supporting the integration of interactive technology-based tools in educational settings to improve student engagement and learning outcomes.

Copyright: © 2024 by the authors. Submitted for possible open-access publication under the terms and conditions of the Creative Commons Attribution (CC BY 4.0) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Biology is a scientific discipline as part of the natural sciences, which is the study of matter and energy related to living things and their life processes (Tambunan et al., 2023). Biology is not a single science but a multidisciplinary science that is closely related to other sciences (Alvargonzález, 2011). The new development of biological disciplines related to other sciences, such as chemistry, has given birth to new sciences, such as pharmacology, molecular biology, and biochemistry (Nicolau, 2014). Etobro & Fabinu (2017) mentioned that biology is considered one of the most difficult subjects to understand because it uses many scientific terms (scientific names) that are not commonly used in daily life, complex learning concepts and difficult-to-explain process material related to natural life. Biology is

the science of life, symptoms, and life processes that interact with and in society.

The teaching and learning process in the classroom, with the presence of teachers and students, has a high level of effectiveness in conveying understanding. The subject that is conveyed to students must be in accordance with what is intended by the teacher so that learning activities between teachers and students can be established effectively (Putra & Irwansyah, 2020). Nasution (2017) also explained that students study diligently if they have an interest in learning. If a subject is not appealing, students will quickly become bored and shift their attention to other matters, especially if they face difficulties. On the other hand, if the subject is of interest, students tend to spend time studying the lesson (Putra & Irwansyah, 2020).

Good academic achievement requires not only intelligence but also a learning interest that emerges from within the students themselves (Fernandez et al., 2022). Students' interest in learning is a crucial factor in understanding lessons. Interest is a strong desire for something inherent in every individual. Strong interest fosters sincere efforts to overcome various challenges (Asria et al., 2021). Suppose students have a high interest in learning biology. In that case, they will study the material in depth to understand it thoroughly, enabling them to grasp and remember the content quickly and achieve good learning outcomes. Interest significantly impacts the learning process. Furthermore, interest can develop through the learning process, which equips students with various skills that support a better quality of life (Yulistiarawati et al., 2021).

According to Renninger (2014), learning interest is the internal and external drive within students to bring about behavioral changes during the learning process. Students learning interest reflects their motivation to gain desired benefits (Listiyani & Muhammad, 2023). The teaching methods employed by teachers significantly influence students' interest in learning materials. Teaching methods have a substantial impact on students' learning interests, as delivering material in ways that align with their needs and characteristics can enhance their engagement with the subject. Interactive, varied, and relevant teaching methods contribute to creating an engaging learning environment, making students feel more involved and motivated to understand the material (Azzahra & Pramudiani, 2022).

In response to the rapid development of science and technology and its influence on the field of education, teachers, as learning managers, are encouraged to improve the quality of education within the learning process (Aprianis, 2022). Effective learning processes are fostered through communication between teachers and students, which plays a critical role in shaping students' learning interests and academic performance to achieve educational goals. From a communication perspective, the current digital era has introduced computer-based communication patterns that increasingly replace direct interpersonal interactions. This shift is driven by the proliferation of digital platforms that facilitate remote communication through text, audio, and video-based channels.

According to West (2012), digital technology provides at least three specific functions in learning that require focus and concentration, particularly in mathematics and science: (1) technology for performing mathematical operations; (2) technology for skill training, acting as a platform to refine mathematical and scientific abilities, and (3) technology for developing conceptual understanding, where digital technology functions as an effective learning environment to enhance students'

conceptual knowledge of specific mathematical concepts. These functions highlight the didactic role of integrating digital technology into the learning process.

Rahmawati et al. (2023) state that innovative and student-centered learning is a teacher's responsibility. Therefore, the teacher is only a facilitator of learning. One of the innovations in learning is the use of quizzes as a tool for student practice exercises. Learning while playing through Quizizz on smartphones or laptops creates an enjoyable learning atmosphere for students. Quizizz is a platform accessible via a website that can be utilized by students both in and outside the classroom (Nurliana & Nugroho, 2021). This media is equipped with avatars, characters, themes, and music, serving as entertaining elements for students during learning activities or when completing practice questions. This feature is particularly beneficial for assessments in biology, as it simplifies the use of visual media, such as cell structures or anatomical organs. According to Salsabila et al., Quizizz is an educational medium designed to address various challenges of conventional learning in the digital era (Listiyani & Muhammad, 2023).

A previous study conducted by Sukma et al. (2021) found that the learning outcomes were higher in the experimental class compared to the control class, with the t-test result showing a t-value of $4.399 > t\text{-table of } 1.697$. It can be concluded that the use of Quizizz media influences the biology learning outcomes of the X MIPA students at SMAN 3 Maros. The present study introduces a new aspect by examining the impact of Quizizz media on the learning interest of 12th-grade students in Biology at SMA Negeri 1 Parungpanjang, Kabupaten Bogor.

Considering the importance of biology in education, teachers are required to apply innovative biology learning media to engage and motivate students in the subject. Therefore, it is necessary to implement the use of biology learning media, such as Quizizz, to determine the biology learning interest of students in 12th grade A & B who have biology specialization subjects in the Kurikulum merdeka.

2. Materials and Methods

This investigation employed a questionnaire-based survey methodology with a questionnaire disseminated through Google Forms. The survey instrument comprised 20 items designed to assess two primary variables: learning interest (the dependent variable, Y) and utilization of Quizizz media (the independent variable, X). The study population consisted of 146 students in the 12th grade enrolled in the A and B specialization programmes within the Kurikulum Merdeka framework. The Slovin formula was used to determine the appropriate sample size, resulting in a final sample of 107 respondents. The data gathered from the survey were subjected to regression analysis to explore the

correlation between Quizizz media usage and students' interest in learning.

This analytical approach provided insights into how the independent variable influenced the dependent variable, offering a comprehensive understanding of Quizizz's potential impact on student engagement and motivation based on their survey responses. The questionnaire items were meticulously developed to collect pertinent data on both variables, ensuring that they effectively captured the intricacies of students' experiences with Quizizz as an educational tool and their levels of learning interest. Google Forms was chosen as the distribution platform to facilitate efficient data collection and streamline the response-gathering process.

Upon completion of data collection, the responses were statistically analyzed. Regression analysis was selected for its capacity to quantify the relationship between the independent and dependent variables and to determine the extent to which Quizizz usage might influence students' learning interests. The findings of this analysis are anticipated to yield valuable insights into Quizizz's effectiveness as an educational tool and its role in promoting student engagement in the learning process.

3. Results

3.1. Respondent Characteristics

Data collection in this study was conducted using an online questionnaire in a Google Form. The respondents in this study are 12th grade students from the A and B specialization programs who have participated in biology lessons and taken the daily biology test. The characteristics of the respondents include gender and class, as shown in Table 1 below:

Table 1. Result of Respondent's Characteristic

Class	Sample	Gender	
		Male	Female
12 A 1	26	13	13
12 A 2	26	12	14
12 B 1	26	16	10
12 B 2	29	10	19
Total	107	51	56

Table 1 provides a detailed distribution of the sample in the study, categorized by class and gender. The total sample size consists of 107 students, with a balanced gender representation of 51 male students and 56 female students. The sample includes students from two main class categories: 12 A and 12 B, with each category further divided into two groups (1 and 2).

In Class 12 A 1, there are 26 students, split evenly with 13 male and 13 female students. Class 12 A 2 also has 26 students, but the gender distribution slightly favors females, with 12 male and 14 female students. In

Class 12 B 1, the gender balance shifts, as there are 16 male students and only 10 female students out of the total 26 students. Class 12 B 2, the largest group, consists of 29 students, with a notable gender imbalance of 10 male students and 19 female students.

Overall, the distribution across all groups indicates a slight predominance of female students in the sample, but the total number of males and females is relatively close. This demographic breakdown provides a foundation for further analysis of any gender-related trends or insights in the context of the study. In addition, to determine the effect of using Quizizz media on the learning interest of grade 12 students in biology subjects, the normality and homogeneity tests are carried out first. Furthermore, a linearity test will be carried out to determine the relationship between the independent variable and the dependent variable, and hypothesis testing will then be conducted.

3.2. Classical Assumptions

3.2.1. Normality Test

Table 2. Result of Normality Test using One-Sample Kolmogorov-Smirnov (N=107)

		Unstandardized Residual
Normal Parameters ^{a,b}	Mean	0.000
	Std. Deviation	6.700
	Absolute	0.087
Most Extreme Differences	Positive	0.087
	Negative	-0.042
Kolmogorov-Smirnov Z		0.899
Asymp. Sig. (2-tailed)		0.395

a. Test distribution is Normal.

b. Calculated from data.

Table 2 shows the Kolmogorov-Smirnov test was employed to assess the normality of the data. According to Harding et al. (2014), the standard error of the estimate is considered normal if the asymptotic significance (Asymp. Sig.) is greater than or equal to the chosen significance level (α), typically set at 0.05. The results of the normality test revealed an asymptotic significance value of 0.395, which is greater than 0.05, suggesting that the data follows a normal distribution. Consequently, the assumption of normality has been met.

3.2.2. Homogeneity Test

Table 3. Result of Homogeneity of Variance

	Levene Statistic	df1	df2	Sig.
Mean	0.053	1	212	0.819
Median	0.037	1	212	0.847
Median and with adjusted df	0.037	1	211.898	0.847
Trimmed mean	0.047	1	212	0.829

Levene's Test was used to assess the homogeneity of variances (see Table 3), with a significance level set at 0.05. According to Harding et al. (2014), if the significance value from the homogeneity test exceeds 0.05, it indicates that the variances of the data are approximately equal, suggesting that the data from the two groups are homogeneous. The results of the homogeneity test showed a significant value of 0.819, which is greater than 0.05, indicating that the variances of the data are homogeneous across the groups.

3.2.3. Linearity Test

According to Harding et al. (2014), the linearity test is conducted to assess whether the relationship between the independent variable and the dependent variable is linear. The results of the linearity test for the effect of Quizizz media usage (X) on learning interest (Y) produced the following regression equation: $Y = 12.43 + 0.58X$. This relationship is further illustrated in the scatter plot presented in Figure 1 below.

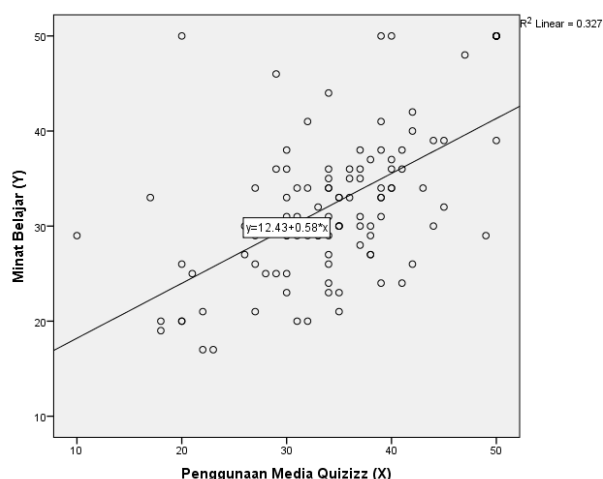


Figure 1. Scatter Plot of the Use of Quizizz Media and Learning Interest

The analysis is based on the F-test results, as presented in Table 4 below, to assess the significance of the regression equation.

Table 4. Result of ANOVA testing

	Sum of Squares	df	Mean Square	F	Sig.
Regression	2315.8	1	2315.8	51.09	.000 ^b
Residual	4759.2	105	45.32		
Total	7075.0	106			

a. Dependent Variable: Learning Interest.
 b. Predictors: (Constant), Quizizz Media Usage

Table 4 presents the significance value of 0.000, which is less than the alpha level of 0.05, and a calculated F value of 51.092. When compared to the F table value of 3.93, the calculated F value exceeds the F table value ($51.092 > 3.93$). It indicates that the simple linear regression model is statistically significant and can be used to predict the level of learning interest as influenced by Quizizz media.

3.3. Hypothesis Test

To assess the impact of individual exogenous variables on the endogenous variable, the analysis can be conducted using the t-test results, as presented in Table 5 below.

Table 5. Result of Hypothesis Testing

Variable	Unstandardized Coefficients		Standardized Coefficients	t
	B	Std. Error	Beta	
(Constant)	12.429	2.865		4.338***
Quizizz Media Usage	0.578	0.081	0.572	7.148***

a. Dependent Variable: Learning Interest

Note: *** is significant at 1 %

Table 5 presents the results of the significance test for the impact of Quizizz media usage on learning interest, showing a significance value of 0.000. Since this value is less than the alpha level of 0.05, it can be concluded that Quizizz media usage has a statistically significant effect on learning interest. The computed t-value for the Quizizz media usage variable is 7.148, which exceeds the critical t-value of 1.66. This suggests that the alternative hypothesis (H1) is supported, while the null hypothesis (H0) is rejected. To assess the extent of Quizizz media usage's contribution to learning interest, the coefficient of determination from the SPSS test results should be considered.

Table 6. Result of Coefficient of Determination

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.572 ^a	0.327	0.321	6.732

a. Predictors: (Constant), Quizizz Media Usage
 b. Dependent Variable: Learning Interest

Table 6 shows the coefficient of determination (R^2) obtained is 0.327, meaning that the effect of Quizizz media usage on learning interest is 32.7%. In comparison, the remaining 67.3% is influenced by other factors outside of the Quizizz media usage variable.

4. Discussion

The results of the study indicate that the implementation of biology learning using Quizizz media influences students' learning interests. This finding is consistent with previous research conducted by Afriza et al. (2022). The use of Quizizz media greatly assists in the assessment of biology learning, particularly because it incorporates images to help students analyze questions. Additionally, Quizizz can serve as an entertainment medium and trigger competition among students. This contributes to an increase in students' learning interests. Researchers have frequently studied the use of the Quizizz application as a learning medium, demonstrating

its benefits in digital-based learning. One of the advantages of Quizizz is its role in transitioning from conventional teaching methods to technology- and information-based learning, thus enhancing students' interest and learning outcomes through creative, innovative, and enjoyable teaching approaches.

Interest is a strong tendency or inclination towards something, passion, or desire, while interest is defined as having or showing interest, a tendency of the heart toward or wanting (something). Another definition is provided by Achru (2019), who states that interest is attention that involves emotional elements. Meanwhile, according to Perry (1954), interest is interpreted as the willingness of the soul, which is active in receiving something from the outside. Interest refers to the inclination or desire that arises within a person to pay attention to be attracted to and focus on a specific object, activity, or field. Interest is often driven by feelings of enjoyment or satisfaction derived from the activity. In the context of learning, interest can be defined as the attraction to the process or content of learning, which motivates a person to engage more deeply. Learning interest plays a significant role in determining learning success, as students with high interest tend to be more active, persistent, and enthusiastic in participating in learning activities.

Learning interest is the tendency of students to be attracted to and enthusiastic about participating in the learning process. This interest can influence how students participate, understand, and absorb the material being delivered. Learning interest is not only reflected in the attraction to the subject matter but also in intrinsic motivation to achieve a deep understanding and the ability to engage in the learning process actively. Abraham Maslow states that a person is motivated because they have needs that must be fulfilled. According to Maslow, these needs are as follows:

1. **Physiological needs:** These are the basic needs that must be met, such as food, shelter, clothing, air, and so on.
2. **Safety needs:** The need to feel secure. This need is fulfilled after the physiological needs are met.
3. **Love and belonging needs:** The need for affection, such as feeling accepted by a group and being valued and respected by others.
4. **Esteem needs:** Individuals tend to seek recognition and appreciation from others after completing certain tasks.
5. **Self-actualization needs:** The need for achievement is closely related to the desire to develop one's talents and interests.

The peak of the individual's needs pyramid is represented by self-actualization and fulfillment needs. These needs are satisfied when an individual can

develop themselves in accordance with their desires and aspirations. Sabri (in Fikriyah, 2020) states that students' interest in learning has several functions, namely:

1. **As a driving force:** It motivates students to keep studying. Students who are interested in the subject will be continuously driven to persevere in their learning.
2. **Encouraging students to strive towards goals:** Interest in learning pushes students to make efforts to achieve their objectives.
3. **Determining the direction of students' actions:** It directs students' efforts toward the goals they wish to achieve.
4. **Encouraging students to be selective in their actions:** Students with high motivation tend to be more selective and focused, ensuring their actions align with their goals.

Students' interest in learning serves as the primary motivator in the effort to achieve optimal learning outcomes. Interest in learning not only affects the level of student engagement in learning activities but also plays a crucial role in shaping a positive perception of the material being studied. However, students' interest in learning is influenced by various factors, both internal to the students themselves and from their surrounding environment. According to Muhibbin Syah (in Fikriyah, 2020), two factors influence interest in learning:

1. **Intrinsic factors** refer to things and conditions originating from within the students themselves that can encourage them to engage in learning activities. These include feelings of enjoyment toward the material and the need for the material being studied.
2. **Extrinsic factors** refer to external conditions that encourage students to engage in learning activities. These include praise, rewards, school rules or regulations, parental role models, and the teaching methods employed by the teacher.

Various factors influencing students' interest in learning, such as school environment support, the role of teachers, and teaching methods, are reflected in measurable indicators of learning interest. Safari (Fikriyah, 2020) mentions the following indicators of learning interest:

1. **Pleasure:** Individuals who feel happy or enjoy certain activities tend to have a connection between their feelings and interests.
2. **Attention:** The presence of attention refers to the concentration or mental activity of the individual directed towards observations, understanding, and similar aspects while disregarding other distractions.

3. Interest: Individuals with a high interest in a particular subject at school are likely to develop a strong attraction to both the teacher and the subject taught. Therefore, feeling attracted is an indicator that reflects a person's interest.
4. Student Engagement: Students' interest in a subject motivates them to enjoy and be eager to engage in tasks related to that subject.

Slavin (2018) mentioned that teachers who use active and collaborative learning methods tend to encourage higher learning interest because students feel they have a role in the learning process and can connect the knowledge they learn with their real-life experiences. Research by Zajda (2018) also mentions that learning methods that are challenging yet enjoyable will motivate students more and increase their interest in learning.

On the basis of the data analysis using simple regression tests, it is evident that Quizizz has a significant effect on students' learning interest, with an F-calculated value of $51.092 > F\text{-table } 3.93$ and a significance value of $0.000 < 0.05$. This confirms that quizzes can increase students' interest in learning. Students' learning interest, measured through a questionnaire instrument, showed an increase in alignment with the use of Quizizz as a learning medium. The t-calculated value greater than the t-table value ($7.148 > 1.66$) indicates a real effect of Quizizz on learning interest. Additionally, the coefficient of determination (R^2) value of 0.327 shows that 32.7% of the variation in learning interest can be explained using Quizizz media. This means that, although other factors also contribute to learning interest, Quizizz plays a significant role in enhancing students' learning interests.

The use of Quizizz media plays a significant role in creating an interactive, enjoyable, and competitive learning atmosphere, which can positively influence students' learning interests. This media provides an appealing opportunity for students to become more actively engaged in the learning process, thereby enhancing their motivation and involvement. Quizizz not only offers variety in learning methods but also enables students to learn independently, assess their understanding in real-time, and receive immediate feedback after completing the quiz (Matematika & Dasar, 2024)

Quizizz is one of the efforts to address the challenges of traditional learning media in Indonesia, which cannot be applied conventionally alongside other forms of technology-based learning. A digital-based educational model can be strategically framed narratively with a perspective-driven approach. Quizizz can help boost students' learning motivation and improve learning outcomes. This aligns with Sumarni's opinion, which states that game-based learning has great potential as an effective learning media because it can stimulate both visual and verbal components (Saputro & Lestari, 2022).

This finding reinforces the view that the use of digital technology in learning can be an effective strategy to motivate students. Therefore, teachers should consider the use of media such as quizzes as an alternative teaching method, particularly in subjects like biology, which are often perceived as challenging and require innovative approaches. Thus, it is hoped that the use of digital-based learning media can be widely implemented to enhance student interest and engagement in the learning process.

5. Conclusions

The implementation of Quizizz media has demonstrated a significant and positive impact on students' interest in Biology at SMA Negeri 1 Parungpanjang. This conclusion is robustly supported by a comprehensive statistical analysis, which provides compelling evidence for the effectiveness of this digital learning tool—the result indicating a statistically significant relationship between the use of Quizizz media and students' learning interest. Furthermore, a significance value of 0.000, which falls well below the conventional threshold of 0.05, reinforces the statistical significance of these findings. Additionally, the calculated t-value of 7.148 surpasses the t-table value of 1.66, further corroborating the strength of the relationship between Quizizz media implementation and enhanced student interest.

The coefficient of determination reveals that Quizizz media accounts for 32.7% of the variance in students' learning interests. This substantial percentage underscores the considerable influence that this digital tool exerts on students' engagement with biological content. The effectiveness of Quizizz Media can be attributed to its capacity to create an interactive, engaging, and competitive learning environment. By fostering active student participation in the educational process, Quizizz Media transforms traditional classroom dynamics, encouraging students to take a more proactive role in their learning journey.

The success of Quizizz media in enhancing students' interest in biology can be attributed to several key factors. First, the interactive nature of the platform allows for immediate feedback, enabling students to gauge their understanding of the subject matter in real-time. This instant feedback mechanism not only reinforces correct responses but also provides opportunities for immediate clarification of misconceptions, thereby facilitating a more efficient learning process. Second, the gamification elements inherent in Quizizz media introduce an element of competition and excitement into the learning experience. This competitive aspect can serve as a powerful motivator, encouraging students to engage more deeply with the subject matter and to strive for improved performance. The incorporation of leaderboards, point systems, and time-based challenges adds fun to the learning process, which can be

particularly effective in maintaining student interest over extended periods.

Furthermore, the flexibility and accessibility of Quizizz media allow for its integration into various teaching modalities, including in-class activities, homework assignments, and review sessions. This versatility enables educators to tailor their use of the platform to suit the needs of their students and the specific requirements of their curriculum. Based on these compelling findings, it is strongly recommended that educators consider incorporating digital media tools such as Quizizz into their teaching strategies. The potential benefits of such integration extend beyond merely enhancing the students' learning interests. They also include improved motivation, increased engagement with the course content, and potentially better academic outcomes. However, it is essential to note that effective implementation of such tools requires careful planning and integration into a broader pedagogical framework.

This study provides robust evidence for the positive impact of Quizizz media on students' interest in biology. The statistical significance of the results, coupled with the substantial proportion of variance explained by the implementation of this digital tool, underscores its potential as an asset in modern educator's toolkit. As educational technology continues to evolve, further research on the long-term effects of such tools on student learning outcomes and motivation would be beneficial. Nonetheless, the current findings provide a strong foundation for advocating the thoughtful integration of digital media tools such as Quizizz into educational practices, particularly in biology education.

Author Contributions: Conceptualization, D.R.S. and H.S.; methodology, D.R.S.; software, D.R.S.; validation, V.A. and H.S.; formal analysis, D.R.S.; investigation, D.R.S. and H.S.; resources, D.R.S.; data curation, V.A. and H.S.; writing—original draft preparation, D.R.S. and H.S.; writing—review and editing, V.A. and H.S.; visualization, D.R.S.; supervision, V.A. and H.S.; project administration, H.S.; funding acquisition, H.S. All authors have read and agreed to the published version of the manuscript.

Author Initials:

D.R.S. - Dini Rusfita Sari D.R.S. and H.S.

V.A. - Venita Anggraeni V.A. and H.S.

H.S. - Henny Suharyati

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Inform Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Not applicable.

Acknowledgments: The authors would like to thank Pakuan University, Bogor, Indonesia, for supporting this research and publication. We also thank the reviewers for their constructive comments and suggestions.

Conflicts of Interest: The authors declare no conflict of interest.

References

- Achru, P. A., (2019). Pengembangan minat belajar dalam pembelajaran. *Idaarrah: Jurnal Manajemen Pendidikan*, 3(2), 205. <https://doi.org/10.24252/idaarah.v3i2.10012>
- Afriza, M., Tanjung, S., & Sugiharto, S. (2022, December). The Effect of Using Quizizz Learning Media and Critical Thinking Ability on Cultural Arts Learning Outcomes in Class X MAN 2 Medan Model. In *Proceedings of the 7th Annual International Seminar on Transformative Education and Educational Leadership, AISTEEL 2022, 20 September 2022, Medan, North Sumatera Province, Indonesia*.
- Alvargonzález, D. (2011). Multidisciplinarity, interdisciplinarity, transdisciplinarity, and the sciences. *International studies in the philosophy of science*, 25(4), 387-403.
- Aprianis, C. (2022). *Pengaruh Penggunaan Aplikasi Quizizz Terhadap Minat Belajar Siswa Pada Materi Hidrokarbon Sekolah Menengah Atas Negeri 9 Mandau* (Doctoral dissertation, Universitas Islam Negeri Sultan Syarif Kasim Riau).
- Asria, L., Sari, D. R., Ngaini, S. A., Muyasaroh, U., & Rahmawati, F. (2021). Analisis antusiasme siswa dalam evaluasi belajar menggunakan platform Quizizz. *Alifmatika: Jurnal Pendidikan dan Pembelajaran Matematika*, 3(1), 1–17. <https://doi.org/10.35316/alifmatika.2021.v3i1.1-17>
- Azzahra, M. D., & Pramudiani, P. (2022). Pengaruh Quizizz sebagai Media Interaktif terhadap Minat Belajar Siswa pada Pelajaran Matematika Kelas V di Sekolah Dasar. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 6(3), 3203-3213.
- Etobro, A. B., & Fabinu, O. E. (2017). Students' perceptions of difficult concepts in Biology in senior secondary schools in Lagos State. *Global Journal of Educational Research*, 16(2), 139-147.
- Fernandez-Perez, V., & Martin-Rojas, R. (2022). Emotional competencies as drivers of management students' academic performance: The moderating effects of cooperative learning. *The International Journal of Management Education*, 20(1), 100600.
- Listiyani, I., & Muhammad, N. Y. (2023). Pengaruh gamifikasi Quizizz dan keaktifan belajar terhadap hasil belajar Pendidikan Agama Islam (PAI) SD Muhammadiyah Mlangi tahun pelajaran 2022/2023. *G-Couns: Jurnal Bimbingan dan Konseling*, 7(03), 773–786. <https://doi.org/10.31316/gcouns.v7i03.5029>
- Nasution, W. N. (2017). The Effects of Learning Model and Achievement Motivation on Natural Science Learning Outcomes of Students at State Islamic Elementary Schools in Medan, Indonesia. *Journal of Education and Training*, 4(2), 131-150.
- Nicolaou, K. C. (2014). The chemistry-biology-medicine continuum and the drug discovery and development process in academia. *Chemistry & Biology*, 21(9), 1039-1045.
- Nurliana, E., & Nugroho, O. F. (2021). Analisis Hasil Belajar Dalam Penggunaan Quizizz Padapembelajaran Ipa. In *Seminar Nasional Ilmu Pendidikan Dan Multi Disiplin*, 4 14-21.

- Perry, R. B. (1954). *General theory of value: Its meaning and basic principles construed in terms of interest*. Harvard University Press.
- Putra, R. S., & Irwansyah, I. (2020). Media komunikasi digital, efektif namun tidak efisien, studi media richness theory dalam pembelajaran jarak jauh berbasis teknologi di masa pandemi. *Global Komunika: Jurnal Ilmu Sosial dan Ilmu Politik*, 3(2), 1-13.
- Renninger, K. A., Hidi, S., Krapp, A., & Renninger, A. (2014). *The role of interest in learning and development*. Psychology Press.
- Saputro, Y. D., & Lestari, M. (2022). Evaluasi penggunaan Quizizz untuk meningkatkan motivasi belajar peserta didik. *Journal of Informatics and Vocational Education*, 5(2), 5-8. <https://doi.org/10.20961/joive.v5i2.68074>
- Sukma, N., Lestari, P. I., & Nur, R. A. (2021). Pengaruh media "Quizizz" dalam pembelajaran daring terhadap hasil belajar biologi siswa. *Binomial*, 4(2), 154-166. <https://doi.org/10.46918/bn.v4i2.1042>
- Tambunan, O., Risnita, R., & Hariyadi, B. (2023). Analisis Penggunaan Aplikasi Evaluasi Belajar Online Pada Pembelajaran Biologi di SMA Kota Jambi:(Analysis of the Use of Online Learning Evaluation Applications in Biology Learning in Jambi City High Schools). *BIODIK*, 9(2), 103-116. <https://doi.org/10.22437/biodik.v9i2.21657>
- Yulistiarawati, D. N., Umayaroh, S., & Linguistika, Y. (2021). Analisis minat belajar siswa dalam penggunaan aplikasi belajar Quizizz pada pembelajaran tematik kelas III sekolah dasar. *Jurnal Pembelajaran, Bimbingan, Dan Pengelolaan Pendidikan*, 1(7), 573-584.
- Zajda, J. (2018). Motivation in the classroom: Creating effective learning environments. *Educational Practice and Theory*, 40(2), 85-103.