



The Effectiveness of Ethno Science-Based Discovery Learning Model Assisted by Online Learning Videos to improve Students' Learning Outcomes

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Abstract

Due to the Covid-19 pandemic, all teaching and learning activities must change to online learning and results in students being stuck on their gadgets and accessing information or content unrelated to the lesson. Consequently, this creates an attitude of students who tend to be passive and unaware of the surrounding environment and local culture. Moreover, the learning material provided by the teacher is hard to understand by students because it is only in the form of text without sufficient explanation. Therefore, this situation affects students' learning outcomes. This study aims to analyze the effectiveness of the ethnosience-based discovery learning model assisted by online learning videos on students. This study uses the Pre-Experimental research method: One Group Pretest–Posstest. The sample in this study are all fifth-grade students at SDN Semirejo 02 with a total of 25 students using Non Probability Sampling with saturation sampling technique. The data is obtained through posttest, interviews, observations, and documentation. The data analysis techniques in this study are classical completeness test, paired sample t-test, and N-Gain test. The results show that there is a significant increase in student learning outcomes as indicated by the results of the t-test which is the $t_{count} (15,868) > t_{table} (1,711)$, and the N-Gain value of 0.49 which is included in the medium effectiveness. The learning model can also improve the affective assessment of students in the aspects of being careful, accurate, and independent. Therefore, this learning makes students enthusiastic in participating in learning. Based on these results, it can be concluded that the ethnosience-based discovery learning model assisted by online learning videos is effective on student learning outcomes.

INTRODUCTION

Education is one of the crucial parts of life. It is a conscious and planned effort to create a learning atmosphere during the learning process so that students actively develop their potential (Rahmayani, 2019). According to Dwianti (2021), education is a series of learning for students with the intention that they can understand, comprehend, and have critical thinking. Education begins at home and continues with the first formal education, elementary school. Elementary school is the most basic level of education where students start to learn and understand the connection of their daily life experience with the lesson material they study in school as a process of character building. Through character building, students are expected to have an attitude of caring for the environment, discipline in doing assignments, and collaborating with friends (Sugiyono, 2017).

In the modern era, the perspective that teaching is only about conveying knowledge is no longer appropriate. The application of proper learning models is required to help students think critically. Besides, the use of the learning model is also expected to assist teachers in managing the classroom so that student's motivation to study in the classroom increases. This situation can lead students to improve their learning outcomes. In addition, using appropriate learning media can encourage students to interact with their peers or teachers.

The Covid-19 pandemic that hit Indonesia has caused various impacts and affected several aspects of life, especially the field of education (Zannah, 2021). According to Zannah, the transition in the education system from face-to-face to online learning has caused various kinds of problems both for teachers and students. The role of teachers in formal education is dominant in achieving a quality education (Sebayang, 2019).

The current Covid-19 pandemic has become a severe obstacle for teaching and learning, so it is carried out online. Online learning is a system that can facilitate students to learn broadly. It allows students to study from anywhere. Moreover, the more varied learning materials, not only in verbal form but also in the form of visual, audio, and motion learning. (Rachmadanti, 2021). Online learning is the only way to break the chain of the coronavirus spread in the school environment. The government decides to conduct online learning because it aligns with the 2013 curriculum, which is the student-centered learning process, and the teacher only becomes a facilitator. Thus, educators can use online learning in this pandemic era to implement student-centered learning in learning activities. A teacher as a learning manager plays a role in facilitating learning to take place effectively. To achieve learning goals, teachers must know how to organize classes well and improve student learning outcomes (Ramadhani, 2021).

Based on the observations and interviews at SDN Semirejo 02, several complex problems exist. Online learning conducted continuously for approximately two years results in students spending too much time on their gadgets and accessing information or content unrelated to the lesson. Consequently, this creates an attitude of students who tend to be passive and unaware of the surrounding environment and local culture. Moreover, teachers don't use online learning optimally. They don't apply innovative learning models, causing students to be less motivated and easily bored during online learning. It is because teachers only focus on giving students assignments without explanations, so this causes students to lack critical thinking skills. The lack of student motivation with online learning impacts their learning outcomes. Thus, an appropriate learning model is required to overcome the problems.

There are several reasons why an appropriate learning model is essential: 1) an effective learning model is beneficial in the learning process so that the teacher and students quickly achieve learning objectives, 2) a learning model can provide helpful information for students during the learning process, and 3) variations in learning models can provide students' learning motivation, avoid boredom so that students will be motivated during the learning process (Asyafah, 2019). Applying an inappropriate learning model can lead students to boredom following the learning

process. Besides, the material provided by the teacher is less understandable. It makes learning monotonous so that students are less motivated to learn, giving less satisfying learning outcomes.

According to Puspita (2021), a teacher has a significant role in teaching and learning. Teachers don't only provide knowledge but also guide students, encourage their potential to build their personalities, and provide their learning motivation. Therefore, teachers must have high creativity in delivering learning materials so that students are interested and actively follow the learning conducted by the teacher. One of the appropriate and exciting learning models to be used by teachers is the discovery learning model using the help of online learning videos.

Discovery learning is a learning model in which students generate new ideas and information for themselves with supervision and direction from the teacher (Salmina in Damayanti, 2022). This learning model invites students to find what they learn by themselves and then construct the knowledge by understanding its meaning. The main characteristics of the discovery learning model; are 1) exploring and solving the problem to create, combine, and generalize knowledge, 2) student-centered learning, and 3) activities to integrate new experiences and existing knowledge (Fajri, 2019). The Discovery learning model emphasizes the teacher giving students a problem and then solving it by doing identifications, data collections, data processing, and data conclusion at the end (Ulfa in Ariska, 2020). Sumianingrum (2017) said that the discovery learning model refers to the main characteristic of learning through these activities: 1) exploring and solving the problem to create, combine, and generalize knowledge, 2) student-centered learning, and 3) activities to integrate new experiences and existing knowledge. According to Ramadhani (2021), the advantage of discovery learning is to provide solutions to teachers to enhance students' activeness, interest, and awareness in the learning process. The incomplete presentation of learning material can stimulate students to discover and construct their understanding of a concept based on learning experiences.

Darmadi (2017) mentioned the steps to apply the discovery learning model are: 1) determining learning objectives, 2) identifying students' characteristics, 3) determining learning material, 4) deciding topics that students must study inductively, 5) developing materials by providing examples, illustrations, assignments, and others for students to learn, 6) arranging lesson topics starting from the simple to the complex, from the concrete to the abstract, and from the enzymatic, iconic to the symbolic, and, 7) assessing student learning processes and outcomes.

Besides the discovery learning model, ethnosience can also be implemented to improve the quality of the learning process by using aspects of local culture. Ethnosience-based learning aims to introduce students to facts developed in a society linked to learning materials. The implementation of ethnosience learning has the potential to establish a way of learning that is generally still teacher-centered to become student-centered (Ahmad, 2020). The exploration stages of ethnosience-based knowledge are topic selection, identification of personal abilities, analysis of various perspectives, reflection, and evaluation that must be done to obtain maximum results. The ethnosience approach has several principles. Firstly, there must be a connection between culture and science, which are research objects (Hadi, 2020). The form of ethnosience will be much easier identified through an educational process about daily life developed by the cultural community in terms of techniques, methods, and contents. Cultural knowledge such as fairy tales, songs, games, traditional houses, traditional rituals, local production, and the use of nature is a form of ethnosience education. Ethnosience identification is included in learning related to cultural knowledge possessed by the local area (Wahyu, 2017). According to Wahyu, ethnosience is based on a constructivist view, prioritizing meaningful learning. Meaningful learning is learning that is arranged based on the characteristics of students. The application of ethnosience in education aims to generate a love-attitude for culture and nation and increase students' knowledge and understanding of the culture and potential of the region. That is useful for overcoming students' difficulties in absorbing abstract and contextual lessons (Nuralita, 2020).

The ethnoscience-based discovery learning model is appropriate for the learning activity. According to Hadi (2020), the implementation of ethnoscience-based discovery learning is to connect the concept of science with the indigenous knowledge of the community. In this study, ethnoscience-based discovery learning is related to the theme of 3 healthy foods at religious and customary events such as *Sedekah Bumi* and the traditional food of *tape singkong* in the community around SDN Semirejo 02, Pati, Central Java. In this pandemic era, besides using appropriate learning models and approaches, teachers also need learning media to facilitate online teaching and learning activities. It can be an online learning video. Online learning videos can be an alternative tool and the best choice for teachers to explain material and assignments remotely. Video is an audio-visual medium since it provides examples of sound, images, or animations that students can observe directly (Romlah, 2021). According to Pebriani (2021), videos can be the appropriate learning media if they can attract students' attention to the material presented. Using videos as media has several advantages; 1) the material presented can be received equally by students, 2) they are good at explaining a process, 3) overcoming the limitations of space and time, 4) they are more realistic and can be repeated and stopped as needed, and 5) influencing the attitude of students by giving the deep impression (Rusman in Kurniawan, 2018).

Based on the explanation above, learning during the pandemic can be optimized using the discovery learning model, which aims to improve students' critical thinking skills by discovering problem formulations obtained following the material associated with the culture around students. That is presented through online video learning to students so that student learning outcomes can increase. Based on these several things, this study aims to determine the effectiveness of the ethnoscience-based discovery learning model assisted by online learning videos on learning outcomes in fifth-grade students at SDN Semirejo 02.

METHOD

The research method used in this study is quantitative, using a Pre-Experimental research design as One Group Pretest-Posttest. The writer presents the research design in table 1 below:

Table 1. Research Design

Grade	Pretest	Treatment	Posttest
Fifth Grade SDN Semirejo 02	O_1	X	O_2

Information:

O_1 = *pretest* score

X = treatment

O_2 = *posttest* score

(Sugiyono, 2018:115)

The population and samples used are all fifth-grade students at SDN Semirejo 02, with 25 students using Non-Probability Sampling with saturation sampling technique. According to (Sugiyono, 2015: 85), saturation sampling is a sampling technique when all population members are used as samples. This condition is often performed when the population is small, with less than 30 people. Data collection techniques used are observation, interviews, tests, and documentation.

This research started with conducting a preliminary study in schools to find existing problems and determine the population, sample, and sampling technique. Based on the issues in the classroom, researchers were interested in using an ethnoscience-based discovery learning model assisted by online learning videos to improve student learning outcomes. The research procedure carried out was online learning in class V SDN Semirejo 02 for five days. On the first day, students did a pretest with 20 questions to determine their initial ability before being given the treatment. On the second day, the researcher conducted a learning activity without using an ethnoscience-based

discovery learning model assisted by video learning. Then on the third and fourth days, the researcher presented learning using an ethnoscience-based discovery learning model with the help of online learning videos. On the fifth day, students did a post-test with 20 questions to determine their ability after being given treatment using an ethnoscience-based discovery learning model assisted by online learning videos.

Data analysis techniques used in this study include descriptive analysis, classical completeness test, paired sample t-test, and N-Gain test. By performing the prerequisite analysis, the researcher had met the normality test first. To find out the difference in the significance of the students' pretest and post-test scores, using the paired sample t-test, which was consulted with the t-table value and the significant level of 5% with the following formula:

$$t = \frac{md}{\sqrt{\frac{\sum x^2 d}{N(n-1)}}}$$

Description:

Md = Mean of the score (d) between post-test and pretest
 xd = the difference between deviation and mean deviation
 N = number of subject
 df = or db is N-1

(Arikunto, 2013:125)

Knowing the difference between the pretest and post-test scores supports whether the increase in learning is effective. It is calculated using the N-gain calculation according to Meltzer in (Ramdhani et al., 2020) with the equation:

$$g = \frac{\text{Posttest Score} - \text{Pretest Score}}{\text{Ideal Score} - \text{Pretest Score}}$$

The criteria for assessing the N-gain score are presented in Table 2.

Table 2. Category Score

Limitation	Category
$g > 0.7$	High
$0.3 \leq g \leq 0.7$	Medium
$g < 0.3$	Low

(Ramdhani et al. , 2020)

RESULTS AND DISCUSSIONS

The Covid-19 pandemic has affected the overall learning process. During the pandemic, the learning process can be done from a distance (Ghozali, 2021). Therefore, the entire learning process is in the form of online. Online learning is a learning system that is done by not meeting face to face. It uses a platform that assists the teaching learning process even though it is from a distance (Nafrin, 2021). In this learning system, teachers will also face several problems. They can be the online learning technique, the decrease in students' motivation, the mobile data that is widely used, the reduction of learning outcomes, and the lack of cooperation from parents.

The learning process can be affected by some factors. They include the use of the learning model, the service of learning media, and the use of facilities and infrastructure in schools that are right on target (Hamsyah, 2020). Based on the observations conducted in class V SD N Samirejo 02, there are several problems that the researcher found. It concluded that continued online learning caused students to focus only on their gadgets when accessing information that not all could be

proven true via the internet. This condition led them to be passive and lack awareness of the surrounding environment, especially the local culture around where they lived.

As a consequence, there is a culture erosion in the school environment because the students spend a lot of time on gadgets. Moreover, the teachers don't apply an innovative learning model when they deliver the lesson. They only burden the students with the assignment without giving enough explanation of the material so that it affects student learning outcomes. The researcher decides to apply the discovery learning model to overcome this problem.

The discovery learning model is a teaching method that focuses on the activities of students. In this learning model, the teacher only has a role as a guide or facilitator, directing students to discover concepts, propositions, algorithms, and many others (Waspada, 2022). Moreover, the researcher doesn't only apply the discovery learning model but also integrates the learning process with ethnosience.

The implementation of ethnosience in this research is considered appropriate to assist students during home-based or online learning. The students can connect the lesson with tangible things such as cultures embedded in a place around the student so that it can make it easier for students to understand the material better, and they can preserve local cultures in their environment. The Covid-19 pandemic makes all students carry out all learning activities at home. In online learning, students can utilize their settings to increase their curiosity. The ethnosience approach is adequate to overcome this situation (Khoiriyah, 2021). One of the things that students can learn is the lesson related to religious and cultural events such as *Sedekah Bumi* and the typical food of *Tape Singkong* in the community around SDN Semirejo 02 Pati, Central Java.

The ethnosience-based discovery learning model is a learning strategy encouraging students to actively observe, find information independently, and do other scientific actions by considering the environment and culture located in a particular climate. Ethno science can be implemented by incorporating the culture developed in a specific society into learning (Sulistyowati, 2020).

In this study, discovery learning based on ethnosience will be combined with online learning videos because the media in the form of videos can effectively increase students' mastery of concepts. According to Rokhim (2020), the use of video in the learning process has a significant influence. A video can also visualize ideas easily and interactively to students compared to the learning that only uses ineffective textbooks. The findings show that the discovery learning model based on ethnosience assisted by online learning videos effectively improves student learning outcomes in the online learning for class V SDN Semirejo 02 Pati. That is ensured by increased student learning completeness, an increase in the average score of student learning outcomes, and the value of N-Gain. Previously, the data on student learning outcomes, both pretest and post-test, had met the normal distribution; therefore, it can continue with hypothesis testing.

The results of the completeness analysis of student learning outcomes are presented in Table 3 below.

Table 3. Frequency Distribution of Student Learning Outcomes Completeness

	Frequency	Percentage	Frequency improvement
pretest	2	8	84%
post-test	23	92	

Based on the results in Table 3, it can be seen that there is only 8% (2 students) completed the pretest, while in the post-test there is 92% (23 students) completed the post-test. The implementation of Ethno science-based Discovery Learning assisted by Online Learning Videos increases students' completeness to 84% of students' initial learning outcomes. This result shows that the learning is acceptable, understandable, and can strengthen conceptual understanding to impact student learning outcomes positively. A study by Mahdian (2022) showed that the completeness of student learning

outcomes increased after being given the treatment of the Discovery Learning model. According to him, the Discovery Learning model has effectively applied in the online teaching process to influence student learning outcomes. According to Sumendra (2021), the Discovery learning model motivates students to find, explore, collect, and build their knowledge in the learning process. The discovery learning model allows students to explore their knowledge through simple discoveries. Discovery learning is one solution that can be collaborated with online learning.

In the learning process, discovery learning has seven advantages; 1) students can develop intelligence, prepare, and provide skills in their knowledge progression, 2) students gain personal knowledge, 3) increase enthusiasm for students, 4) encourage students to make progress, 5) able to guide students to learn according to their learning styles so that students can be motivated to learn, 6) assist students in increasing their self-confidence, and 7) discovery learning strategy centers on the learner, not the teacher (Roestiyah, in Prayogo 2022).

Then, the average student learning outcomes increase is tested for its significance level using the paired t-test. The result is that the value of t-count is 15,868 > t-table (1,711). It shows a significant difference in the average student learning outcomes between the pretest and post-test. To find out more about the average increase in student learning outcomes, the following is a comparison graph of learning outcomes in Figure 1.

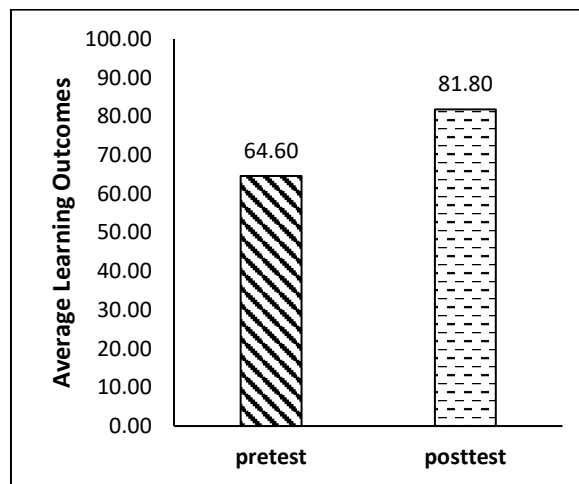


Figure 1. Graph of Differences in Average Student Learning Outcomes

Based on the graph in Figure 1. It can be concluded that the average student learning outcomes increased after learning by 26.6% from the initial learning outcomes. It indicates that Ethno science-based Discovery Learning assisted by Online Learning Videos has a positive and significant influence on student learning outcomes.

This finding is in line with Damayanti's study (2020). Her study shows that discovery learning assisted by learning videos can improve student learning outcomes. It can be seen from the increase in mastery learning from 62.5% to 80.16. These findings are also ensured by a study conducted by Kusrini et al. (2018), which shows an increase in the average score because of students' activeness during the learning process.

Siregar (2022) also shows that learning videos in the discovery learning model make students respond well and enthusiastically during the learning process. If students are excited during the learning process, they absorb the material being studied more. Moreover, it will have a positive impact on student learning outcomes. The most important aspect of using video as a medium in learning is that videos can present actual object movements and be used many times as students want. Therefore, online videos can help teachers clarify the explained learning material.

The use of videos can stimulate students' knowledge, train them to think logically, think analytically, be more creative and effective, and sharpen their imagination (Daniati in Kasih, 2020). As a learning medium, the video is an introduction tool to tell the information from the teacher to students. Several things must be considered in using video in the learning process. They include 1) the teacher preparing the material and choosing the appropriate video to achieve the expected learning objectives, 2) the teacher must know the duration of the video, 3) providing a general explanation of the video content and preparing the equipment that will be used so that the learning can run well, 4) The video must be able to motivate students to study what activities they should do and the information in it, and 5) the use of learning video must be able to support learning activities that facilitate students to achieve the desired student development aspect (Maymunah, 2021).

A study by Suantara (2021) showed that the implementation of the discovery learning model in learning activity made students more active in participating in the learning process by utilizing the supporting objects and media. In addition, the application of discovery learning models provides opportunities for students to develop and make progress compatible with their abilities and interests during the online learning process.

N-Gain analysis is done to determine the learning model's effectiveness. The results of the N-Gain test are presented in Table 4 below.

Table 4. Frequency Distribution of Student N-Gain Category

N-Gain Category	Frequency	Frequency Percentage
Low	3	12
Medium	21	84
High	1	4

Based on Table 4, it can be seen that the majority of students, which was 84%, experienced an increase in learning outcomes in the medium category after the learning. These findings are also supported by the average N-Gain value of 0.49, which is also included in the medium category. The amount of the N-Gain value can indicate the effectiveness of the learning model application. So it can be said that applying the Ethno science-based Discovery Learning model assisted by Online Learning Videos can improve the learning outcomes of fifth-grade elementary school students with medium effectiveness.

These findings are in line with research conducted by Ali (2018); the discovery learning model gave a better effect with an average pretest score of 14.60, an average post-test score of 27.49, and an average gain score of 12.86. In addition, Ali said that the teacher's understanding of learning affected the way of teaching. A teacher must know the teaching strategies, including learning models, techniques, and learning methods. Teachers also have to be able to create a conducive, safe, comfortable, and enjoyable learning atmosphere. A teacher can generate students' creative minds so that they are motivated and active during the learning process, resulting in increased student learning outcomes. In the 2013 curriculum, the assessment aspects are cognitive (learning outcomes) and practical, showing students' mental attitudes and awareness of learning. Affective assessment that is measured includes parts careful, thorough, and independent. Affective assessment is presented in each lesson 1-3 in thematic learning Theme 3 Sub-theme 2. Through observation and assignment of student worksheets, the results of the affective assessment can be obtained, which can be presented in Table 5.

Table 5. Affective Assessment Results

Aspect	Total Score		
	Learning I	Learning II	Learning III

Carefulness	65	78	87
Accuracy	71	85	90
Independence	73	84	95
Average	69,67	82,33	90,67

Based on table 5, it can be seen that at the time of learning I, students had an average value of 69.67 because students did not look enthusiastic about participating in the learning activity and were less careful in doing assignments. After all, the material was only explained. All the works were given in text through the WhatsApp group. Then the affective assessment increased in learning II and reached a high category value in learning III with an average of 90.67. This indicated that applying ethnoscience-based discovery learning models assisted by online learning videos could also improve students' affective assessment. After learning, students show more careful behavior in giving answers or solutions to problems, participating actively in a group, accurately doing assignments, and completing tasks independently.

CONCLUSION

Based on the findings, it can be concluded that the discovery learning model based on ethnoscience assisted by online learning videos is effective in the learning outcomes of fifth-grade students at SDN Semirejo 02 Pati, Central Java. This can be confirmed by the average post-test score (81.80), which is higher than the pretest (64.60). In addition, the results of the t-test obtained $t_{count} (15,868) > t_{table}(1,711)$, indicating that there is a significant increase in learning outcomes after the learning. Ethno science-based discovery learning doesn't only improve learning outcomes. Still, it can also enhance the affective assessment of students in thematic lessons Theme 3 Sub-theme 2 learning 1 - 3, which makes students show carefulness, accuracy, and independent aspects with high scores.

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