Effectiveness of SETS-Based Electronic Student Worksheet (E-LKPD) to Improve Student Learning Outcomes

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Article history		Abstract
		This research aimed to determine the effectiveness of electronic-based student worksheets (E-LKPD) on student learning outcomes. The method used was a quasi-experiment with one group pretest-posttest design. The sample taken in a cluster random sampling were 32 students of class VII SMPN 2 Ngemplak Sleman School Year 2021/2022. The instrument used was a problem sheet in the form of a description. The results of the study were analyzed using quantitative descriptive methods. The results of the analysis of the increase in the pretest and posttest obtained an average of N-Gain 0.60 in the medium category. The average pretest value was 6.94 while the average posttest value was 8.80. Test results of t sig value (2-tailed) < 0.05 showed a significant improvement between pre-test and post-test. This indicated that E-LKPD-based SETS was effective for improving students' cognitive learning outcomes.

1. INTRODUCTION

Coronavirus Diseases 2019 (COVID-19) has shocked countries around the world. The Covid 19 pandemic has changed the way people live from various aspects, one of which is Education (Rachmawati, et al., 2020). In several countries on March 2020, it has been announced the closure of schools (Setiawan, 2020). Face-to-face learning is not possible. This forces the implementation of distance learning or online (Sun et al., 2020). Online learning during the Covid-19 Pandemic is confirmed by the Circular Letter of the Minister of Education No.4 of 2020 on the implementation of Education policy in the emergency period of the spread of Corona Virus Disease (Covid-19) (Kemdikbud, 2020).

Online learning is learning that utilizes the internet as a forum to channel knowledge (Syarifudin, A. S, 2020). Teachers and students are required to have good network or internet access. The implementation of online learning is determined by several supporting factors, such as mobile phones, quotas, and internet network, and the availability of appropriate teaching materials (Putria et al., 2020).

The implementation of distance learning requires learners to play an active role in the learning process or student-centered (Handarini &Wulandari, 2020).

Based on the results of interviews, during online learning students are less active due to a lack of direct interaction between teachers and students. In addition, students are still late in the collection of assignments. Thus, teachers are required to provide learning innovation during online learning. According to (Hastuti, et al., 2014) that the use of LKPD is one way that can be used to increase student activity during learning activities. LKPD is used as one of the media to optimize student involvement in learning.

LKPD is a teaching material containing material or theory, summaries, and instructions that must be completed by learners (Shafitri 2020). LKPD allows students to learn by their own according to their abilities and interests to stimulate learning activities (Muthoharoh, 2017). Distance learning or online is not possible if students use printed LKPD. Thus, electronic LKPD (E-LKPD) is needed to be applied. Electronic Student Worksheet (E-LKPD) is one of the electronic teaching materials that can be used in online learning (Apriadi, 2020). The preparation of E-LKPD can shorten the time learners in answer by directly clicking on the answer column and precisely its use because it is following the needs in the pandemic period for distance learning (Putri, 2021).

The application used in E-LKPD is live worksheet. Live worksheet is an app from Google that can be accessed for free. This application can be used by teachers to create worksheets in interactive online form while automatically correcting student results. Students can work on and submit worksheets to teachers online. The advantage of live worksheets application for students is that it can motivate learning because it contains various interesting features so that children are excited to work on it, while for teachers, the live worksheets application is easy to use, and can save time and paper (liveworksheet.com/about).

Teaching media used by teachers play an important role in improving students' learning outcomes (Azhar, 2011). Therefore, the E-LKPD developed must be innovative in order learners can play an active role in teaching and learning activities and make it easier for learners to understand the subject matter. One learning model that can be used is the SETS learning model. SETS (Science, Environment, Technology, and Society) is learning by combining the concepts of science studied and their implications for the environment, technology, and society (Binadja, 1999).

The advantages of SETS learning are always connected with the daily life of students so that learners can develop their knowledge to solve everyday problems (A.J.A.P. Resni, 2013). Learning with the SETS model requires students to be actively involved in acquiring material concepts through understanding and utilizing science, technology, and the environment in society so that the concept is not easily lost and can improve learning achievement (Aprianingtyas, 2016).

Based on Fauzi's research (2019), SETS-based LKPD developed is very practical and effective as learning media for learners. According to Yuniastuti (2015), the set learning model affects the learning outcomes of learners. The increase in students' learning outcomes on their learning in a more pleasant atmosphere. E-LKPD is more attractive to students and impacts the learning outcomes of elementary school students (Khotimah, 2020).

Students are expected to know the elements of SETS and understand the implications of the relationships between the SETS elements. Thus, E-LKPD-based SETS guides students to think globally and solve problems in everyday life in the surrounding environment according to their capacities that make students motivated to learn (Eliyanti, 2018). This will impact students' cognitive learning outcomes on the material taught. Based on the above description, this study aims to test the effectiveness of SETS-based E-LKPD to improving student learning outcomes.

2. METHOD

This study used a one-group pretest-posttest design. The research was conducted at SMP Negeri 2 Ngemplak, Sleman in the odd semester of the 2021/2022 school year from November to December 2021. The study sample was class VII C which consisted of 32 students taken in a cluster random sampling. The data collection technique was conducted by written tests. Data collection instruments are test instruments in the form of pretest questions and posttest problems that are used to measure student learning outcomes. Cognitive learning outcomes were measured using pretest and posttest questions totalling 5 problems with cognitive realm C1 to C4.

Table 1. One-Group Pretest-Posttest research design

Pretest	Treatment	Posttest
O	X	O

Information:
O: Material Test
X: Treatment using SETS-based E-LKPD
Furthermore, the results of the pretest and posttest work are seen to increase using the N-Gain formula as follows:

$$N - gain = \frac{Skor\ posttest - Skor\ pretest}{Skor\ maximum - Skor\ pretest}$$ ....(1)

Once the value of N-Gain is known, it is then interpreted using the criteria in Table 2. (Mubarokah, 2019).

Table 2. N-gain Criteria

N-Gain Score	Category
$0.70 < $ N-Gain	High
$0.30 \leq$ N-Gain ≤ 0.70	Medium
N-Gain ≤ 0.30	Low

3. RESULTS AND DISCUSSION

This study used the results of pretest and posttest analysis to measure students' cognitive learning outcomes on volcanic eruption material. The results of the study are known based on the analysis of student learning outcomes to determine the effectiveness of the E-LKPD-based sets consisting of pretest, posttest, N-Gain, and T-test. The pretest score results show data on students' initial abilities before the learning process using SETS-based E-LKPD.

Table 3. Recapitulation of pretest and posttest values

Class	Ideal score	Average		N-Gain
		Pretest	Posttest	
SETS-based E-LKPD	10	6.94	8.80	0.60

The student pretest average was 6.94. After a pretest, students were given materials using the SETS-based E-LKPD. An improvement in student learning outcomes can be known after students are given post-test questions. The posttest average was 8.80. This shows that the SETS-based E-LKPD effectively improves student learning outcomes with an average N-gain score of 0.60 in the medium category.

Test results of normality and homogeneity of student learning outcomes obtained the results of sig. The pretest value was 0.054, and the posttest was 0.078. From the calculation results of sig.>0.05, pretest and posttest data are normally distributed. The homogeneity test of student learning outcome data was 0.499. From the calculation results of sig.>0.05, pretest and posttest data showed a homogeneous distribution. The analysis used the T-test to see if there was a significant increase in students' learning outcomes before and after being given sets-based E-LKPD treatment.

The results of the analysis using the T-test showed that the sig value (2-tailed) was 0.000. Because of the sig value. (2-tailed) < 0.05 it indicates a significant increase between pre-test and post-test. Therefore, it can be concluded that SETS-based E-LKPD is effective for improving student learning outcomes.

E-LKPD contains volcanic eruption material, SETS learning model syntax, and elements of SETS (Science, environment, technology, and society). Students are trained to associate material concepts with everyday life through the use of SETS-based E-LKPD. E-LKPD contains discussion activities related to disaster mitigation student housing environment, namely volcanic eruptions. Then, students are asked to answer questions contained in E-LKPD. Students actively discuss and solve problems.

Cognitive learning outcomes are abilities possessed by students after receiving a learning experience. One of the factors affecting student cognitive learning outcomes is student activity during learning (Hamidah, 2018). SETS-based E-LKPD keeps students active and able to solve the problems in it. Students can discuss the issues discussed in the E-LKPD so that students are not passive and can conclude the discussion results. This is in accordance with the opinion of Aprianingtyas (2016) that learning with SETS has a positive impact. Students are required to be directly involved in acquiring learning concepts so that the concept is not easily lost and will last a long time in the student's memory.

In E-LKPD-based sets in which there is an introductory stage, the teacher stimulates and invites students to identify social issues in the environment around the students. Students enthusiastically answer the teacher's questions. According to Khasanah (2015), learning with SETS is more meaningful because it is directly related to arising problems in students' daily lives. In accordance with the research of Rahmaniati (2015) that students easily understand the material, can master the material concept, and are sensitive to issues in the community.

The use of E-LKPD media can make the learning process more attractive. Electronic LKPD using live worksheets has several advantages, such as being easy to use when students are at home, practical, and having various features that can make LKPD more attractive (Hidayati, 2021). E-LKPD provided contains materials and questions to be answered so that students can easily understand the concept of the material during online learning. When students are accustomed to filling out the questions on E-LKPD, students will know the results obtained so students can evaluate their learning outcomes. Measuring learning outcomes is pivotal because the results achieved can be seen by students. Thus, they will try to improve their learning outcomes in the future.

The use of a live worksheet application is simple. Teachers can create worksheets or use available worksheets in this application. The teacher can upload a file (doc, pdf, jpg, or png) which will then become an image. The file can be added by drag or a box by the teacher to fill in the student's answer. In addition, the use of the application is very accessible to students. The student answers' will be sent to the teacher's email so the teacher can check them.

4. CONCLUSION

Based on the research results, it can be concluded that learning using SETS-based E-LKPD was considered effective in improving the learning outcomes of class VII students, seen from the increase in the average pretest score from 6.94 to 8.80 on the average of posttest score. The average N-gain value was 0.60 with a medium category. In addition, students were active and enthusiastic in working on E-LKPD and answering questions from the teachers. Thus, it is hoped that the SETS-based E-LKPD can be used as an alternative by teachers when learning online and offline because it is easy to use and can improve students' cognitive learning outcomes.

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