



# The Use of Quizizz Applications and Its Impact on Higher Order Thinking Skills of Elementary School Teacher Education Students in Elementary Science Learning

Etie Novia Rizki<sup>1\*</sup>, Haryanto<sup>2</sup>, Wahyu Kurniawati<sup>3</sup> 

<sup>1,2</sup> Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

<sup>3</sup> Universitas PGRI Yogyakarta, Yogyakarta, Indonesia

## ARTICLE INFO

### Article history:

Received February 22, 2022

Accepted May 04, 2022

Available online May 25, 2022

### Kata Kunci:

Aplikasi Quizizz, HOTS, Pendidikan Guru

### Keywords:

Quizizz Application, HOTS, Teacher Education



This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.

Copyright © 2022 by Author. Published by Universitas Pendidikan Ganesha.

## ABSTRAK

Kemampuan *Higher order thinking skill (HOTS)* yang seharusnya berkembang pada mahasiswa semester genap PGSD dalam pembelajaran IPA mengalami kendala karena pembelajaran jarak jauh selama pandemi Covid-19. Penelitian ini bertujuan untuk menganalisis pengaruh penggunaan aplikasi media Quizizz terhadap *Higher order thinking skill (HOTS)* mahasiswa PGSD pada pembelajaran IPA. Jenis penelitian adalah quasi eksperimen (eksperimen semu) dengan desain penelitian *Pretest-Posttest Control Group Design*. Populasi yang digunakan adalah mahasiswa PGSD semester genap kelas eksperimen A2 dan kelas kontrol A1 berjumlah 68 mahasiswa. Pengambilan sampel menggunakan teknik *purposive sampling*. Pengumpulan data menggunakan tes dan observasi. Instrumen yang digunakan dalam penelitian adalah soal tes berbentuk objektif. Teknik analisis data dengan menggunakan uji analisis deskriptif, uji normalitas, uji homogenitas, uji hipotesis dan uji ANOVA. Hasil penelitian menunjukkan bahwa skor rata-rata nilai hasil *posttest* dengan menggunakan Quizizz lebih tinggi dari pada skor hasil *posttest* dengan menggunakan Kahoot. Dengan demikian, dapat disimpulkan terdapat pengaruh aplikasi media Quizizz terhadap kemampuan *Higher order thinking skill (HOTS)* pada mahasiswa dalam pembelajaran IPA.

## ABSTRACT

Higher-order thinking skills (HOTS), which should develop in even semester students of PGSD in science learning, have experienced problems due to distance learning during the Covid-19 pandemic. This study aims to analyze the effect of using the Quizizz media application on Higher order thinking skills (HOTS) of PGSD students in science learning. This type of research is a quasi-experimental (quasi-experimental) design with *Pretest-Posttest Control Group Design*. The population used is the even semester students of the experimental class A2 and the control class A1 totaling 68 students. Sampling using a purposive sampling technique and collecting data using tests and observations. The instrument used in the study was an objective test question: the data analysis technique used descriptive, normality, homogeneity, hypothesis, and ANOVA tests. The results showed that the average score of the post-test results using Quizizz was higher than the post-test scores using Kahoot. Thus, it can be concluded that the Quizizz media application affects students' Higher order thinking skill (HOTS) ability in science learning.

## 1. INTRODUCTION

Education is a place or institution in realizing the ideals of education to create a generation of quality human resources (Bahri, 2022; Saputra, 2021). It means that quality education begins with human resources by prioritizing the meaning of education (Ghofir, 2020). Education facilitates human resources in building a generation that can produce superior quality (Indrati et al., 2020). Education staff or teachers are one of the components that determine the success of a learning process. Educators can change education (Somantri, 2021; Suardipa & Handayani, 2021; Susilo & Sarkowi, 2018). Becoming a quality educator requires a learning process at the tertiary level, which will later produce knowledgeable, conversant, creative, independent, democratic, and responsible students.

One of the learning processes that can produce quality students is the science learning process which involves higher-order thinking processes. The higher-order thinking process means that the learning process is student-centered and aims to shape and build students to think critically and at a higher level. Students can apply Higher order thinking skills (HOTS) in science learning (Nur et al., 2022; Satwika et al., 2018; Wicaksono, 2022). Science learning studies phenomena or events that occur in nature (Handayani, 2018). Learning science can be done by experiment, experiment, observation, and observation of the

\*Corresponding author.

E-mail addresses: [riski88@gmail.com](mailto:riski88@gmail.com) (Etie Novia Rizki)

occurrence of a phenomenon in biology (Guswita et al., 2018; Susanto et al., 2019). Science is developed through natural observations, laboratory experiments, and theoretical studies, so learning science follows the characteristics of science (Khery et al., 2020; Muhajir et al., 2021). Therefore, science learning is delivered not only orally and in writing in class but also involves activities in the laboratory and observations of the natural surroundings. The complex science learning process can then assist students in developing higher-order thinking skills (HOTS) (Fanani, 2018).

Higher-order thinking ability (HOTS) is a systematic thinking process that leads to the ability to apply knowledge, skills, and values in reasoning, reflection, problem-solving, decision making, innovating, and creating new things (Gradini et al., 2018; Sani et al., 2020; Saraswati & Agustika, 2020). In the learning process in the 4.0 era, students are certainly required to master higher-order thinking skills or known as High Order Thinking Skills (HOTS), because higher-order thinking is one of the stages of thinking that cannot be separated from everyday life, and every student is directed to have this high-order thinking pattern because high-order thinking skills make a person able to think critically as described by (Astini, 2020; Chotimah & Nurdiansyah, 2017). Higher-order thinking skill (HOTS) is an ability that uses a person's higher way of thinking, which is not only memorizing, remembering but students must be able to think critically and creatively so that they can solve problems by analyzing, evaluating, and creating (Hendriawan & Usmaedi, 2019; Pardede et al., 2020; Saefullah et al., 2021). So in the high-level thinking process, students must apply what they have learned and analyze, evaluate, and synthesize the knowledge they have acquired to solve problems in everyday life (Sismawarni et al., 2020; Syahri & Ahyana, 2021). The main purpose of Higher order thinking skills (HOTS) is for students to collect information, categorize it and generate new ideas to be implemented in other situations they have (Thamrin et al., 2019).

It's just that the reality on the ground shows that the High Order Thinking Skills (HOTS) owned by students are considered less than optimal because, in their daily routines, such as in lectures, they only sit, listen, and take notes and analysis, evaluation and creation activities are rarely trained on students (Yuliati & Lestari, 2018). This aligns with initial observations and interviews at PGRI Yogyakarta University in the PGSD study program. The observations and interviews show that learning science by applying the High Order Thinking Skills (HOTS) ability has experienced problems, resulting in decreased student achievement. The obstacle most experienced by lecturers is the difficulty of designing online lessons to complete the syllabus and achieving HOTS goals. At the same time, the obstacles experienced by students are the difficulty of understanding the material because the lecture process is only carried out through the process of giving assignments without any delivery of material through the media. In addition, the lack of students' ability to get used to training thinking processes is also the cause of each student's low high-level thinking skills. Students tend to want to learn practically and instantly without going through a systematic thought process. It has an impact on the learning process that is less than optimal and has an impact on decreasing students' thinking abilities.

One of the efforts that can be made to overcome these problems is by applying a learning model that can train students' higher-order thinking skills, such as quiz learning media. Quizizz application media is a game form integrated with material or evaluation questions (Mulatsih, 2020; Mulyati & Evendi, 2020). The quiz app can be used as an online assessment tool through multiplayer fun classroom activities and allows all students to practice with their computers, smartphones, and iPads (Purba, 2020; Suwanto, 2021). Quizizz games also have game characteristics such as avatars, themes, memes, and entertaining music in the learning process, allowing students to compete with each other and motivate them to learn so that learning outcomes can improve (Mulyati & Evendi, 2020; Pamungkas, 2020). The Quizizz media application has various interesting features and is easy to use and understand for students (Rahman et al., 2020). As for the various advantages of the Quizizz media application, the use of the Quizizz media application is quite easy. The quizzes compiled can be directly added to the Quizizz media application and can be arranged with images, backgrounds, and options of choice (Jati, 2020; Nizaruddin et al., 2021; Yana et al., 2020). Second, Quizzes can be shared with codes with students. Third, the Quizizz media application provides statistical data from students' quiz results which can be downloaded as an Excel spreadsheet. Fourth, the use of the Quizizz media application is quite flexible because there is a time set in the quizzes (Ningsih et al., 2021).

Several studies that have been carried out previously revealed that using educational media based on quiz educational games effectively improved student learning outcomes in the tenth grade Office Technology subject (Citra & Rosy, 2020). Other studies also revealed that, in general, students considered using Quizizz to take quizzes assigned before face-to-face lectures in class, positively impacting learning activities in accounting courses. Students considered Quizizz an easy-to-use application. Its use made lectures fun, increased mastery of the material, and increased student motivation and activity in studying consolidated accounting courses (Amri & Shobri, 2020). Subsequent research also revealed the same thing, that it was stated that the quiz educational game media could increase student activity in online learning

during the prevention of the spread of Covid-19 social studies subjects (Nurhayati, 2020). Based on several previous research results, it can be said that the use of quizizz learning application media is very effective in using the online learning process. In previous studies, no studies discussed the use of the quizizz application and its impact on the higher-order thinking skills of elementary school teacher education students in elementary science learning. So this research is focused on analyzing the effect of using the Quizizz media application on Higher order thinking skills (HOTS) of PGSD students in science learning.

## 2. METHOD

The type of research used is quasi-experimental, with a research design of Pretest-Posttest Control Group Design. The population in this study were all second-semester students, totaling 68 students. Sampling in the study was carried out by random sampling technique, with the research sample being students in classes A2 and A1. The control class (class A-1) is taught using conventional learning methods, and the experimental class (class A-2) is taught using Quizizz learning media. Data collection in the study was carried out using the test method, with research instruments in the form of multiple-choice pretest and post-test questions. The pretest was given before the treatment was given to the experimental class and the control class. After the treatment, a post-test was given to measure the Higher order thinking skill (HOTS). Previously, the test instrument passed validity and reliability testing by validation experts.

The data obtained in the study were then analyzed using One Way Anova. Before testing the hypothesis, several requirements must be met and need to be proven. The requirements in question are: the data analyzed must be normally distributed and know the data being analyzed is homogeneous. Both of these prerequisites must be proven first, so to fulfill this, a prerequisite analysis test is carried out by conducting a normality test and a homogeneity test. Normality test using SPSS version 23 for windows statistical test Shapiro Wilk at a significance of 0.05. While the homogeneity of variance test in this study was carried out using Levene's Test of Equality of Error Variance with the help of SPSS version 23 through the Box's M test. After the prerequisite test was carried out, it was continued by calculating the t-test, the paired sample t-test.

## 3. RESULT AND DISCUSSION

### Result

Research on the analysis of the application of the Quizizz application media begins by carrying out an analysis of the average pretest and post-test results of students. The results of the calculations are presented in Table 1.

**Table 1.** The results of Calculating the Hots Ability Score

Statistic	A2		A1	
	Y1	Y2	Y1	Y2
Number of Respondents	34	34	34	34
mean	66.59	73.18	56.12	58.59
Standard Deviation	12.721	9.054	12.397	11.479
variance	161.825	81.968	153.683	131.765
Minimum Score	40	60	40	44
Maximum Score	88	92	80	80

Based on the data in Table 1. it can be seen that the results of the calculations from the research data show that the pretest results of the experimental class PGSD students before the Quizizz media application was applied got an average score of 66.59 with a minimum score of 40 and a maximum score of 88. At the same time, the post-test results of students in The control class PGSD after the Quizizz media application was applied got an average score of 73.18 with a minimum score of 60 and a maximum score of 92. Then the pretest results of the control class PGSD students before the Kahoot media application was applied got an average score of 56.12 with a minimum score of 40 and the maximum score of 88. At the same time, the post-test results of the control class PGSD students after the Kahoot media application was applied got an average score of 58.59 with a minimum score of 44 and a maximum score of 80. So from this data, the Quizizz application media application influences the ability of Higher order thinking skills (HOTS), which is proven n with the post-test results of the experimental class PGSD students having a greater average of 73.18. Furthermore, the prerequisite testing, the normality and homogeneity tests, must be carried out before testing the hypothesis. The normality test and homogeneity test can be seen in table 2.

**Table 2. Normality Test Results**

Statistic	Class	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
experimental class pretest results	IPA-A2	0.110	34	0.200	0.963	34	0.302
control class pretest results	IPA-A1	0.130	34	0.157	0.931	34	0.034
experimental class posttest results	IPA-A2	0.111	34	0.200	0.949	34	0.114
control class post-test results	IPA-A1	0.158	34	0.031	0.921	34	0.017

The normality test is a way to determine the results of the HOTS ability in science learning for PGSD students by using the Quizizz media application whether it has normally distributed data or vice versa. Calculations were performed through a normality test with a significant level ( $\alpha = 0.05$ ). So it is known from [Table 2](#) that the results of the normality test can be analyzed by comparing the largest (sig.) score with a significant level ( $\alpha = 0.05$ ). If the score (sig.)  $>$  ( $\alpha = 0.05$ ) is data that is normally distributed. Based on [Table 3](#), it can be found the score (sig.) of the experimental class and the score (sig.) of the control class which have a score higher than 0.05. The results of the two classes show that the data is normally distributed. The analysis was continued on the homogeneity test with a significance level of  $= 0.05$ . If the score (sig.) is superior to the significant level ( $\alpha = 0.05$ ), then the data is homogeneous. On the other hand, if the result is (sig.)  $<$  0.05, then the data is not homogeneous. The results of the homogeneity test are presented in [Table 3](#).

**Table 3. Homogeneity of Variance Test Results**

<b>Box's M</b>	<b>4.351</b>
F Approx.	1.432
df1	3
df2	31363.200
Sig.	0.231

[Table 3](#) shows that the calculation results in both classes have a score (sig.)  $0.231 > 0.05$ , so it is homogeneous data after calculating the normality test and homogeneity test with the results of the calculation of the results of normal and homogeneous data. In the next step, the researcher conducted a hypothesis test, the t-test, presented in [Table 4](#).

**Table 4. T-Test Results**

Statistic	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
<b>Result</b>								
<b>Pair 1 HOTS - Class</b>	61.118	13.665	1.172	58.800	63.435	52.157	135	0.000

Based on the calculation of the paired sample t-test with SPSS version 23, there are requirements when making decisions. If the score of sig. (2-tailed) is smaller than the score of (0.05), then H0 and H1 are accepted. The paired sample t-test test tests the hypothesis of an increase in the pretest and post-test scores for the class given the Quizizz treatment and the non-treatment class. The results show that [Table 5](#) has a smaller significance score of 0.05, which is  $0.000 < 0.05$ . So it can be concluded that using the Quizizz media application affects the ability of Higher order thinking skills (HOTS) of second-semester PGSD students in science subjects. Thus, based on the analysis of the hypothesis, there is a significant difference in the ability of Higher order thinking skills (HOTS) jointly between experimental class students (IPA A2) during the learning process using the Quizizz media application and control class students (IPA A1) during the learning process and using Kahoot media application. This can also be proven by the ANOVA results in the table below. The data results show a significance score of  $0.000 < 0.05$  or less than 0.05. So it can be proven that quizizz media application affects the ability of Higher order thinking skills (HOTS). The results of the one-way ANOVA test are presented in [Table 5](#).

**Table 5.** One Way ANOVA Result

Statistic	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6179.176	3	2059.725	15.567	0.000
Within Groups	17464.941	132	132.310		
Total	23644.118	135			

## Discussion

The research analysis results show that using the Quizizz media application affects students' Higher order thinking skill (HOTS) ability in science learning. It means that the Quizizz media application is better and more effective because the Quizizz application media allows students to be involved in lessons and complete their assignments so that the learning process becomes more permanent and efficient (Degirmenci, 2021; Nurdin & Anhusadar, 2020). A permanent and efficient learning process in using the Quizizz application can be realized because this Quizizz media application has many features that help students in the learning process, such as features in delivering material through videos, pictures, and various forms of quizzes (Jati, 2020; Ningsih et al., 2021; Nizaruddin et al., 2021; Yana et al., 2020). To encourage student motivation in learning and improve higher-order thinking skills (HOTS). They recall the importance of students' higher-order thinking skills (HOTS). Higher-order thinking skills (HOTS) are very interesting to show that students must experience learning that helps them improve their knowledge and thinking skills (Kwangmuang et al., 2021). In addition, through the HOTS thinking process, students will be able to increase their self-awareness of their thinking processes and their ability to criticize and solve problems (Jarvis & Baloyi, 2020).

Higher-order thinking skills (HOTS) are thinking skills that students must master to meet the demands of learning 4.0 (Astini, 2020; Chotimah & Nurdiansyah, 2017). High Order Thinking Skills (HOTS) is the ability to think systematically, which leads to applying knowledge, skills, and values in reasoning, reflection, problem-solving, decision making, innovating, and creating new things (Sismawarni et al., 2020; Syahri & Ahyana, 2021). In the process of high-level thinking, students are not only required to apply what they have learned but also to analyze, evaluate, and synthesize the knowledge they have acquired to solve problems in everyday life (Gradini et al., 2018; Sani et al., 2020; Saraswati & Agustika, 2020). The main purpose of Higher order thinking skills (HOTS) is for students to collect information, categorize it and generate new ideas to be implemented in other situations they have (Thamrin et al., 2019).

The results obtained in this study are in line with previous studies, which also revealed that the use of educational game-based learning media Quizizz was effective in improving student learning outcomes in the tenth-grade Office Technology subject (Citra & Rosy, 2020). Other studies also revealed that, in general, students considered using Quizizz to take quizzes assigned before face-to-face lectures in class, positively impacting learning activities in accounting courses. Students considered Quizizz an easy-to-use application. Its use made lectures fun, increased mastery of the material, and increased student motivation and activity in studying consolidated accounting courses (Amri & Shobri, 2020). Subsequent research also revealed the same thing, that it was stated that the quiziz educational game media could increase student activity in online learning during the prevention of the spread of Covid-19 social studies subjects (Nurhayati, 2020). Based on several previous research results, it can be said that the use of quiziz learning application media is very effective in using the online learning process.

## 4. CONCLUSION

Based on the results of the analysis of the results of hypothesis testing and the discussion that has been carried out, the conclusion in this study is that there are significant differences in the ability of Higher order thinking skills (HOTS) between experimental class students during the learning process using the Quizizz media application and control class students during the learning process using the Quizizz media application. The average score of the post-test results using the Quizizz media is higher than the post-test scores using the Kahoot media application. Thus, it can be concluded that Quizizz media application affects the Higher order thinking skills (HOTS) of UPY PGSD students in science learning.

## 5. REFERENCES

- Amri, M., & Shobri, Y. A. (2020). Persepsi Mahasiswa Terhadap Penggunaan Quizizz Dalam Pembelajaran Akuntansi Konsolidasi Bank Syariah Di Iain Ponorogo. *Jurnal Teknologi Informasi Dan Pendidikan*, 13(1). <https://doi.org/10.24036/tip.v13i1>.
- Astini, N. K. suni. (2020). Tantangan Dan Peluang Pemanfaatan Teknologi Informasi Dalam Pembelajaran Online Masa Covid-19. *Cetta: Jurnal Ilmu Pendidikan*, 3(2), 241-255.

- <https://doi.org/10.37329/cetta.v3i2.452>.
- Bahri, S. (2022). Meningkatkan Kualitas Manajemen Lembaga Pendidikan Islam Melalui Sumber Daya Manusia di Era Pandemi. *Munaddhomah: Jurnal Manajemen Pendidikan Islam*, 3(1), 43–56. <https://doi.org/10.31538/munaddhomah.v3i1.158>.
- Chotimah, U., & Nurdiansyah, E. (2017). Meningkatkan high order thinking skills mahasiswa semester III PPKn dalam pembelajaran Psikologi Sosial melalui penerapan metode six thinking hats. *Jurnal Civics: Media Kajian Kewarganegaraan*, 14(1), 63–74. <https://doi.org/10.21831/civics.v14i1.14563>.
- Citra, C. A., & Rosy, B. (2020). Keefektifan Penggunaan Media Pembelajaran Berbasis Game Edukasi Quizizz Terhadap Hasil Belajar Teknologi Perkantoran Siswa Kelas X SMK Ketintang Surabaya. *Jurnal Pendidikan Administrasi Perkantoran (JPAP)*, 8(2), 261–272. <https://journal.unesa.ac.id/index.php/jpap/article/view/8242>.
- Degirmenci, R. (2021). The Use of Quizizz in Language Learning and Teaching from the Teachers' and Students' Perspectives: A Literature Review Article. In *Language Education and Technology (LET Journal)*, 1(1). <http://langedutech.com>.
- Fanani, M. Z. (2018). Strategi Pengembangan Soal Hots Pada Kurikulum 2013. *Edudeena*, 2(1). <https://doi.org/10.30762/ed.v2i1.582>.
- Ghofir, J. (2020). Transformasi Nilai Pendidikan Keberagamaan Pada Generasi Milenial. *Tadris: Jurnal Penelitian Dan Pemikiran Pendidikan Islam*, 14(1), 92–111. <https://doi.org/10.51675/jt.v14i1.74>.
- Gradini, E., Firmansyah, F., & Noviani, J. (2018). Menakar Kemampuan Berpikir Tingkat Tinggi Calon Guru Matematika Melalui Level HOTS Marzano. *Eduma: Mathematics Education Learning and Teaching*, 7(2). <https://doi.org/10.24235/eduma.v7i2.3357>.
- Guswita, S., Anggoro, B. S., Haka, N. B., & Handoko, A. (2018). Analisis Keterampilan Proses Sains Dan Sikap Ilmiah Peserta Didik Kelas XI Mata Pelajaran Biologi Di SMA Al-Azhar 3 Bandar Lampung. *Biosfer: Jurnal Tadris Biologi*, 9(2), 249–258. <https://doi.org/10.24042/biosfer.v9i2.4025>.
- Handayani, T. W. (2018). Peningkatan Pemahaman Konsep IPA Menggunakan Model Pembelajaran Inkuiri Terbimbing Di SD. *Edutainment: Jurnal Ilmu Pendidikan Dan Kependidikan*, 6(2), 130–153. <https://doi.org/10.35438/e.v6i2.94>.
- Hendriawan, D., & Usmaedi. (2019). Penerapan Pembelajaran Higher Order Thinking Skill (HOTS) di Sekolah Dasar. *Jurnal Pendidikan Dasar Setiabudhi*, 2(2), 72–85. <https://stkipsetiabudhi.e-journal.id/jpd>.
- Indrati, I., Islam, M., & Paramita, A. (2020). Program Online Scholarship Competition Sebagai Wujud Partisipasi Penciptaan Generasi Emas Indonesia 2045. *Jurnal Penelitian Dan Pengembangan Sains Dan Humaniora*, 4(1), 1. <https://doi.org/10.23887/jppsh.v4i1.24392>.
- Jarvis, M.-A., & Baloyi, O. B. (2020). Scaffolding in reflective journaling: A means to develop higher order thinking skills in undergraduate learners. *International Journal of Africa Nursing Sciences*, 12(1), 100195. <https://doi.org/10.1016/j.ijans.2020.100195>.
- Jati, D. H. P. (2020). Peningkatan Hasil Belajar PPKn Melalui Pembelajaran Online Berbasis Quizizz. *E- Jurnal Mitra Pendidikan*, 4(5), 231–240. <https://doi.org/10.52160/e-jmp.v4i5.737>.
- Khery, Y., Rosma Indah, D., Aini, M., & Asma Nufida, B. (2020). Urgensi Pengembangan Pembelajaran Kimia Berbasis Kearifan Lokal dan Kepariwisata untuk Menumbuhkan Literasi Sains Siswa. *Jurnal Hasil Penelitian Dan Kajian Kepustakaan Di Bidang Pendidikan, Pengajaran Dan Pembelajaran*, 6(3), 460. <https://doi.org/10.33394/jk.v6i3.2718>.
- Kwangmuang, P., Jarutkamolpong, S., Sangboonraung, W., & Daungtod, S. (2021). The development of learning innovation to enhance higher order thinking skills for students in Thailand junior high schools. *Heliyon*, 7(6), e07309. <https://doi.org/10.1016/j.heliyon.2021.e07309>.
- Muhajir, S. N., Masara, A., & Ramdani, G. (2021). Literasi Sains Mahasiswa Calon Guru Fisika. *JURNAL Pendidikan Dan Ilmu Fisika*, 1(1), 24. <https://doi.org/10.52434/jpif.v1i1.1259>.
- Mulatsih, B. (2020). Application Of Google Classroom, Google Form And Quizizz In Chemical Learning During The Covid-19 Pandemic. *Ideguru: Jurnal Karya Ilmiah Guru*, 5(1). <https://doi.org/10.51169/ideguru.v5i1.129>.
- Mulyati, S., & Evendi, H. (2020). Pembelajaran Matematika melalui Media Game Quizizz untuk Meningkatkan Hasil Belajar Matematika SMP. *GAUSS: Jurnal Pendidikan Matematika*, 3(1), 64–73. <https://doi.org/10.30656/gauss.v3i1.2127>.
- Ningsih, M. P., Sugiyanti, S., & Ariyanto, L. (2021). Pengaruh Model Pembelajaran Quantum Learning dan Active Learning Berbantu Aplikasi Quizizz terhadap Hasil Belajar Matematika Siswa Kelas XI. *Imajiner: Jurnal Matematika Dan Pendidikan Matematika*, 3(5), 366–374. <https://doi.org/10.26877/imajiner.v3i5.7732>.
- Nizaruddin, N., Muhtarom, M., & Nugraha, A. E. P. (2021). Pelatihan Penggunaan Quizizz sebagai Media

- Evaluasi Pembelajaran Daring. *E-Dimas: Jurnal Pengabdian Kepada Masyarakat*, 12(2), 291–296. <https://doi.org/10.26877/e-dimas.v12i2.6417>.
- Nur, A. M., Nasrah, N., & Amal, A. (2022). Blended Learning: Penerapan dan Pengaruhnya Terhadap Kemampuan Berpikir Kritis Mahasiswa Program Studi PGSD. *Jurnal Basicedu*, 6(1), 1263–1276. <https://doi.org/10.31004/basicedu.v6i1.2189>.
- Nurdin, N., & Anhusadar, L. (2020). Efektivitas Pembelajaran Online Pendidik PAUD di Tengah Pandemi Covid 19. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 5(1), 686. <https://doi.org/10.31004/obsesi.v5i1.699>.
- Nurhayati, E. (2020). Meningkatkan Keaktifan Siswa Dalam Pembelajaran Daring Melalui Media Game Edukasi Quiziz pada Masa Pencegahan Penyebaran Covid-19. *Jurnal Paedagogy*, 7(3), 145. <https://doi.org/10.33394/jp.v7i3.2645>.
- Pamungkas, S. (2020). Upaya Meningkatkan Hasil Belajar Daring Pada Siswa Kelas VI Melalui Media Belajar Game Berbasis Edukasi Quizizz. *Majalah Lontar*, 32(2), 57–68. <https://doi.org/10.26877/ltr.v32i2.7306>.
- Pardede, O. B., Sinaga, E. A., Br Depari, A. W., & Gultom, R. J. B. (2020). Analisis Kemampuan Berpikir Kritis (Critical Thingking) Siswa Melalui Penggunaan Soal HOTS Dalam Pembelajaran Bahasa Indonesia. *Kode: Jurnal Bahasa*, 9(4). <https://doi.org/10.24114/kjb.v9i4.22027>.
- Purba, L. S. L. (2020). The effectiveness of the quizizz interactive quiz media as an online learning evaluation of physics chemistry 1 to improve student learning outcomes. *Journal of Physics: Conference Series*, 1567(2), 022039. <https://doi.org/10.1088/1742-6596/1567/2/022039>.
- Rahman, R., Kondoy, E., & Hasrin, A. (2020). Penggunaan Aplikasi Quizizz Sebagai Media Pemberian Kuis Dalam Meningkatkan Motivasi Belajar Mahasiswa. *JISIP (Jurnal Ilmu Sosial Dan Pendidikan)*, 4(3). <https://doi.org/10.36312/jisip.v4i3.1161>.
- Saefullah, A., Oktarisa, Y., Fatkhurrohman, M., Nulhakim, L., & Rostikawati, D. A. (2021). Pendampingan Guru Madrasah di Kota Serang dalam Pembuatan Alat Praktikum Fisika Berbasis Higher Order Thinking Skills (HOTS). *Dharma Pengabdian Perguruan Tinggi (DEPATI)*, 1(1), 1–10. <https://doi.org/10.33019/depati.v1i1.2289>.
- Sani, M. M. R., Meha, A. M., & Nenotek, S. A. (2020). Penerapan Model Siklus Belajar 5E Untuk Meningkatkan Kemampuan Berpikir Tingkat Tinggi (HOTS) Siswa di SMP Adhyaksa 2 Kupang Tahun Ajaran 2018/2019. *Jurnal Sains Dan Edukasi Sains*, 3(1), 15–23. <https://doi.org/10.24246/juses.v3i1p15-23>.
- Saputra, W. (2021). Pendidikan Anak Dalam Keluarga. *Tarbawy: Jurnal Pendidikan Islam*, 8(1), 1–6. <https://doi.org/10.32923/tarbawy.v8i1.1609>.
- Saraswati, P. M. S., & Agustika, G. N. S. (2020). Kemampuan Berpikir Tingkat Tinggi Dalam Menyelesaikan Soal HOTS Mata Pelajaran Matematika. *Jurnal Ilmiah Sekolah Dasar*, 4(2), 257. <https://doi.org/10.23887/jisd.v4i2.25336>.
- Satwika, Y. W., Laksmiwati, H., & Khoirunnisa, R. N. (2018). Penerapan Model Problem Based Learning untuk Meningkatkan Kemampuan Berfikir Kritis Mahasiswa. *Jurnal Pendidikan (Teori Dan Praktik)*, 3(1), 7. <https://doi.org/10.26740/jp.v3n1.p7-12>.
- Sismawarni, W. U. D., Usman, U., Hamid, N., & Kusumaningtyas, P. (2020). Pengaruh Penggunaan Isu Sosiosaintifik dalam Model Pembelajaran Berbasis Masalah Terhadap Keterampilan Berpikir Tingkat Tinggi Siswa. *Jambura Journal of Educational Chemistry*, 2(1), 10–17. <https://doi.org/10.34312/jjec.v2i1.4265>.
- Somantri, D. (2021). Abad 21 Pentingnya Kompetensi Pedagogik Guru. *Equilibrium: Jurnal Penelitian Pendidikan Dan Ekonomi*, 18(02), 188–195. <https://doi.org/10.25134/equi.v18i2.4154>.
- Suardipa, I. P., & Handayani, N. N. L. (2021). Pengaruh Pendidikan Matematika Realistik Terhadap Prestasi Belajar Matematika Dengan Kovariabel Bakat Numerik Pada Siswa Kelas V SD Gugus Banyuning. *Purwadita: Jurnal Agama Dan Budaya*, 5(1), 63–72. <http://jurnal.stahmpukuturan.ac.id/index.php/Purwadita/article/view/1465%0A>.
- Susanto, M. Y., Mumpuni, A. D., & Fadhilah, I. N. (2019). Pengembangan Pola Pikir Rasional dan Objektif dalam Pembelajaran IPA melalui Pendekatan Scientific. *Buletin Literasi Budaya Sekolah*, 1(1). <https://doi.org/10.23917/blbs.v1i1.9302>.
- Susilo, A., & Sarkowi, S. (2018). Peran Guru Sejarah Abad 21 dalam Menghadapi Tantangan Arus Globalisasi. *Historia: Jurnal Pendidik Dan Peneliti Sejarah*, 2(1), 43. <https://doi.org/10.17509/historia.v2i1.11206>.
- Suwarto. (2021). Menggunakan Quizizz untuk Meningkatkan Prestasi Belajar Bahasa Indonesia. *JURNAL PENDIDIKAN*, 30(3), 499. <https://doi.org/10.32585/jp.v30i3.1934>.
- Syahri, A. A., & Ahyana, N. (2021). Analisis Kemampuan Berpikir Tingkat Tinggi Menurut Teori Anderson Dan Krathwohl. *Jurnal Riset Dan Inovasi Pembelajaran*, 1(1), 41–52.

- <https://doi.org/10.51574/jrip.v1i1.16>.
- Thamrin, N. R., Widodo, P., & Margana. (2019). Developing Higher Order Thinking Skills (Hots) For Reading Comprehension Enhancement. *Journal of Physics: Conference Series*, 1179(1), 012073. <https://doi.org/10.1088/1742-6596/1179/1/012073>.
- Wicaksono, A. G. (2022). Potensi Pemberdayaan Keterampilan Berpikir Kritis Mahasiswa Calon Guru Sekolah Dasar Melalui Model Discovery Learning. *Jurnal Basicedu*, 6(1), 1398–1407. <https://doi.org/10.31004/basicedu.v6i1.2229>.
- Yana, A. U., Antasari, L., & Kurniawan, B. R. (2020). Analisis Pemahaman Konsep Gelombang Mekanik Melalui Aplikasi Online Quizizz. *Jurnal Pendidikan Sains Indonesia*, 7(2), 143–152. <https://doi.org/10.24815/jpsi.v7i2.14284>.
- Yuliati, S. R., & Lestari, I. (2018). Higher-Order Thinking Skills (HOTS) Analysis Of Students In Solving Hots Question In Higher Education. *Perspektif Ilmu Pendidikan*, 32(2), 181–188. <https://doi.org/10.21009/PIP.322.10>.