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NEARPOD INTEGRATION: IMPROVING ANALYTICAL SKILLS IN NATURAL SCIENCE SUBJECT

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Abstract. The purpose of this classroom action research is to describe the effectiveness of learning that integrates Nearpod Media to improve student analytical thinking skills regarding environmental pollution in the natural sciences. Regardless, the ability of analysis consists of three aspects, namely differentiating, organizing, and attributing, so that increasing analytical thinking skill is viewed from these three aspects. The subjects of this research are grade VII students at SMPN 29 Gresik. The research instruments used were questionnaire sheets and pre-test and post-test sheets in cycle I and cycle II. Meanwhile, the data analysis uses descriptive analysis, descriptive statistics, and a sample t-test. The research findings indicate that the learning process carried out by the students is very good. Effectiveness is shown by the pre-test and post-test scores for each aspect. Based on descriptive statistics, it is known that the skewness value ranges from -0.98 to 0.93 and the kurtosis value ranges from -0.002 to 1.63, which means normal data distribution. Furthermore, the T-test score is <alpha coefficient of 0.05, showing a significant difference in improving students' analytical skills after the treatment. Therefore, it can be concluded that using Nearpod media integrated into learning can effectively improve students' analytical skills in natural sciences and environmental pollution material.

Keywords: analytical thinking, natural science, nearpod

INTRODUCTION

Natural science is developed from observation and research on natural symptoms in living and non-living things. Science is not only seen as a product but also as a process and attitude (Puspitasari et al., 2024). Through science, students learn to improve their thinking skills, because it has a process element that emphasizes problem-solving displayed through scientific work (Risamasu, 2016). In problem-solving, students apply the scientific method by prioritizing analytical skills based on theory, systematics, and hypotheses. Science is a process where learning activities are directly related to the real world, so it requires experimentation to obtain evidence obtained through investigation; therefore, in studying science requires analytical thinking skills (Winarti, 2015).

Analysis is an activity to find a pattern. Furthermore, Mahya (2019) states that analysis is a way of thinking related to the systematic examination of something to determine its parts, the relationship between parts, and its relationship to the whole. Analytical thinking skills are the ability to categorize something into certain parts and

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then look for relationships or interrelationships between groups and connect them to natural phenomena that occur in everyday life (Fitriani et al., 2021). Analytical thinking is the skill of observing problems that occur in the surrounding environment to be associated with concepts and theories so that they can find solutions and describe problems encountered in everyday life. Furthermore, this ability is classified as a high-order thinking skill or high-level thinking skill where it has the skills to associate, manipulate, change the knowledge gained from the experience possessed, and be able to determine decisions to solve problems creatively (Dinni, 2018).

Analytical thinking skills include three abilities, namely differentiating and distinguishing where ability is learning to be able to find important information, organizing is how to find out various information, and also the ability to determine a goal (Nurjannah et al., 2021). Furthermore, Hasyim (2018) divides analytical skills into three things, namely, the ability to distinguish and the ability to organize and determine goals. However, Astriani et al., (2017) identified the aspects included in the analytical level of analytical thinking, consisting of :

1) Aspects of Different (differentiating or distinguishing)
   This aspect is the ability to distinguish between relevant and irrelevant parts of an object. Generally, verbs that are often used to formulate this indicator are selecting, distinguishing, and focusing.
2) Organizing Aspect (organizing)
   This aspect is the ability to determine the fit of each part so that they can function together in a structure. Generally, the verbs that are often used are find, combine, organize, and compose.
3) Connecting Aspect (attributing)
   This aspect is the ability to determine the point of view of an object or problem presented. Generally, this indicator uses many verbs, such as interpreting, connecting, explaining, and linking.

The importance of a teacher honing the analytical thinking skills of students is because it has a close relationship with their memory. Memory with the ability to analyze, design, create, and evaluate can increase memory with the highest percentage of 70 - 90%; the ability to apply exercises and demonstrations increases memory by 30 - 50% and increasing memory through the ability to explain and define is at the lowest percentage of 10 - 20% (Dale, 1969; Davis & Summers, 2015). In this study, it is known that there is a relationship between the ability to analyze the memory of students, good analytical skills, and high memory, which can improve student learning outcomes. Thus, learning that hones analytical thinking skills is also useful for improving student learning outcomes.

Based on the results of observations and interviews conducted by researchers at UPT SMPN 29 Gresik, it is known that the ability to analyze students is still low and the learning process carried out in the classroom is still teacher-centered, where the dominant method used is the lecture method. Such a learning process makes the teacher the center of information, so students have difficulty constructing their own knowledge and analyzing phenomena or problems that occur in the surrounding environment. This results in students' analytical skills not being well-honed to provide solutions and efforts to solve the problems faced. This problem certainly occurs due to several factors, such as students not being actively involved in learning so that it seems boring (Rozali et al., 2022). Students have difficulty analyzing information if they only receive information from the material delivered through lectures, so they are passive in learning, accompanied by a lack of innovation in using interactive learning media in the classroom (Daniar & Sari, 2022).

Based on the problems that occur, researchers conduct learning that stimulates analytical skills by presenting interactive media in the classroom, namely integrating Nearpod media into learning to facilitate students in honing analytical thinking skills in science lessons, especially on environmental pollution material, so that students can find out how efforts are made to find solutions to problems regarding environmental pollution.

Nearpod was chosen as an integrated learning medium to stimulate analytical thinking skills because, based on previous findings, it is known that Nearpod can improve critical thinking skills, which include analysis, interpretation, and the ability to formulate problem-solving for students on ecosystem material (Wulandari et al., 2023). This is in line with other findings that Nearpod can facilitate students in solving problems and developing their ideas (Nurmiati et al., 2022). Sanmugam et al., (2019) also conducted research showing that interactive learning can be done by using Nearpod technology because its application can increase learner engagement and participation through interaction on the device screen, so they can participate in learning activities through the features provided. Nearpod can connect teachers and learners through innovative educational features such as collaborative boards, videos, blanks, and images that assist teachers in presenting learning resources in the form of slides, evaluations, videotapes, simulations, and other digital media. Besides, another advantage of Nearpod media is that it can be accessed anywhere because this media is web-based through the internet network, which can provide information about students' activities during learning in real time because on the report menu there are performance reports conducted by students (Rahmawati et al., 2023).

This research is also in line with the findings of Aryani et al., (2023) that the application of Nearpod-based interactive media can significantly increase students' motivation to participate in learning. This is due to the interesting features contained in it, such as collaborative boards, fill-the-blank, open-ended questions, and draw-it, which can be responded to in real-time by students and displayed in the form of a report that can be downloaded by the teacher so that they feel valued in learning. In addition, learning strategies that use Nearpod-based interactive media improve listening skills well and can increase the level of focus of students on ongoing learning in the classroom because they can listen to audio and read questions of various types, such as fill-in-the-blanks, multiple-choice, true or false questions, and matching questions with the answer. Besides that, the activities of students can be monitored by the teacher through his gadget to then evaluate the learning outcomes of students (Turahmah et al., 2023). The existence of this feature of monitoring student learning outcomes makes it easy for teachers to evaluate because the assessment has been carried out by the system, thus the teacher can use the available time to prepare for further learning or guide students who still need guidance (Sukmawati et al., 2024).

Following the assumption that the use of interactive media in the classroom can facilitate students in analyzing information, this research is important to do in a learning atmosphere. Research relevant to this is classroom action research by integrating Nearpod as a media in science subjects on environmental pollution material content. This medium provides opportunities for students to improve their analytical thinking skills through the features contained therein; however, evidence of its effectiveness in being integrated into the topic of environmental pollution in science subjects has not been found. For this reason, there is a need for follow-up research that aims to analyze the effectiveness of Nearpod media as a web-based interactive medium on students' analytical skills. Theoretically, the results are expected to be useful for the application of this medium in science subjects.

RESEARCH METHOD

This research was conducted using the classroom action method to solve problems encountered in the classroom. The research is also a type of descriptive research because it describes the application of a learning strategy and how to achieve its success (Aryani et al., 2023). Classroom action research consists of four phases, namely (Aqib & Chotibuddin, 2018).

1) Planning
   This phase consists of identifying problems, determining objectives, action plans or teaching designs, selecting strategies, and determining indicators of success.
2) Action
   The implementation of the action consists of implementing the action plan that has been determined and collecting data during the implementation process.
3) Observation
   The observation phase consists of observing the actions taken, measuring the success rate of learning outcomes and analytical thinking skills, and analyzing the data.
4) Reflection
   The reflection phase consists of activities to evaluate the level of success in the action phase that has been implemented, take lessons from experience, and provide improvements for the implementation of the next action.

These phases are carried out in a cyclic manner, where after carrying out the reflection phase, the next activity is to carry out the planning phase and the next phases for the next cycle.

The classroom action research was carried out in February - April 2024 at UPT SMPN 29 Gresik, class VII G for science subjects on environmental pollution material. The research subjects were 31 people, consisting of 17 male and 14 female. In this class action research, researchers collected data to measure analytical skills using a questionnaire instrument and an analysis thinking ability test instrument. Total with 8 multiple choice questions containing indicators of aspects of the ability to analyze material. This instrument has a validity coefficient of > 0.02 and a reliability value of 0.86, so it can be categorized as an instrument that has high validity and reliability (Novia et al., 2020). Data collection techniques are carried out by giving test instruments before and after learning at the end of the cycle to obtain data on the ability to analyze students after participating in the learning process that integrates Nearpod-based interactive media. The analysis method used in this research is quantitative descriptive analysis in the form of percentage numbers of achievement of the following criteria :

Table 1. Criteria for assessing students' analytical skills

Percentage of Achievement (%)	Category
$80 < N \leq 100$	Very high
$60 < N \leq 80$	High
$40 < N \leq 60$	Moderately
$60 < N \leq 20$	Low
$20 < N \leq 0$	Very low

Source : (Purbaningrum, 2017)

The results of the analysis ability test can be found using the formula (Qomariya et al., 2018) :

$$\text{Percentage of Achievement} = \frac{Score\ obtained\ by\ students}{Maximum\ score\ of\ the\ test} \text{ x } 100\ \%$$

In addition, to find out how students respond learning, the researchers made the categories based on the questionnaire assessment score on a Likert scale (1 - 4) with the following criteria (Sugiyono, 2019) :

Table 2. Learner response questionnaire assessment category.

Score	Category
4	Strongly Agree
3	Agree
2	Disagree
1	Strongly Disagree

The average of student responses to the questionnaire was calculated using a formula that exists in Riza et al., (2020):

$$\text{Average assessment score} = \frac{Score\ obtained\ by\ students}{Maximum\ score\ of\ the\ test} \text{ x } 100$$

Table 3. Criteria for Questionnaire Assessment Score

Interval average score	Category
82 - 100	Very good
63 – 81	Good
44 - 62	Not good
25 - 43	Very unfavorable

The effectiveness of using Nearpod media integrated into this learning was known from the ability test for each aspect, which includes distinguishing, organizing, and attributing. The results of this test are analyzed based on normality (skewness and quartos) and paired sample t–test (Palimbong et al., 2022).

RESEARCH RESULT AND DISCUSSION

Research results are reported in three parts, namely: (1) data on the quality of students' learning; (2) students' learning process; and (3) analysis of students analytical skills.

Data on the Quality of Students' Learning

This data shows learning that describes the ability of students to hone analytical thinking skills in the aspects of differentiating, organizing, and attributing. The results of this study are used as a reference in determining the next action plan. The following figure shows the achievement of the criteria for students' analytical thinking skills for each cycle.

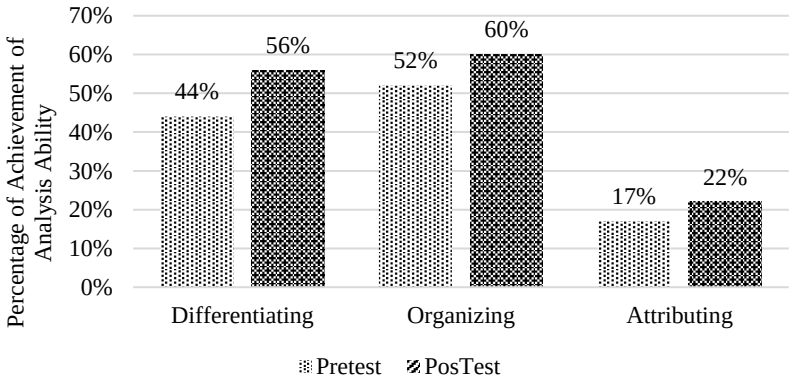

Figure 1. Percentage of analytical thinking skills in the cycle I

Indicators of analytical thinking skills contained in this research test instrument consist of differentiating, organizing, and attributing. In this study, the indicator in the distinguishing aspect is "the ability to interpret the causes of complex scenarios and solve problems from two or more complex scenarios related to the content of air and marine pollution material." While the indicator in the organizing aspect is "analyzing the information obtained by structuring the information into small parts to recognize the relationship or pattern obtained, regarding soil pollution to determine the pattern of interrelationships in each component of the soil ecosystem." The attribution aspect has an indicator "determining the point of view to pick the value and draw conclusions from the point of view of information about the greenhouse effect."

At the time of the pretest, the average analysis ability of students for the aspects of distinguishing and organizing had sufficient criteria, while the attribution aspect had very low criteria. At the time of the post-test, the average learner has the same analysis ability criteria as the criteria at the time of the pretest but has an increase in the percentage of achievement, the distinguishing aspect has increased by 12%, the organizing aspect has increased by 8%, and the attribution aspect has increased achievement by 5%. Next is Figure two which shows the achievement of students' analytical skills in cycle 2.

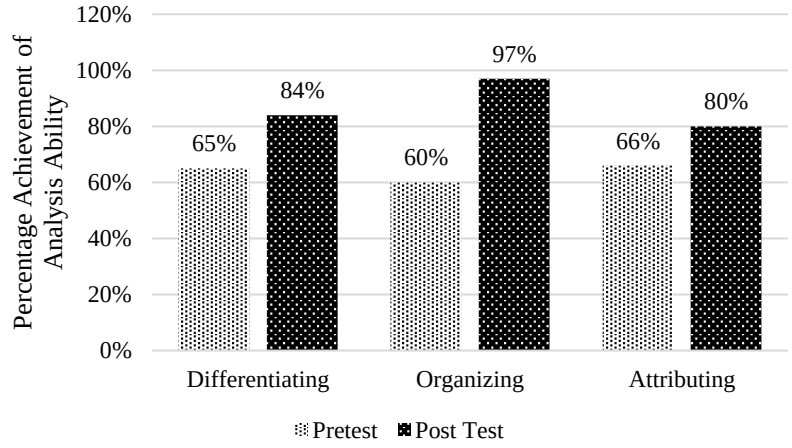

Figure 2. Achievement of students' analysis skills cycle II

Based on the figure, the results of research on students' analytical thinking skills have increased for each aspect. In the aspect of differentiating, there is an increase in the percentage of achievements by 19%. In the aspect of organizing, there is an increase in the percentage of achievements by 37%. The attribution aspect experienced an increase in achievement of 14%. The average percentage of achievement for analytical skills in all aspects, including distinguishing, organizing, and attributing aspects, after learning in cycle II was 87%. Thus, it can be concluded that the achievement of students' analytical skills for cycle II has met very high criteria, with a percentage range of $80 < N \leq 100$.

Based on the results of the analysis in cycle I and cycle II, there was an increase in the achievement of students' analysis skills. This increase can be compared as seen in Figure 3.

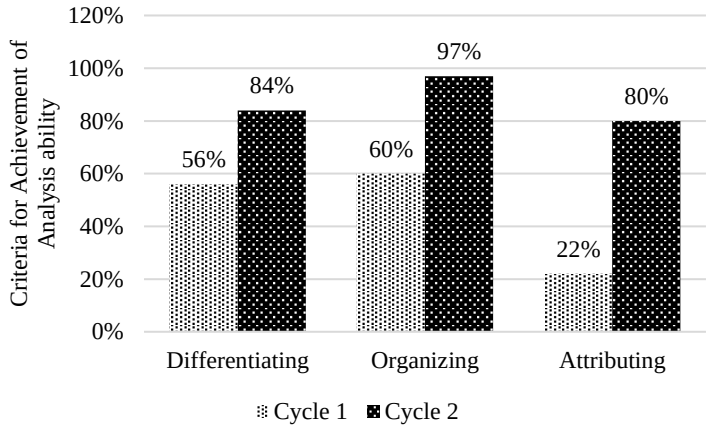

Figure 3. Comparison of the achievement of analysis skills in Cycle I and Cycle II

In cycle II, there was an increase in the achievement of analytical skills when compared to cycle I for all aspects of analytical skills, which include aspects of distinguishing, organizing, and attributing. The increase for each of these aspects was 28%, 37%, and 58%. This increase also occurred in the analysis skill criteria for each aspect. The aspects of differentiating and organizing aspects in the first cycle post-test were in the sufficient criteria with a percentage range of $40 < N \leq 60$, increasing to very high criteria with a criteria range of $80 < N \leq 100$ in the results of the second cycle post-test. The attribution aspect also experienced a very significant increase in criteria. Based on the results of the first cycle post-test this aspect was in a low category with a percentage range of $60 < N \leq 20$, while in the second cycle post-test, this aspect increased and was in the high category with a criteria range of $60 < N \leq 80$.

The ability to analyze students increased significantly for each cycle, as evidenced by the learning outcomes post-test scores for each cycle. This shows that Nearpod media is proven to be effective if integrated into science learning on environmental pollution material. This effectiveness is because Nearpod media has many interactive features that attract students' attention such as collaborative boards, videos, blanks, and images that assist teachers in presenting learning resources in the form of slides, evaluations, videotapes, simulations, and other digital tools. Through these features, it can stimulate students to participate in learning and develop their analytical thinking skills. These studies prove that the use of Nearpod media can be

effectively applied to improve higher-order thinking skills such as critical thinking and analysis.

Students' Learning Process

To find out how the learning process of students, can be determined through a questionnaire of students' responses to the use of Nearpod media in science learning, which was carried out at the end of the learning session in cycle II, the results of the questionnaire are listed in Table 4.

Table 4. Students' Learning Process

No	Question	Average	Criteria
1	By using Nearpod-based media, I can more easily understand the flow of environmental pollution.	85%	Very Good
2	By using Nearpod interactive media, I am interested in asking something that I don't understand.	89%	Very Good
3	By using Nearpod-based interactive media, I find it easier to answer questions that are asked.	91%	Very Good
4	By using Nearpod-based interactive media, I find it easier to conclude what is being learned.	82%	Very Good
5	By using Nearpod-based interactive media, I find it easier to determine how to solve environmental problems.	85%	Very Good
6	By using Nearpod-based interactive media, I find it easier to distinguish treatments for air, soil, and water pollution.	89%	Very Good

Based on the data in the table above, it can be seen that during the learning process using Neapod media for 2 cycles, students can carry out the learning process very well, as evidenced in the average percentage range of 82% - 91%. This is consistent with Sugiyono (2019) who found that the average score interval of 82% - 100% is a very good category. This is in line with the findings conducted by Nurmiati et al., (2022) regarding the results of students' responses to using Nearpod media which show that most of them choose to agree or strongly agree if Nearpod-based interactive media is said to attract attention and make the learning atmosphere more enjoyable. This is due to the many features that make it easier for students to analyze the material, making it easier for students to solve a problem and develop ideas for writing biography text.

The purpose of this study is to test the effectiveness of using Nearpod media integrated into learning students' analytical skills on pollution material. This effectiveness test is determined based on the learning process experienced by students and the value of learning outcomes, which are part of learning that consists of teachers who teach, students who learn, and learning outcomes (Setyorini et al., 2023). The results showed that the learning process of students was in the very good category, so it can be concluded that students learned very well when the pollution material was integrated with Nearpod media.

Students Analysis Skills

Students' analytical skills are known through the results of pre and post-tests for each aspect of analytical ability which includes distinguishing, organizing, and attributing. These analysis skills are assessed in each cycle with the results of the analysis as shown in Table 5.

Table 5. Descriptive statistics of students' analysis skills data

No	Analysis Skill Aspects	Cycle	N	Min	Max	Mean	SD	Skewness	Quartosis
1	Differentiating	1	25	0	2	0.92	0.49	-0.22	1.63
		2	25	0	2	1.92	0.90	-0.55	-0.25
2	Organizing	1	25	0	1	0.68	0.47	-0.82	-1.44
		2	25	0	3	1.44	0.91	-0.71	-0.02
3	Attributing	1	25	0	2	0.44	0.58	0.93	-0.00
		2	25	0	2	2	0.76	-0.98	-0.50

Based on the data, it is known that most of the data for each aspect in each cycle has a standard deviation value lower than the mean value, so it can be interpreted that the data deviation that occurs is low and the distribution of values is evenly distributed, except for the aspect of attributing cycle I has a standard deviation value higher than the mean value which means that the distribution of values is uneven. The skewness and kurtosis values show that the data distribution is symmetrical with a skewness value range of -0.98 - 0.93 and kurtosis of -0.002 - 1.63, which means that the normal data distribution ranges from $-1 \leq x \leq 1$ (Meyers et al., 2013; Setyorini et al., 2023).

Based on these data, we can then analyze the effectiveness of Nearpod media that is integrated to improve analytical thinking skills based on the significance of differences for each aspect before and after the action through the t-test (t-test: Paired Two samples for means) on Ms. Excel.

Table 6. The results of the analysis's ability t-test for aspects of differentiating, organizing, and attributing

	Differentiating Aspect	Organizing Aspect	Attributing Aspec
Mean (before)	0.472	0.4	0.66
Mean (After)	0.680	0.586	0.88
Variance (before)	0.076	0.074	0.119
Variance (After)	0.101	0.122	0.068
Observations	25	25	25
Pearson Correlation	0.526	0.397	0.452
Hypothesized Mean Difference	0	0	0
Df	23	24	24
t Stat	-3.497	-2.681	-3.381
P(T<=t) one-tail	0.000969403	0.00617765	0.00123426
t Critical one-tail	1.713	1.710	1.710
P(T<=t) two-tail	0.001	0.013	0.002
Critical two-tail	2.061	2.063	2.063

Based on the data in the three tables, it is known that the calculated P value for the differentiating aspect is 0.001, the organizing aspect is 0.013 and the attributing aspect is 0.0024. The calculated P value in all aspects is smaller than the significance level α of 0.05, indicating that H_0 is rejected. In addition, decision-making is also

reviewed based on the values of t-count (t stat) and t-table (t Critical two-tail). In each aspect of analytical ability, it is known to have t-count (t stat) value greater than the t-table value (t Critical two-tail), this also indicates that H_0 is rejected. Thus, based on the data above, it can be concluded that there is a significant difference in ability between before and after treatment in each aspect of analytical ability. This difference certainly indicates that there is a significant increase in analytical skills after integrating Nearpod-based interactive media on pollution material. This is in line with research conducted by Wulandari et al., (2023), where the use of Nearpod media can improve students' critical abilities on ecosystem material, as indicated by an increase in pretest and post-test scores.

Science learning using Nearpod media is proven to effectively improve students' analytical skills because the use of this media makes it very easy for students to understand the material being studied through videos that are played, as well as triggering questions located between videos that lead and hone students' analytical skills on a problem and interactive quizzes. Such a learning process can be something that encourages students to be actively involved in learning and makes it easier for researchers to organize learning according to the planned scenario. In addition, during this learning process, students' critical thinking skills can also be strengthened by providing opportunities for them to solve problems encountered in everyday life (Siagian et al., 2023). Thus, this finding certainly supports the abilities needed in education, namely 21st-century skills, where one of them is critical thinking which can determine a problem and use its knowledge to solve the problems encountered (Wijayati et al., 2019). This can be supported by creativity in solving problems with stimulus from a teacher who compiles material content with interactive media in the classroom (Amaliyah et al., 2023).

CONCLUSION

This study concludes that Nearpod media is proven to be effectively used to improve analytical skills in science learning in terms of the learning process carried out by students and student learning outcomes. Nearpod media makes students actively involved in learning and helps students hone their analysis skills through video features that can be combined with triggering questions and other activities that make learning interactive. Therefore, the media can be used as an alternative to improve learning effectiveness.

This research is limited to environmental pollution material, science subjects, and one school. Therefore, further research can be conducted for other content materials and other subjects and can be conducted in several schools with a larger scope that have different backgrounds, for example, schools located in the suburbs or schools located in the middle of the city. It would be unfortunate if the evidence in this study were used for science learning in general.

REFERENCES

Amaliyah, F., Supeno, S., & Wahyuni, S. (2023). The Profile of Creative Thinking Skills of Junior High School Students in Science Learning About Alternative Energy. *Jurnal Paedagogy*, *10*(3), 675. https://doi.org/10.33394/jp.v10i3.7444

Aqib, Z., & Chotibuddin, M. (2018). *Teori dan Aplikasi Penelitian Tindakan Kelas: (PTK)* (Cetakan pertama). Deepublish.

Aryani, P. I., Patmawati, H., & Santika, S. (2023). Penerapan Nearpod Sebagai Media Pembelajaran Interaktif Berbasis Web. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *7*(3), 2966–2976. https://doi.org/10.31004/cendekia.v7i3.1349

Astriani, D., Susilo, H., Suwono, H., & Lukiati, B. (2017). Profil Keterampilan Berpikir Analitis Mahasiswa Calon Guru Ipa Dalam Perkuliahan Biologi Umum. *Jurnal Penelitian Pendidikan IPA*, *2*(1), 66–70. https://doi.org/10.26740/jppipa.v2n2.p66-70

Dale, E. (1969). *Audio-Visual Methods in Teaching* (3rd ed.). Holt, Rinehart & Winston.

Daniar, F., & Sari, P. M. (2022). Pengembangan Multimedia Interaktif Macromedia Flash Berbasis Keterampilan Berfikir Kritis pada Pembelajaran IPA di Sekolah Dasar. *Jurnal Paedagogy*, *9*(4), 646. https://doi.org/10.33394/jp.v9i4.5463

Davis, B., & Summers, M. (2015). Applying Dale's Cone of Experience to increase learning and retention: A study of student learning in a foundational leadership course. *QSCIECE PROCEEDING*, 1–7. https://doi.org/10.5339/qproc.2015.elc2014.6

Dinni, H. N. (2018). HOTS (High Order Thinking Skills) dan Kaitannya dengan Kemampuan Literasi Matematika. *Prisma, Prosiding Seminar Nasional Matematika*, 170–176. https://journal.unnes.ac.id/sju/prisma/article/view/19597

Fitriani, Fadly, W., & Faizah, U. N. (2021). Analisis Keterampilan Berpikir Analitis Siswa pada Tema Pewarisan Sifat. *Jurnal Tadris IPA Indonesia*, *1*(1), 55–67. https://doi.org/10.21154/jtii.v1i1.64

Hasyim, F. (2018). Mengukur Kemampuan Berpikir Analitis Dan Keterampilan Proses Sains Mahasiswa Calon Guru Fisika Stkip Al Hikmah Surabaya Measuring Pre-Service Physics Teachers' Analytical Thinking Ability And Science Process Skills Of Stkip Al Hikmah Surabaya. *JIPVA (Jurnal Pendidikan Ipa Veteran)*, *2*(1), 80–89. http://e-journal.ikip-veteran.ac.id/index.php/jipva

Mahya, A. (2019). Implementasi Pembelajaran Berbasis Hots Dalam Meningkatkan Kemampuan Analisis Mata Kuliah Pembelajaran Ips Di Sekolah Dasar. *JPD: Jurnal Pendidikan Dasar*, 44–52. https://doi.org/10.21009/JPD.0102.05

Meyers, L. S., Gamst, G. C., & Guarino, A. J. (2013). Performing Data Analysis Using IBM SPSS. *John Wiley & Sons, Inc*.

Novia, T., Wardani, A., Nurdi, & Nurmasyitah. (2020). Analisis Validitas dan Reliabilitas Butir Soal UTS Fisika Kelas X SMA Swasta Muhammadiyah 4 Langsa. In *GRAVITASI Jurnal Pendidikan Fisika dan Sains* (Vol. 3, Issue 1). https://ejurnalunsam.id/index.php/JPFS

Nurjannah, I. E., Irawan, E., Ekapti, R. F., & Faizah, U. N. (2021). Efektivitas Penerapan Model Pembelajaran Problem Based Learning terhadap Peningkatan Keterampilan Berpikir Analitis. *Jurnal Tadris IPA Indonesia*, *1*(2), 108–117.

Nurmiati, M., Permana, A., & Siliwangi, I. (2022). Penerapan Media Pembelajaran Berbasis Aplikasi Nearpod Pada Materi Menulis Teks Biografi Siswa Kelas X Sman 1 Batujajar. *Parole : Jurnal Pendidikan Bahasa Dan Sastra*, *5*(2). https://doi.org/10.22460/parole.v5i2.11389

Palimbong, S. M., Pompeng, O. D. Y., & Widia. (2022). Pengaruh penerapan surat pemberitahuan elektronik (e-spt) masa pajak pertambahan nilai (ppn) terhadap kepatuhan wajib pajak. *AKUNTABEL : Jurnal Akuntansi Dan Keuangan*, *19*(2), 475–481. https://doi.org/10.29264/jakt.v19i2.11169

Purbaningrum, K. A. (2017). Kemampuan Berpikir Tingkat Tinggi Siswa Smp Dalam Pemecahan Masalah Matematika Ditinjau Dari Gaya Belajar. *Jurnal Penelitian Dan Pembelajaran Matematika.*, 40–49. http://dx.doi.org/10.30870/jppm.v10i2.2029

Puspitasari, E., Krismanto, W., Tuken, R., & Pasinggi, Y. S. (2024). Using Video Animation In Contextual Teaching And Learning To Enhance Student Engagement In Science Learning. *Quantum: Jurnal Inovasi Pendidikan Sains*, *15*(1), 13–27. http://dx.doi.org/10.20527/quantum.v15i1.17134

Qomariya, Y., Muharrami, L. K., Hadi, W. P., & Rosidi, I. (2018). Profil Kemampuan Berpikir Analisis Siswa Smp Negeri 3 Bangkalan Dengan Menggunakan Metode Pictorial Riddle Dalam Pembelajaran Inkuiri Terbimbing. *Jurnal NSER*, *1*(1), 9–18. https://doi.org/10.21107/nser.v1i1.4172

Rahmawati, H. A., Anwar, W. S., & Mirawati, M. (2023). Pengembangan Media Pembelajaran Interaktif Berbasis Nearpod Tema Sungguh Kayanya Negeriku Subtema Pemanfaatan Kekayaan Alam di Indonesia. *Jurnal PGSD: Jurnal Ilmiah Pendidikan Guru Sekolah Dasar*, *16*(1), 15–20. https://doi.org/10.33369/pgsd.16.1.15-20

Risamasu, P. V. M. (2016). Pembelajaran Ipa Menumbuhkan Karakter Siswa. *Prosiding Seminar Nasional PGSD UST*, 249–259. https://doi.org/10.5281/zenodo.1039985

Riza, F. Y., Antosa, Z., & Witri, G. (2020). Jurnal Inovasi Pendidikan dan Pembelajaran Sekolah Dasar Pengembangan Lembar Kerja Peserta Didik Berbasis Multikultural Pada Pembelajaran Seni Budaya dan Prakarya Kelas V Sekolah Dasar. *Jurnal Inovasi Pendidikan Dan Pembelajaran Sekolah Dasar*, 21–32. http://e-journal.unp.ac.id/index.php/jippsd

Rozali, A., Irianto, D. M., & Yuniarti, Y. (2022). Kajian Problematika Teacher Centered Learning Dalam Pembelajaran Siswa Studi Kasus: Sdn Dukuh, Sukabumi. *Journal of Elementary Education*, *05*. https://doi.org/10.22460/collase.v5i1.9996

Sanmugam, M., Selvarajoo, A., Ramayah, B., & Lee, K. W. (2019). Use Of Nearpod As Interactive Learning Method. *Inted2019 Proceedings*, *1*, 8908–8915. https://doi.org/10.21125/inted.2019.2219

Setyorini, S., Kristiyandaru, A., & Pramulia, Y. M. (2023). Pembelajaran play-teach-play: Upaya meningkatkan hasil belajar gerak manipulative peserta didik kelas I. *Multilateral : Jurnal Pendidikan Jasmani Dan Olahraga*, *22*(2), 116. https://doi.org/10.20527/multilateral.v22i2.15942

Siagian, G., Gunawan, R. G., Festiyed, Ahda, Y., & Yerimades. (2023). Pengembangan Instrumen Tes Berbasis Kemampuan Berpikir Kritis Berlandaskan Literasi Sains Pada Materi Pencemaran Lingkungan. *QUANTUM : Jurnal Inovasi Pendidikan Sains*, *14*(2), 288–298. https://doi.org/http://dx.doi.org/10.20527/quantum.v14i2.15319

Sugiyono. (2019). *Metodelogi Penelitian Kuantitatif dan Kualitatif*. ALFABETA.

Sukmawati, R. Ati., Khairunnisa, Yulinda, R., Adini, M. H., Purba, H. S., & Ningrum, N. S. (2024). Development Of Web-Based Interactive Learning Media On The Topic Of Living Organism Adaptation Using The Tutorial Method. *QUANTUM: Jurnal Inovasi Pendidikan Sains*, *15*(1), 28–38. https://doi.org/10.20527/quantum.v15i1.17489

Turahmah, A., Djunaidi, & Jaya, A. (2023). Nearpod Website Strategy In Increasing Students' Listening Ability. *Esteem : Journal Of English Study Programe*, *6*(1), 94–99.

Wijayati, N., Sumarni, W., & Supanti, S. (2019). Improving Student Creative Thinking Skills Through Project Based Learning. *KnE Social Sciences*. https://doi.org/10.18502/kss.v3i18.4732

Winarti. (2015). Profil Kemampuan Berpikir Analisis Dan Evaluasi Mahasiswadalam Mengerjakan Soal Konsep Kalor. *Jurnal Inovasi Dan Pembelajaran Fisika*, *2*(1), 19–24.

Wulandari, I. A., Maspupah, M., & Sholikha, M. (2023). Analysis of Critical Thinking Skills of Students Assisted With Nearpod Media on Ecosystem Materials. *Pedagonal : Jurnal Ilmiah Pendidikan*, *7*(1), 58–63. https://doi.org/10.55215/pedagonal.v7i1.6008