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DIFFERENCES IN GEOGRAPHY LEARNING RESULTS USING THE NEARPOD APPLICATION ON THE MATERIAL DIVERSITY OF FLORA FAUNA IN INDONESIA CLASS XI ACADEMIC YEAR 2023/2024 SMA NEGERI 21 SURABAYA

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Abstract

Instructional media is a device that allows students to acquire information , knowledge , experience , and skill in teaching and learning process. The problem often faced by teachers in teaching is to choose appropriate instructional media in the learning process so that students fully understand the given subject. This study aimed to determine differences in cognitive learning outcomes of students after using gradual and thorough Nearpod application instructional media based on cognitive load theory to subject diversity of flora and fauna in Indonesia. This research is a quasi experimental factorial design with 2 × 1. Source of this study come from students , media specialists , and expert material obtained from the research questionnaire. Meanwhile learning outcomes data that is obtained through a pre-test and post-test .The results based on the score of the student post-test shows that class which use the Nearpod application media had an average value of 90, better than class that use no instructional media which scored 74 so there is significant differences occurred between the three classes is evidenced in the results of the Independent T Test results that have a Sig. 0,031 this suggests there is a difference , then H0 is rejected and H1 accepted . In other words, Nearpod application media influenced on student learning outcomes . Based on this study it is suggested that the teacher can use a Nearpod application instructional media in teaching process.

Keywords: *Instucional Media, Cognitive Load Theory , Learning Geography Results*

INTRODUCTION

Learning outcomes are the skills, attitudes and skills that students acquire after they receive treatment given by the teacher so that they can construct that knowledge in everyday life. There are two factors that influence student learning outcomes, namely factors from within the student and factors from outside the student (Sudjana, 1989). From this opinion, the factors in question are factors within students, changes in their abilities, as stated by Clark & Marsahall (1981), stating that students' learning outcomes at school are 70% influenced by students' abilities and 30% are influenced by the environment. Likewise, factors external to students, namely the environment, are the most dominant in the form of learning quality (Sudjana, 2002: 39). An effective teaching and learning process requires a way of

thinking in a directed and clear way about what is being learned.

With the many problems that arise, there needs to be reforms in the educational environment that direct learning so that students can always be active. This is where the role of education is to provide a concept of effective learning methods. Education in the modern era increasingly depends on the level of quality. Anticipation of teachers to use various available resources to overcome problems faced by students to prepare learning that can foster student activity. Mastery of the material is very important for teachers to improve student learning outcomes, students need something interesting so that their attention is focused on the lessons delivered by the teacher, therefore teachers need learning media. Increasing students' active geographic learning is not easy, because in teaching and learning activities in the school environment, several problems are often encountered, including: (1) Almost no students have the initiative to ask the teacher (less active in asking); (2) Busy copying what the teacher wrote and said; (3) When asked by the teacher, no one wanted to answer but they answered simultaneously so that their voices were not clear; (4) Students sometimes make noise when the teacher explains or teaches.

The low level of student activity is caused by several factors, including: (1) teacher factors, for example the lack of encouragement and motivation from the teacher to guide students to ask or answer questions; (2) from students, for example, feelings of fear and embarrassment about asking or answering questions, feelings of not being confident in their own answers, and so on.

In the teaching and learning process, geography teachers should understand how to provide stimulus so that students love learning geography and better understand the material provided by the teacher, as well as being able to anticipate the possibility of groups of students showing symptoms of failure by trying to find out and overcome factors that hinder the learning process. learners.

The success of the teaching and learning process in geography learning can be measured by the success of students who take part in these learning activities. Success can be seen from the level of understanding, mastery of the material and students' learning achievements. The higher the understanding and mastery of the material as well as learning achievement, the higher the level of learning success. However, in reality it can be seen that students' achievement in learning geography is still low. In connection with this problem, in geography learning, a variety of problems were also found as follows: (1) students' activeness in participating in learning is still not visible; (2) students rarely ask questions, even though teachers often ask students to ask if there are things they don't understand or don't understand; (3) students' activeness in working on practice questions in the learning process is also still lacking; (4) students' lack of courage to work on questions in front of the class.

In teaching geography, it is hoped that students will be truly active, so that it will have an impact on students' memories of what they learn will last longer. A concept will be easily understood and remembered by students if the concept is presented through procedures and steps that are

appropriate, clear and attractive. Student activity influences success in learning.

Geography learning needs to be improved in order to increase students' abilities and achievements. This effort began with improving the learning process carried out by teachers, namely by offering learning media that could increase students' focus.

Learning media can generally be defined as physical or non-physical tools that are deliberately used as intermediaries for teachers and students in understanding learning material to make it more effective and efficient. So that the learning material is received more quickly by students in its entirety and attracts students' interest in learning further. In short, media is a tool used by teachers with a customized design to improve the quality of learning (Musfiqon, 2011).

Nearpod software can be downloaded on mobile phones and other technology devices via playstore. The Nearpod application is a virtual classroom program that allows teachers and students to participate in interactive learning experiences online (Rohaliya et al, 2023) . Three roles can be played by the Nearpod application to access learning, namely students, teachers and administrators. The learning process can only be accessed by students and educators. However, many teachers do not utilize this technology because they prefer to use direct lectures rather than being busy creating learning media through the Nearpod application in delivering learning material. The Nearpod application makes it easier to teach geography because it can be used to deliver material in detail and can be accompanied by pictures and animations about geosphere phenomena which are objects of study in geography learning.

Learning referring to cognitive load theory can make students happy and active in participating in learning so that students are able to construct their own knowledge. Therefore, students will discover the concept themselves. The learning stage is carried out in three stages, namely: initial stage, core stage, and final stage. The initial stage is carried out to provide motivation to students by linking learning with the initial knowledge that students already have, preparing learning media and student workbooks and motivating/arousing students' interest in linking geographical phenomena in everyday life with learning material. , initial activities are used to manage intrinsic cognitive load.

The core stage is carried out by directing students to obtain hydrosphere learning material through learning media based on the Nearpod application with the help of a student handbook, helping students understand and solve problems in the student handbook and creating interaction between teachers and students through group discussions. and classes, core activities are used to manage intrinsic cognitive load, reduce extranous load, and increase germane load. The final stage is carried out to reflect on learning activities, by testing and asking students' responses to learning and the difficulties they experienced during learning. The final activity is used to manage intrinsic cognitive load. By implementing this learning, learning outcomes can be improved.

Remembering that the object of geographical study is geosphere phenomena or earth surface phenomena that are very real to be found. Natural landscapes that students

have never seen directly in the field need to be displayed through learning media so that the material received by students can be better understood, this is because what students see is easier to remember than what they hear or memorize. Based on a discussion with the geography teacher at SMA Negeri 21 Surabaya which was held in October, it can be concluded that in geography learning, students only see geographic study objects in student textbooks and workbooks distributed by the school, in these books there are indeed pictures of objects. studying geography, but I felt that the pictures were not very clear and interesting, because the number was limited, the size was small, and the colors used were only black and white, not like what can be found in the field, therefore the completeness of learning in geography lessons in odd semesters was very poor , both individual completeness set by the school is 75 and classical completeness is 85% (Depdikbud in Trianto 2010: 241). The following is a summary of the results of the recapitulation of the average grades for class X in the odd semester.

Table 1 Average Grade of Geography Lessons for Class XI Odd Semester

No	class	score
1	XI-5	73,23
2	XI-6	74,15

Source: Primary Data

In terms of the distribution of flora and fauna in Indonesia, there are many objects of geographical study which are of course often found around us and many of which are spread throughout Indonesia. This is because a phenomenon will form if there are factors that support the formation of a geographic phenomenon, so there is a need for learning media that makes it easy to attract students' attention and show students geosphere phenomena that are difficult to find in the surrounding area. Based on the description above, the aim of this research is to explain the differences in cognitive learning outcomes of class

METHOD

This type of research is experimental research with a quasi-experimental research design. Because all variables that may have an influence cannot be controlled completely. This quasi-experimental research aims to test the influence of independent variables on the dependent variable. Using all subjects in the study group (intact group) to be given treatment (treatment) which first begins with an initial test (pre-test) and ends with a final test (post-test) in this case the research subjects are State High School students 21 Surabaya class XI. Meanwhile, learning media is research treatment given to subjects.

The method chosen in this research is a quasi-experimental method with a 2 x 1 factorial design. The factorial version of the non-equivalent control group design 2 x 1 is a quasi-experimental research design (quasi-research). The quasi research design used in this research can be described as follows:

Table 2 Research Design

Grup	Prates	Treathment	Postes
A	O_1	X_0	O_2
B	O_1	X_1	O_2

Information: O_1 = prates
O_2 = postes
X_0 = without treathment
X_1 = treathment

The variables in this research are independent variables and dependent variables. The independent variable is the learning media, namely the Nearpod application media. Meanwhile, the dependent variable is cognitive learning outcomes. To minimize external factors that influence research results, it is necessary to control these factors. The control variables in this research are (1) teacher ability, (2) material coverage, (3) learning tools, (4) test instruments, (5) learning allocation, (6) test time allocation. Some of these variables are thought to influence learning outcomes, so efforts need to be made to prevent their existence from occurring systematically. The control class and experimental class received the same teaching materials given by the same teacher in separate rooms. The study time is the same, the students' tasks in studying are also the same.

The dependent variable is in the form of learning outcomes regarding the distribution of flora and fauna in Indonesia, of course the initial abilities of students influence other than the learning media used by teachers in delivering learning material. Thus, it is necessary to control students' abilities. The purpose of controlling this initial knowledge is to determine the level of agreement between the two groups, whether they are significantly different or not. Students' initial abilities can be determined through pre-tests from both class groups. The test is carried out by taking the pre-test value for each class to be studied and then tested. Based on the calculation of the pre-test results, it is found that the Sig value is 0.889 > the probability value is 0.05, so H0 is accepted. From the results of these calculations it can be concluded that the two classes are equivalent or homogeneous so that the research can be continued.

Random assignment of students to determine treatment was not possible, so students who were in classes XI-5 and XI-6 were used. Class selection was based on a lottery (random), the results were determined in class XI-6 as the treatment class (Nearpod application media), XI-5 as the control class (without media).

The research instruments used to collect data in this research are (1) student learning test question sheets, (2) student activity sheets, and (3) teacher activity sheets, each of which has its own assessment.

RESULTS AND DISCUSSION

Results

Characteristics of Learning Media

This research requires a preliminary study to find out which media is suitable for classroom conditions and the facilities available at the school and the results show several problems regarding geography learning and facilities that can be used as supporting media facilities. The problem in learning geography is that teachers have not changed the use of learning media in learning subjects, only in the form of direct learning in the form of Student Work Modules, the number of supporting books in the library is very limited, geography learning media such as globes and wall maps are rarely used because they are damaged. Based on this problem, researchers took the initiative to create a learning media based on the Nearpod application which would then be filled with pictures and animations about types of flora and fauna and then displayed on the screen projector in each class at the school.

Validation of Learning Media

Validation is used to measure whether or not the learning media that will be given to students is appropriate and is carried out by validators who are experts in their field. The Nearpod application-based learning media used has been validated by learning media experts and geography material experts. Here are the results.

Table 3. Percentage of Learning Media Eligibility by Learning Media Experts

Rated aspect Goal	No	Criteria	Percentage
media format	1	Media Nearpod konkret dan simpel	50 %
	2	The effectiveness of the sentences used includes the material presented	50%
	3	Conformity of material with established indicators	75%
	4	The Nearpod media applied is appropriate to the age of the students.	75%
The quality of media appearance	5	The size of the text corresponds to the slide capacity	75%
	6	Use contrasting text and background colors so that readability is high	75%
Material suitability	7	Suitability of the material on Nearpod media with the material you want to convey	75%
	8	The Nearpod media applied can improve students' cognitive aspects as seen in the post test	50%
	9	Nearpod media contains images and animations of geographic objects that are rarely found in the surrounding environment	75%
	10	The material in Nearpod media contains the truth (concepts, facts and examples)	75%
Average Validation of Media Experts			60%

Source: Processed Primary Data

The table shows the validation value of learning media that has been assessed by learning media experts. The average total number of content feasibility components is 60%, or based on the Likert scale score interpretation criteria (Riduwan. 2009:21) the content feasibility falls within the "feasible" criteria.

Table 4.Percentage of Eligibility of Learning Media by Material Experts

Rated aspect Goal	No	Quetion	Percentage
Know the Material Criteria	1	Suitability of learning media with learning objectives	100%
	2	The relationship between the content of material in the media and the subject matter	100%
	3	Clarity of material in learning media	100%
	4	Appropriateness of the language used	75%
	5	The media applied can improve students' cognitive aspects as seen from the post-test scores	100%
	6	The media applied can improve students' cognitive aspects seen from students' behavior	75%
	7	The material in learning media contains truth (concepts, facts and examples)	100%
	8	Images, animations and videos contained in appropriate media	100%
	9	Images, animations and videos contained in the media can be seen clearly	75%
	10	Systematic presentation of material with appropriate learning media	75%
Rata-rata validasi dari ahli materi			90%

Source: Processed Primary Data

Nearpod learning media which has been validated by material experts, namely geography teachers, based on validation points, has a total feasibility of 92%. Based on the Likert scale (Riduwan, 2009:21) the figure 90% is included in the "very feasible" criteria.

Observation of Teacher Activities

Teacher activities were observed by researchers, observations were made during learning in both experimental class 1 and experimental class 2 and the results can be seen in the following table.

Table 5. Recapitulation Results of Teacher Activities in Using Learning Media based on the Nearpod application

No	Indicator	Meeting				Percentage
		I	II	III	IV	
1	The teacher carries out apperception by relating the material to be studied with previous material.	3	3	4	4	87,5 %
2	Teachers motivate students with certain techniques	3	3	4	4	87,5%
3	The teacher conveys the learning objectives to the students.	3	3	4	4	87,5%
4	The teacher explains the material using learning media	3	4	4	4	93,75%
5	The teacher answers questions regarding material that students do not understand	3	4	4	4	93,75%
6	The teacher guides the class discussion to answer questions in the Module	2	3	4	4	81,25%
7	Teachers give rewards to active students	2	2	3	2	56,25%
8	The teacher helps students conclude the material	3	3	4	4	87,5%
9	Time Management	2	3	4	4	81,25%
Total		66,7 %	77,8 %	97,2 %	94,4%	84,02%

Source: Processed Primary Data

Based on table 4.3 above, it shows that the results of observations regarding teacher activities at four meetings. At the first, second and third meetings, there was an increase from 66.7% to 77.8% at the second meeting and 97.2% at the third meeting, then it fell at the fourth meeting with a total percentage of 94.4%. Based on the Likert scale (Riduwan, 2009:21), the percentage of teacher activity in media trials at the first and second meetings had a high score (66.7% and 77.8%) while at the third and fourth meetings it was in the very high category (97, 2% and 94.4%).

Validity and Reliability of Learning Tests

There were 3 invalid questions out of 30 questions that were tested for validity using the SPSS program. The three questions that are invalid are questions number five and thirty which appear marked (a) which means they cannot be calculated because the variable is constant, then question number twenty one is because rcount (0.359) < rtable (0.423).

Table 6. Summary of the Validity Test of the Flora Fauna Distribution Learning Outcome Test Instrument

No	rxy (r count)	r tabel	Information
1	0,783	0,423	Valid
2	0,506	0,423	Valid
3	0,506	0,423	Valid
4	0,903	0,423	Valid
5	a	0,423	not Valid
6	0,506	0,423	Valid
7	0,903	0,423	Valid
8	0,903	0,423	Valid
9	0,903	0,423	Valid
10	0,606	0,423	Valid
11	0,606	0,423	Valid

12	0,903	0,423	Valid
13	0,506	0,423	Valid
14	0,903	0,423	Valid
15	0,903	0,423	Valid
16	0,645	0,423	Valid
17	0,606	0,423	Valid
18	0,772	0,423	Valid
19	0,506	0,423	Valid
20	0,903	0,423	Valid
21	0,359	0,423	Tidak Valid
22	0,506	0,423	Valid
23	0,506	0,423	Valid
24	0,772	0,423	Valid
25	0,581	0,423	Valid
26	0,903	0,423	Valid
27	0,903	0,423	Valid
28	0,645	0,423	Valid
29	0,506	0,423	Valid
30	a	0,423	Tidak Valid

Source: Processed Primary Data

Based on the results of calculations using the SPSS 27 program, the reliability of the learning results test for the distribution of flora and fauna in Indonesia obtained a value of 0.757.

Based on the reliability coefficient interpretation table above, the coefficient value of 0.757 is in the high category, so the reliability of 0.757 is acceptable.

Student Activities

Student activities are observed by observers and carried out during the learning process in the experimental class. The results of observing student activities are presented in the following table.

Table 7. Recapitulation Results of Student Activities in Using Nearpod Learning

No	Student Activity Category	Meeting				Information
		I	II	III	IV	
1	Pay attention to the teacher's explanation	3	3	4	4	87,5%
2	The level of seriousness of students in following lessons	3	3	4	4	87,5%
3	Student activity in class	3	3	3	3	75%
4	Pay attention to the opinions of other students during activities	3	3	3	4	81,25%
5	Respond to the opinions of other students	3	3	4	3	81,25%
Total		75 %	75 %	90 %	90 %	82,5%

Source: Processed Primary Data

Table 7 above shows that the results of observations regarding student activities showed a result of 82.5%. On a Likert scale, the score shows that student activity is in the very good category because it is in the range of 76% - 100%.

Data from the pre-test results of the group of students who received the treatment (learning media based on the Nearpod application) and the control class (learning without media/direct learning) were analyzed using the Independent T test.

Pretest Results

Table 8. Summary of Pretest Data Calculation Results for the Distribution of Flora Fauna

Group Statistics

	Media	N	Mean	Std. Deviation	Std. Error Mean
Nilai_Prates	Tanpa Media	36	54.64	12.389	2.065
	Nearpod	36	51.47	12.127	2.021

From table 8 above, the data obtained from the pre-test results using the Independent T test shows that the Sig value is 0.031 > the probability value is 0.05 so that H0 is rejected. Thus, it can be concluded that there is a significant difference between the post-test results on the distribution of flora and fauna in Indonesia between the experimental class and control class students after being given treatment.

Test Assumptions Data Normality

The normality test for the distribution of independent variable data is seen in various ways so that strong conclusions can be obtained. In this case the null hypothesis (H0) is tested which states that the sample comes from a normally distributed population. Acceptance or rejection is based on: (1) if the significance or probability value is less than 0.05, the data distribution is not normal, and (2) if the significance or probability value is more than 0.05 then the data distribution is normal. Lillefors Significance Correction Test of Kolmogorov-Smirnov and Shapiro-Wilk.

Table 9. Normality Test of Learning Results for the Distribution of Flora and Fauna in Indonesia

Instructional Media	Kolmogorov-Smirnov[a]		
	Stat	df	Sig.
Nearpod	.129	36	.200*
Without Media	.131	34	.200*

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

From the results of the Lillefors Significance Correction test from Shapiro-Wilk, normality of learning outcomes using learning media based on the Nearpod application and without learning media can be obtained, with a significance level or probability above 0.05, namely with Nearpod media with a value of 0.294, and without media it can be 0.559. It was concluded that the distribution of the two learning outcomes was normal.

Sample Homogeneity

Testing for the homogeneity of sample variance in the research was carried out on learning outcomes data on the distribution of flora and fauna in Indonesia in groups of students who were treated with learning media based on the Nearpod application and without learning media. Testing the homogeneity of sample variance using the Levene test with a significance level of 0.05. The criteria for determining the homogeneity of sample variants can be done by comparing the calculated significance results to a significance level of 0.05. If the calculated significance is more than 0.05, then it can be concluded that H0 is accepted, so it can be interpreted as homogeneous sample variance.

From the results of calculating learning outcomes with the help of the SPSS version 27 computer program, Levene's statistical calculation results show that the level of significance or probability is above 0.05, namely 0.096. So it can be concluded that H0 is accepted, so it can be interpreted that the sample variance is homogeneous.

Discussion

Instructional Media

Learning using nearpod media can make learning interactive, effective, innovative and apart from that it can also increase students' motivation in learning (Nurmasita et al.,, 2022). The media that has been implemented in the form of the Nearpod application has been assessed for its suitability by both media experts and material (content) experts. The feasibility category is based on the Likert scale explained by Riduwan (2009).

Media experts gave a score with a total percentage of 60% which was included in the worthy category. In the first variable, the learning media expert validation sheet got an average score of 62.5%, while in the media display quality variable it got an average score of 75%, and in the material suitability variable it got an average score of 68.75%, so from the third The total variable is 60%, on a Likert scale including 51%-75% and is included in the appropriate category so that without revision it can be given to students.

Apart from the feasibility assessment from media experts, the Nearpod-based learning media that was implemented also received an assessment from content experts, namely other geography teachers who taught at the school where the research was conducted. On the validation sheet for material experts there is only one

variable, namely knowing the material criteria found in the media being applied. There are 10 points on the validation sheet which overall get an average score of 90%, on a Likert scale including 76%-100% and are in the very appropriate category so they do not require revision and can be given directly to students.

Based on the results of the Nearpod application-based learning media trial activities at SMAN 21 Surabaya, criticism and suggestions were obtained from media experts and material experts. The following is a summary of the responses from media experts and material experts.

Table 10 List of Responses from Media Experts and Material Experts regarding Nearpod Application-Based Learning Media

Ahli	Isi
Media Expert	1. Nearpod media is still dominated by sentences so it is less dense and concise. 2. The sentences are simplified again so that they don't look like text
Materials Expert	1. The use of sentences is made simpler. 2. Use of images is better if added.

Nearpod learning media is media that uses smartphone or laptop or tablet devices that have followed developments in science and technology in the era of globalization (Rahmawati et al., 2022). This learning media requires an internet connection to be able to access and carry out the activities provided by the teacher. This media can be applied in various existing learning models (Nurmiati, et al., 2022; Hidayati et al., 2024). The advantages of Nearpod E-media include being flexible because it can be accessed anywhere as long as it has an internet network, allows for interactive learning (teleconference and virtual), can be operated on a cellphone or PC and can be used independently by students and its use is not limited to space and time (Perlawanan et al., 2023; Pramesti & Camellia,2023).

Learning outcomes

There are differences in learning outcomes in the experimental class and control class in the pre-test and post-test results seen from the average value. In the experimental class the average pre-test score was 51 and increased after being given treatment in the form of learning media based on the Nearpod application with an average post-test score of 90. In the control class, namely the class without learning media, the average pre-test score was 54, then after going through learning. without media got an average score of 74.

Based on the explanation above, all classes experienced an increase in the average score on the post-test, but of the two classes, the class using the Nearpod application-based learning media had the highest increase than the class without learning media. The increase in scores was significantly different between the two research classes, because the treatment given to the two classes was also different based on the cognitive load theory which was used as the theoretical basis in the research. Material that intrinsically has a heavy load, if presented well, the cognitive processes in the worker's

memory will run smoothly. On the other hand, even though the intrinsic cognitive load of material is light, if it is presented poorly, such as too much or randomly, the cognitive processes in the worker's memory will run slowly or stop. A good learning process can also be influenced by students' motivation and attitudes towards the material being studied. To increase student motivation, researchers used learning media based on the Nearpod application which is designed to be as attractive as possible so that students' learning motivation can be raised (Susanto, 2021; Prasetya et al., 2025). This is proven by the significant difference in learning outcomes between the experimental classes that used learning media based on the Nearpod application which had better learning outcomes than control class with no learning media (Aryani,2023). According to Inanta et al., (2022) have conducted research on Improving Social Sciences Learning Outcomes Through Nearpod Media for Students of Smpk Penabur Kelapa Gading Jakarta.

CONCLUSION

Based on the results and discussion in the previous chapter, researchers can draw the following conclusions:

Based on the learning media validator, learning media in the form of the Nearpod application was declared feasible by experts, namely learning media experts and geography teachers as content experts. The test instrument for student learning outcomes is valid and reliable. Students are very enthusiastic about participating in learning using learning media based on the Nearpod application. The teacher's ability to manage learning in the experimental class is very good. Based on inferential statistical calculations, it was found that the learning outcomes of students who used learning media based on the Nearpod application were better than those who did not use learning media based on the Nearpod application.

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