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The Use of E-Lkpd Google Slide Assisted Pear Deck to Improve Students Concept Understanding on Ecosystem Material

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ABSTRACT

Concept understanding is an important ability that students must have in the learning process, based on previous research, the understanding of the concept of students, especially in ecosystem material, is still relatively low, this is because the appropriate learning media has not been integrated. This study aims to improve students' understanding of concepts in ecosystem material by using google slide LKPD assisted by pear deck. This research method uses a pre experimental design with a one-group pre-test post-test design and the sample is taken by convenience sampling technique. The instruments used were test questions and questionnaires. Analysis of research data includes descriptive statistics and N-Gain test. Based on the results of the concept understanding test data analysis, the average percentage of students' concept understanding increased from 37.5% in the low category to 77.81% in the high category. The results of inferential statistical analysis using N-Gain obtained an average of 0.64 with a moderate category. It can be concluded that the use of E-LKPD google slide assisted pear deck can improve students' concept understanding on ecosystem material.

INTRODUCTION

Biology is one of the subjects that is considered difficult by students in general. This difficulty is caused by the complexity of biological material, which consists of many terms derived from Latin, interrelated processes and requires deep understanding (Farahani et al., 2023). According to Nisak (2021), students' perceptions of difficulties in studying biology are influenced by several factors including material that is too much and complex, a lot of memorization, difficult terms, and material that is difficult to understand and visualize This difficulty certainly has an impact on students' understanding of the biological concepts studied (Dewi & Ibrahim, 2019).

Concept understanding is the ability of individuals to understand and master a concept of science according to their capacity. This concept understanding is obtained through a learning process that encourages students to obtain ideas independently, by linking learning to the phenomena encountered, so that the concept is formed from the thinking potential of students (Fitri et al., 2019). In science learning, mastery of theory is developed through solving natural problems and applying scientific attitudes, to produce conclusions that become concepts of knowledge (Amizera et al., 2022). The process shows that concept understanding not only helps students understand the material in depth, but also plays an important role in building scientific thinking skills. Therefore, concept mastery is a fundamental aspect that supports the success of learning and the development of student competencies in various fields of science.

Given the importance of understanding concepts, evaluation of students' level of understanding of concepts is essential in learning. Adella et al. (2020) said that evaluation is a process

to collect, analyze, and interpret information to determine the level of achievement of learning goals by students. A good evaluation will provide an overview of the quality of learning so that it can be a reference to help teachers plan learning strategies so that learning becomes effective.

One of the effects of effectiveness in learning is influenced by the teaching materials used (Nisak, 2021). Teaching materials have unique and specific properties. Unique means that the teaching materials can only be used for a certain audience in a certain learning process. Specific, it means that the content of the teaching materials is designed in such a way that it is only to achieve certain goals from certain audiences (Ulhaq & Lubis, 2023).

Learning media that can be used in the classroom are electronic student worksheets (E-LKPD), electronic student worksheets (E-LKPD) are guidelines or guidelines for digital learning activities used by students in making observations and problem-solving that can be accessed through mobile phones, laptops, computers, and others (Purnama, 2020). According to Khoerunnisa et al. (2023) E-LKPD are digital teaching materials that are systematically arranged in certain learning units and presented in electronic format. E-LKPD is designed to increase students' interest in learning in the learning process by utilizing digital technology.

Some previous studies show that the level of understanding of students' concepts on ecosystem material is still relatively low. Harahap et al. (2020) found that the average understanding of student concepts was only 61.10, which did not meet the passing score standard. The low mastery of this concept is indicated by the lack of variation in learning media and the lack of use of interactive tools that can support students' understanding of ecosystem material. In addition, research Sudianto et al. (2024) also revealed that high school students' concept understanding is still relatively low due to learning approaches that do not actively involve students in the learning process.

Based on the problems that have been described, one of the efforts that can be made to overcome them is through teaching materials that are more interesting and interactive, namely E-LKPD Google Slides Assisted by Pear Deck so that it can improve concept understanding in students. The development of E-LKPD to improve concept understanding has been carried out including research conducted by (Agustin et al., 2023) which shows that Pear deck-based Google slide E-LKPD has a positive impact on students such as making learning more fun and not boring.

Pear Deck is an interactive platform used in teaching to increase student engagement during the teaching and learning process. The platform allows teachers to create interactive presentations using a variety of templates, such as quizzes, multiple-choice questions, and slides to draw. With Pear Deck, teachers can collect student responses in real-time, provide direct feedback, and encourage active student participation in the classroom, both in-person and online (Anggoro, 2021). So the purpose of this study is to obtain information about the use of E-LKPD google slides assisted by pear deck in improving students' concept understanding on ecosystem material.

MATERIALS AND METHODS

1. Time and Place of Research

This research was conducted in August 2024 at one of the high schools in Bandung city, West Java Province.

2. Research Methods

This research used quantitative research with an experimental approach and the research method used is pre experimental design with one-group pre-test post-test. This design aims to measure the use of E-LKPD google slides assisted pear deck on concept understanding by comparing scores before (pre-test) and after (post-test) treatment. This design is described based on Table 1.

Table 1. Pre-Test Post-Test One Group Design

Pre Tets	Treatment	Post Test
O_1	X	O_2

Note : O_1 = Pre-test of concept understanding before learning activities; X = Learning using E-LKPD google slide asststed pear deck; O_2 = Post-test of concept understanding after learning activities.

3. Population and Sample

The population of this study were students in one of the schools in high school in Bandung City, while the sample used in this study was in one of the classes in Bandung City High School selected through convenience sampling technique totaling 20 students. According to Emerson (2021) convenience sampling is taking based on convenience, namely respondents who are willing to be sampled. The convenience in this case is that the respondent is chosen because he happens to be in the right place at the right time and the respondent's willingness.

4. Research Procedure

The procedure in this study, which includes the preparation and implementation stages. The stages, namely:

a. Preparation Stage

At this stage, the preparation of learning devices that will be used in research is carried out. Learning devices or instruments made are E-LKPD google slides assisted pear deck, teaching modules, concept understanding test devices, and student response questionnaires related to learning.

b. Implementation Stage

At this stage, learning is carried out using E-LKPD google slides assisted by pear deck. The first step, namely giving a pre-test to students before learning which aims to measure their initial abilities. The second step, taught using E-LKPD google slide assisted pear deck and then given a post test and response questionnaire.

5. Data Collection

Data were collected using tests and questionnaires. The test instrument used was in the form of multiple choice questions. There are 16 questions to measure concept understanding using Bloom's Taxonomy levels including the ability to remember (C1), understand (C2), apply (C3), and analyze (C4). The instrument to measure concept understanding is a multiple choice test with indicators as presented in Table 2.

Table 2. Indicators of Concept Understanding Test

No.	Indicators	Cognitive Levels
1.	List the components that make up the ecosystem in an energy flow	C1
2.	Comparing the characteristics of biotic components and abiotic components that make up ecosystems	C2
3.	Determine the kinds of biotic components and abiotic components that make up the ecosystem.	C3
4.	Analyze the role of ecosystem components	C4
5.	Explain the kinds of interactions between biotic components and abiotic components in the ecosystem.	C2
6.	Differentiate types of interactions between the same species or different species in interactions between biotic components.	C2
7.	Classify examples of types of interactions between the same species or different species in interactions between biotic components.	C3
8.	Analyze the occurrence of interactions between components	C4
9.	Identify the interrelationships between the components that make up the food chain	C2

The questionnaire is done by giving a set of written questions to respondents to answer. In this study, the questionnaire was used to determine the students' response to the use of pear deck-based google slide E-LKPD. Students make an assessment by responding to the questionnaire that has been given. There are 13 questions from 3 indicators as presented in Table 3.

Table 3. Indicator of Student Response Questionnaire

No.	Indicators	Sub Indicators
1.	Students' attitude towards learning biology	Show interest in learning biology
2.	Students' attitudes towards ecosystem learning using the discovery learning model	Showing interest in ecosystem material using the discovery learning model
3.	Students' response to learning by using the discovery learning model assisted by Pear Deck-based Google Slide E-LKPD.	Showing students' interest in learning with the help of E-LKPD Google Slides assisted by Pear Deck
		Demonstrate students' mastery of concepts with the help of Pear Deck-based Google Slides E-LKPD.

6. Data Analysis

The data analysis techniques used were descriptive and inferential statistical analysis. Descriptive analysis was used to describe students' concept understanding before and after being given treatment in the form of using E-LKPD google slide assisted pear deck. This analysis includes the highest score, lowest score, mean, median, and average percentage of students' concept understanding both before and after treatment, then grouping students according to the categories in Table 4.

Table 4. Percentage Category of Student Concept Understanding

Level of Understanding (%)	Score Category
$66{,}68 \leq Z \leq 100$	High
$33{,}34 \leq Z \leq 66{,}67$	Moderate
$0 \leq Z \leq 33{,}33$	Low

In addition, to determine the increase in students' concept understanding can be known through the calculation of N-Gain. This data is obtained from the pre-test and post-test results given to students. The correct answer to each question is given a score of 1 and the wrong answer is given a score of 0. The total score obtained from each item is then interpreted using the following formula:

$$Value = \frac{Number\ of\ scores\ obtained}{Maximum\ score}\ x\ 100\%$$

The results of the pre-test and post-test were obtained and then the N-Gain test was analyzed by calculating the difference between the two data. N-Gain test to find out how much the increase in students' concept understanding from the use of E-LKPD google slides assisted pear deck that has been done in this study using the following formula:

$$N - Gain = \frac{Post\ Test - Pre\ Test}{Maximum\ score - Pre\ test}$$

The average gain score will be determined based on the gain category in the following Table 5 below:

Table 5. N-Gain Level Category

N-Gain	Score Category
$g \geq 0{,}71$	High
$0{,}31 \leq g < 0{,}70$	Moderate
$g > 0{,}30$	Low

RESULTS AND DISCUSSION

Based on the results of the study, the use of E-LKPD google slides assisted by pear decks in learning on ecosystem material previously began with a pre-test which was used to measure students' concept understanding of the ecosystem material to be studied. The following is a table related to the results obtained in the pre-test shown in Table 6.

Table 6. Results of Descriptive Analysis of Pre Test

No.	Information	Pre Test
1.	Number of Sampel	20
2.	Lowest Score	25
3.	Highest Score	56
4.	Number of students with scores ≥ 75	0
5.	Number of students with scores ≤ 75	20
6.	Mean	38
7.	Median	34
8.	Standard Deviation	9,9
9.	Percentage of Concept Understanding (%)	37,5

Based on the table above, the results of the descriptive analysis of the student pre-test are shown in Table 6 that out of 20 students obtained the results of the ecosystem material concept understanding test with the lowest average value of 25 and the highest value of 56. The number of students who scored ≥ 75 was 0 students and the number of students who scored ≤ 70 was 20 students. This shows that all students still do not understand the concept of ecosystem material. In addition, the average student concept understanding test results were 38 with a median of 34 and a standard deviation of 9.9. The average percentage of students' concept understanding is 37.5%, which is moderate. So that efforts need to be made to improve students' understanding of concepts in order to achieve the maximum percentage of completeness by applying appropriate learning models and using learning media to help students in the implementation of learning. This is in accordance with the opinion Pristiwanti et al. (2023) that learning media significantly helps students in the learning process by increasing their interest, fostering motivation, increasing concept understanding, and facilitating the effective delivery of information. This encourages active participation, enthusiasm, and regular engagement during lessons, and ultimately improves overall learning outcomes.

Next, based on the results of data analysis of concept understanding tests given after the use of E-LKPD google slides assisted by pear decks, the results of descriptive analysis of student post tests are shown in Table 7. Table 7 shows that of the 20 students obtained the results of the concept understanding test on ecosystem material with the lowest score of 63 and the highest score of 88. The number of students who scored ≥ 75 was 16 people and the number of students who scored ≤ 75 was 4 people. In addition, the average test result was 78, the median was 81, and the standard deviation was 6.9. The percentage of concept understanding is 77.81% which is classified into the high category.

Table 7. Results of Descriptive Analysis of Post Test

No.	Information	Post Test
1.	Number of Sampel	20
2.	Lowest Score	63
3.	Highest Score	88
4.	Number of students with scores ≥ 75	16
5.	Number of students with scores ≤ 75	4
6.	Mean	78

No.	Information	Post Test
7.	Median	81
8.	Standard Deviation	6,9
9.	Percentage of Concept Understanding (%)	77,81

Furthermore, inferential analysis was carried out to measure the improvement that occurred through the calculation of the N-Gain score as shown in Table 8 below.

Tabel 8. N-Gain Test Results of students' concept understanding

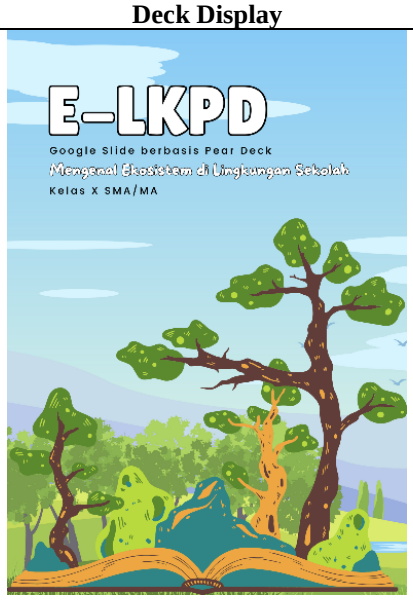
Information	Score N-Gain
Mean	0,64
Improved Performance	64%
Category	Moderate

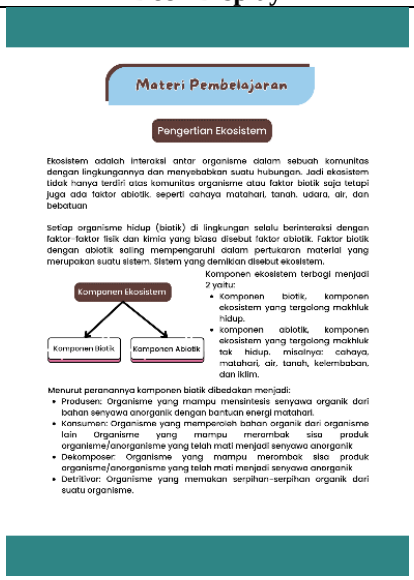
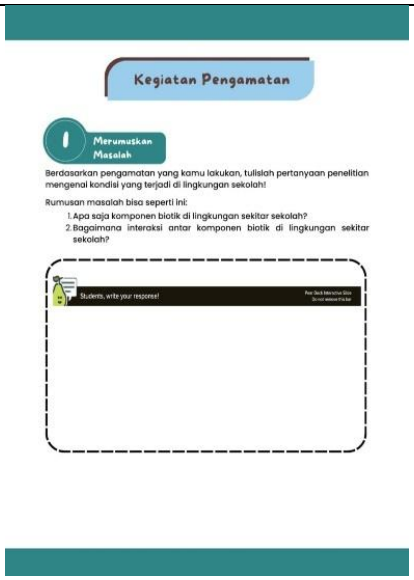
Table 8 shows that the average N-gain of students' concept understanding on ecosystem material is 0.64 which is in the medium category. This means that classically, students' concept understanding after the use of E-LKPD google slides assisted by pear deck has increased moderately. There are several factors that cause an increase in students' concept understanding, namely an attractive E-LKPD format, access to a variety of resources, visual and interactive learning experiences, and integration of real-life activities that connect science, environment, technology, and society (Yuniastuti, 2023). These findings are in line with the results of research that E-LKPD assisted by pear deck applications can increase student involvement and facilitate students actively in the learning process and can train students' concept understanding (Agustin et al., 2023; Sa'adah & Rodliyah, 2022).

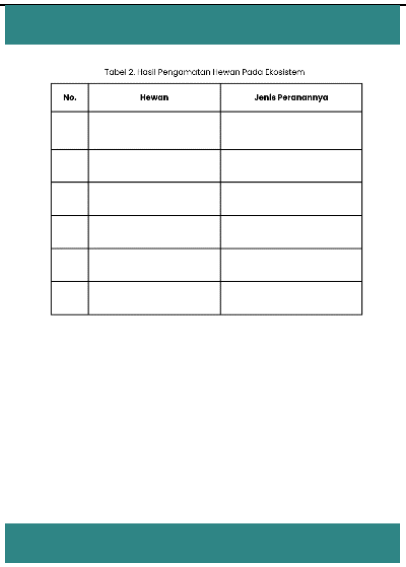
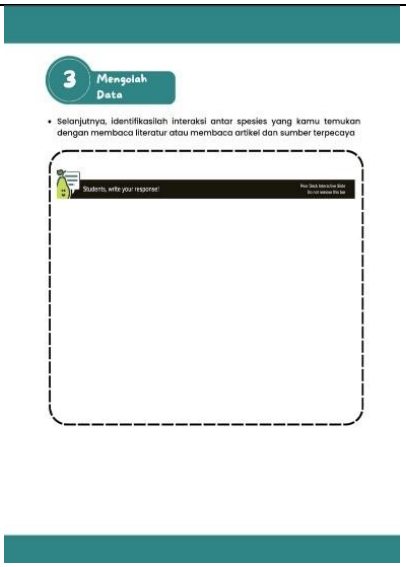
Based on research Sihombing (2023) pear decks are seen as an effective digital tool that improves learning outcomes by engaging students and allowing teachers to provide feedback on students' writing. Most students agreed that it had a positive impact on their learning ability. This is in line with the findings of (Ruado & Cortez, 2024) that pear decks can improve student achievement in biology learning by encouraging engagement, facilitating active learning, and providing opportunities for feedback by teachers to students. These elements are critical to improving the overall learning experience E-LKPDs also influence learning outcomes by improving student understanding, active participation, and fostering an interactive learning environment. Its flexibility allows access to materials anytime, anywhere, while teachers can easily deliver content and monitor student progress effectively (Saputra et al., 2024). According to (Ramadani et al., 2024) new learning experiences using appropriate and well-designed models and media can arouse students' interest and enthusiasm for learning, thus having a positive impact on their learning outcomes.

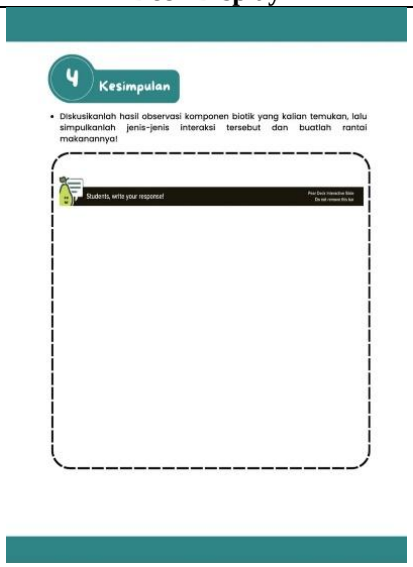
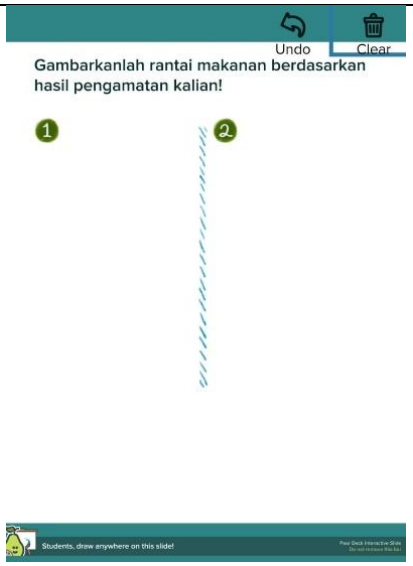
This is in accordance with the contents of the E-LKPD google slide based on Tab1e 9, where the designed E-LKPD introduces the concept of ecosystems through learning materials. In addition, the pear deck-assisted google slide E-LKPD provides students with the opportunity to answer questions that can be directly reviewed by the teacher.

Table 9. Display of E-LKPD Google Slides Assisted Pear Deck

No.	Part	E-LKPD Google Slide Asstisted Pear Deck Display	Contents
1.	Cover		In this section is the cover of the pear deck assisted google slide E-LKPD
2.	Apperception		Before starting to open the E-LKPD google slide assisted pear deck, students are given an apperception first related to the material to be learned
3.	Learning Components		In this section, an explanation of the learning components that will be studied

No.	Part	E-LKPD Google Slide Asstisted Pear Deck Display	Contents
4.	Material Content		In this section, there is material about ecosystems that students can read before the lesson
5.	The material content section in which there is a QR to access examples of food chains in the form of Augmented Reality		At the end of the learning material there is a QR code which is an example of a food chain, so that students can understand the concept of food chains more interactively
6.	Observation Activity		This section is about observation activities in the surrounding environment

No.	Part	E-LKPD Google Slide Asstisted Pear Deck Display	Contents
7.	Plant Observation Data Collection		In this section, students write down the plants found in the observation location
8.	Animal Observation Data Collection		In this section, students write down the animals found in the observation location
9.	Processing Data		In this section, students process data related to the identification they have done

No.	Part	E-LKPD Google Slide Asstisted Pear Deck Display	Contents
10.	Conclusion		In this section, students write down the conclusions of the observations they have made
11.	Describing the Food Chain		In this section, students are asked to describe the food chain from the observation data

This finding is in accordance with the results of research Hashim & Aziz (2022) that the use of pear decks can improve students' reading comprehension and create an interactive learning environment because it integrates technology into learning. This is also supported by students' responses to the implementation of E-LKPD google slides assisted pear deck in Table 10.

Table 10. Students Response Result

Indicator	Interval (%)	Response Category
Students' attitude towards learning biology	73	Positive
Students' attitudes towards ecosystem learning using the discovery learning model	75	Positive
Students' response to learning by using the discovery learning model assisted by Pear Deck-based Google Slide E-LKPD.	77	Positive
Average	75	Positive

Based on the data analysis that has been done, students give a positive response to the E-LKPD google slide assisted pear deck. Student enthusiasm can be seen with the data obtained from the questionnaire given to students with a percentage of 75% in the positive category. This is based

on the use of E-LKPD google slide assisted pear deck which is user friendly and easy to use. According to Sari & Purnomo (2023) a good E-LKPD is an E-LKPD that uses language in accordance with the criteria, namely clear, practical and ambiguity-free sentences, and language that must be easily understood by students. In addition, this E-LKPD is also assisted by the pear deck application which has interactive features that can increase student motivation in learning using technology. This is supported by research Goodman & Baxter (2023) that pear decks are quite effective in increasing students' comfort to actively participate in the learning process and strengthen their understanding of the material.

CONCLUSION

This study shows that the use of E-LKPD google slides assisted by pear deck can improve students' understanding of ecosystem material with an N-Gain value of 0.64 which is classified in the moderate category and student responses after using E-LKPD google slides assisted by pear deck are in the positive category with a percentage of 75%. These findings indicate that the use of E-LKPD google slide assisted pear deck can provide positive benefits to students and provide an interactive learning experience. Learning experience by integrating technology and learning outside the classroom is an alternative to improve students' concept understanding of ecosystem material. The limitations of this study, namely the limited number of samples so that further research suggestions are to use a larger sample.

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