

EFFECTIVENESS OF ELECTRONIC STUDENT WORK SHEET (e-LKPD) USING LIVEWORKSHEETS BASED ON DISCOVERY LEARNING ORGANIZATIONAL SYSTEM CONCEPTS OF LIFE ON LEARNING OUTCOMES OF CLASS VII STUDENTS

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Abstract

The use of conventional and general teaching materials is one of the causes of low student learning outcomes. This study aims to examine the effectiveness of using Electronic Student Worksheets (e-LKPD) with Liveworksheets based on Discovery Learning the concept of life organization systems on learning outcomes for class VII students at MTsN 9 Boyolali. This research is a pre-experimental study with a one-group pretest-posttest design, with one experimental class. The sample of this research was class VII A students of MTsN 9 Boyolali who were selected by purposive sampling technique. The results showed that the use of e-LKPD with Liveworksheets based on Discovery Learning the concept of an effective life organization system on student learning outcomes as evidenced by the results of data analysis, namely the normality test obtained a value of Sig. > The value of α is $0.200 > 0.05$, and the homogeneity test results obtained Sig. Based on Mean > the value of α is $0.056 > 0.05$ and the results of the t-test obtained the value of Sig. < 0.05, which is 0.000 with the standard deviation value obtained, which is 29, then the t-count is 14.130, while the t-table value is 2.045. Comparison of the results from t count > t table, namely $14.130 > 2.045$, it can be concluded that the use of e-LKPD based on Discovery Learning has an influence that is significant to the learning outcomes of students on the concept of life organizational systems.

Keywords: e-LKPD, Liveworksheets, Discovery Learning, Learning Outcomes, pre-experimental study

Abstrak

Penggunaan bahan ajar yang masih bersifat konvensional dan umum merupakan salah satu penyebab rendahnya hasil belajar peserta didik. Penelitian ini bertujuan untuk menguji efektivitas penggunaan Lembar Kerja Peserta Didik Elektronik (e-LKPD) dengan *Liveworksheets* berbasis *Discovery Learning* konsep sistem organisasi kehidupan terhadap hasil belajar peserta didik kelas VII MTsN 9 Boyolali. Penelitian ini merupakan penelitian pre-eksperimen dengan desain *one-group pretest-posttest*, dengan satu kelas eksperimen. Sampel penelitian ini adalah peserta didik kelas VII A MTsN 9 Boyolali yang dipilih dengan teknik *purposive sampling*. Hasil penelitian menunjukkan bahwa penggunaan e-LKPD dengan *Liveworksheets* berbasis *Discovery Learning* konsep sistem organisasi kehidupan efektif terhadap hasil belajar peserta didik dibuktikan dengan hasil analisis data yaitu pada uji normalitas memperoleh nilai Sig. > nilai α yaitu $0,200 > 0,05$, uji homogenitas diperoleh hasil nilai Sig. Based on Mean > nilai α yaitu $0,056 > 0,05$ dan hasil uji *t-test* diperoleh nilai Sig. < 0,05 yaitu 0,000 dengan nilai standar deviasi yang diperoleh yaitu 29 maka t hitung diperoleh 14,130 sedangkan nilai t tabel sebesar 2,045. Perbandingan hasil dari t hitung > t tabel yaitu $14,130 > 2,045$ maka disimpulkan bahwa penggunaan e-LKPD berbasis *Discovery Learning* memiliki pengaruh yang signifikan terhadap hasil belajar peserta didik pada konsep sistem organisasi kehidupan.

Introduction

Education in the digital era requires innovation in the learning process so that it is more effective in helping students obtain the expected learning outcomes (Syibli et al., 2021). Currently, problems in the world of education are very complex, so teachers are expected to be able to create innovative and creative learning strategies to achieve the expected learning objectives (Khoirul Sidik & Titikusumawati, 2022). Conventional learning methods that rely

on books and exposure to material from teachers are often ineffective in providing understanding to students which results in not achieving predetermined learning outcomes, especially in complex materials such as life organizational systems. Thus, the use of Discovery Learning-based Electronic Student Worksheets (e-LKPD) is an alternative learning medium for students (Costadena & Suniasih, 2022). Based on the research results of Titikusumawati & Adi Prayitno (2022) there are still many teachers who have not been able to overcome problems in the learning process through innovative models, methods, or learning strategies. Referring to previous research by Diah Masturah & Putrini Mahadewi (2018) shows that innovation in the learning process affects student learning outcomes. A good learning media is a learning media that fits the characteristics of students to make the learning process more effective. (Syofyan & Ismail, 2018). Science subjects are subjects that study the basic principles of natural phenomena and their reactions and require appropriate learning methods to achieve learning objectives (Widiyanti & Fitrotun Nisa, 2021). The concept of life organization systems is one of the natural science materials that requires appropriate learning methods so that students can understand the material effectively and obtain the expected learning outcomes. The use of technology in appropriate learning will be able to help students achieve predetermined learning outcomes (Ansyah et al., 2021).

Electronic Student Worksheets (e-LKPD) are one of the teaching materials that contain material and assignment steps that students are required to complete them. In the e-LKPD, there are instructions and directions for students to carry out experimental activities and solve a case. The use of e-LKPD aims to develop the cognitive aspects and skills of students through experimental or investigative activities. One of the benefits of the learning process with e-LKPD is to increase the efficiency and effectiveness of the learning process in terms of funds, time, facilities, and personnel with optimal results (Fuadi et al., 2021). Learning activities with LKPD will make it easier for teachers to direct students in discovering concepts through individual and group activities so that they can train process skills and develop students' scientific attitudes (Arima Gusti & Ratnawulan, 2021). LKPD used during the learning process will support and facilitate students in understanding and constructing the concept of understanding constructively. With LKPD students can discuss and share thoughts with other students to make students actively involved in the learning process (Fragkiadaki & Ravanis, 2021). The learning model used in developing the e-LKPD Liveworksheets is the Discovery Learning model because in it students are allowed to solve their own problems according to their abilities and find their own understanding (Ariani, 2020). The Discovery Learning model provides opportunities for students to gain an understanding of concepts independently but can also practice problem-solving and creative thinking skills (Titikusumawati et al., 2020). According to Prastika & Masniladevi (2021), Liveworksheets are a web-shaped platform that is accessed online by providing services to teachers so they can take advantage of existing e-LKPD or create their own so that learning becomes more interactive. Student Worksheets (LKPD) combined with Liveworksheets will change the appearance of the LKPD into Electronic Student Worksheets (e-LKPD) which can be accessed in the form of doc, pdf, jpg, etc. files which make the learning process more enjoyable because it uses learning media varied. Besides that, Liveworksheets can correct student answers automatically through the system. Questions or assignments that can be made through the Liveworksheets website include multiple choice, matching, or choosing true or false (Prabowo, 2021).

Based on the results of a preliminary study conducted by researchers at the Madrasah Tsanawiyah in the Boyolali area, it was found that the use of teaching materials in the form of worksheets in the field was still in the form of general and conventional worksheets and was not based on a particular learning model. In addition, from the results of the preliminary study, it was also found that 85% of students felt that the LKPD used had several drawbacks such as the presentation of material that was not simple, poor image quality, and too many difficult exercises. In line with the previous statement, the results of research conducted by

Rahmawati Noer Jannah & Ragil Widiyanto Atmojo (2022) show that there are still many teachers who use conventional teaching materials and learning media, this is due to the lack of ability and supporting facilities for teachers to be able to develop media interesting and interactive learning. Arima Gusti & Ratnawulan's research (2021) states that there are still many LKPDs that are used whose preparation is not following the LKPD preparation standards that have been published by the Ministry of National Education in 2008, besides that the material presented is less interesting and not interactive. E-LKPD teaching materials are useful for helping students understand the material more easily and provide opportunities for students to study independently so that student-centered learning is no longer teacher-centered (Fuadi et al., 2021). From the results of the analysis of student learning outcomes it was found that student learning outcomes in the concept of life organization systems were not optimal where to reach the KKM value limit remediation activities were needed, this meant that there was a need for solutions to solve these problems. Less than optimal use of teaching materials and learning media was found in previous research conducted by Monica et al., (2021) which led to a low level of student learning outcomes.

Based on this, a study was conducted to test the effectiveness of e-LKPD with Liveworksheets based on Discovery Learning the concept of life organization systems on student learning outcomes. In this study, the use of LKPD is displayed through the Liveworksheets application which makes LKPD more attractive and interactive and can be accessed via electronic devices connected to the internet network. The preparation of LKPD is based on the steps of the Discovery Learning model which focuses on the discovery process independently by students. This research is expected to provide effective alternative solutions in science learning and can contribute to the development of learning technology in the future. In addition, this research is also important for developing students' abilities to utilize technology in learning, as well as improving their skills in solving problems and developing critical thinking skills. This is important considering that technology is increasingly becoming an important part of students' daily lives and future jobs.

Research Methods

The research method used in this study was a pre-experimental study with a One-Group Pretest Posttest design. The research design is as follows:

Table 1. One-Group Pretest Posttest Design

O_1	X	O_2
Pretest	Treatment	Posttest

Explanation:

O_1 = The pretest aims to measure student learning outcomes before being given treatment, namely learning with e-LKPD based on Discovery Learning

X = Treatment is learning using e-LKPD based on Discovery Learning

O_2 = The posttest aims to find out the learning outcomes of students after being given treatment, namely learning with e-LKPD based on Discovery Learning

The population in this study were all students of class VII MTs N 9 Boyolali. The selection of the research sample was carried out using a purposive sampling technique, then the sample selected was class VII A students consisting of 20 female students and 20 male students. This study has several instruments used to collect data, namely preliminary study questionnaires, pretest, and posttest questions, teacher and student response questionnaires, and observation sheets of learning implementation. The data analysis technique used to

measure the effectiveness of the e-LKPD on learning outcomes is divided into two, namely tests and non-tests. Non-test data analysis techniques consist of practice tests and observation of the implementation of learning. While the test data analysis technique is the analysis of the pretest-posttest instrument questions and the analysis of the pretest-posttest data results which include the normality test, homogeneity test, and T-test using the SPSS 22.0 For Windows application. The research instruments for the pretest and posttest questions were tested on non-sample and non-population students, namely class VIII D. Then an instrument test analysis was carried out with the stages of homogeneity test, reliability test, difficulty level test, and item discrimination test. After testing, the pretest-posttest questions were obtained which were feasible to be used as research instruments.

Result and Discussion

This study aims to determine the effectiveness of e-LKPD with Live worksheets based on Discovery Learning the concept of life organization systems on the learning outcomes of class VII students at MTsN 9 Boyolali. Based on the results of research and data analysis that has been carried out in the sample class, namely class VII A, the data was obtained from the pretest and posttest results of students. The results of the data analysis of students pretest and posttest results are in Table 2.

Table 2. Results of Pretest and Posttest Data Analysis

Test Type	N	Min Value	Max Value	Mean
Pretest	30	12	66	36
Posttest	30	24	100	76

Based on the data from the pretest and posttest results in Table 2. it can be seen that there is a significant difference between the results of the pretest before being given treatment and the results of the posttest after being given treatment. To analyze and test the effectiveness of the e-LKPD on student learning outcomes, several testing steps are needed on the data from the pretest and posttest results. The testing stages are the normality test, homogeneity test, and t-test. The first stage is the normality test, the results of which are in Table 3.

Table 3. Results of Normality Test Analysis

Test	α Value	Sig. Value	Decision
Pretest	0,05	0,200	Normal
Posttest		0,200	distributed data

Based on Table 3. The results of the normality test were obtained, namely the Sig. > The value of α is $0.200 > 0.05$ so it can be concluded that the data from the pretest and posttest results are normally distributed. Furthermore, after the normality test is carried out is the homogeneity test which aims to test whether the data obtained has a homogeneous variant or not. The homogeneity test results are in Table 4.

Table 4. Homogeneity Test Analysis Results

Test	α Value	Sig. Value Based on Means	Decision
Pretest and Posttest	0,05	0,056	Homogeneous distributed data

Based on Table 4. The results of the homogeneity test analysis were obtained where the Sig. Based on the Mean $> \alpha$ value, the data is homogeneous, and if the Sig. Based on the Mean $< \alpha$ value, the data is said to be not homogeneous. The results of the homogeneity test analysis obtained the value of Sig. Based on Mean $>$ the value of α is $0.056 > 0.05$ so, it can be concluded that the data is homogeneous. After carrying out the normality test and homogeneity test is the T-Test which aims to determine the level of significance of an independent variable (independent) affecting the dependent variable, where the independent variable is the use of e-LKPD with Live worksheets based on Discovery Learning and the dependent variable is learning outcomes learners. The results of the T-Test are in Table 5.

Table 5. T-Test Result

	Sig. Value	Sig. (2-tailed) Value	df	t-count	t-table
Pretest and Posttest result	0,05	0,000	29	14,130	2,045

The T-Test was carried out using the SPSS 23.0 for Windows application program, with the condition that a decision is made if the value of Sig. (2-tailed) > 0.005 then H_0 is accepted and H_a is rejected, so it can be said that there is no significant effect, and if the value of Sig. (2-tailed) < 0.005 then H_0 is rejected and H_a is accepted, which means there is a significant effect. Based on the results of the T-Test analysis in Table 4. Sig. < 0.05 , which is 0.000 , and based on the standard deviation value obtained, namely 29 , the t count is 14.130 while the t table value is 2.045 . So, when compared to the results of t count $>$ t table, that is $14.130 > 2.045$. The results of hypothesis testing using the Independent Sample T-Test technique show that there is a significant effect between before being given treatment and after being given treatment. So it can be seen that the use of e-LKPD based on Discovery Learning has a significant influence on student learning outcomes on the concept of life organization systems.

The results of observing the implementation of learning using e-LKPD based on Discovery Learning for 4 meetings are intended for teachers and students. According to Nur Muhammad (2022) that the results of the percentage of implementation of learning which has an average value of more than 80% mean that learning has been carried out in a very good category.

Tabel 6. The Results of The Analysis of The Implementation of Learning

	Average percentage	Category
Teacher	88,45 %	Very good
Students	84,6 %	Very good

The implementation of learning using e-LKPD based on Discovery Learning shows an average percentage by teachers of 88.45% in the very good category and the average percentage of learning implementation by students is 84.6% in the very good category.

The effectiveness of e-LKPD products based on Discovery Learning can be determined by comparing the results of the students' pretest and posttest through the first step, the normality test, the results of which are listed in Table 3. From the results of the analysis, the Sig. > 0.05 , namely 0.200 so that it can be said that the data is normally distributed. Then, the

homogeneity test whose analysis results are listed in Table 4. Sig. Based on the Mean of 0.056, the data can be said to be homogeneous. After the normality and homogeneity tests, then a T-test is carried out, with the results of the analysis contained in Table 5. From the results of the T-test, it can be seen that the use of e-LKPD based on Discovery Learning has a significant influence on student learning outcomes because it has a value Sig. < 0.05, namely 0.000, and based on the results of a comparison between $t\text{-count} > t\text{ table}$, namely $14.130 > 2.045$. So it can be concluded that the use of e-LKPD based on Discovery Learning the concept of life organization system is effective on the learning outcomes of Class VII students of MTs N 9 Boyolali.

The implementation of learning using e-LKPD based on Discovery Learning shows an average percentage by teachers of 88.45% in the very good category and the average percentage of learning implementation by students is 84.6% in the very good category. This is in line with previous research by Atik Astiti et al, (2021) which obtained a percentage of learning implementation using the Discovery Learning model of 85.64% in the very good category. From the results of these percentages, it is known that learning has been almost fully implemented following the learning syntax of the Discovery Learning model, but several aspects of learning are not implemented such as students who are less prepared to take part in learning, students who do not actively participate in learning, teachers who do not give appreciation at the end of the lesson

The learning outcomes of students before being given treatment and after being given treatment, namely the use of e-LKPD with Live worksheets based on Discovery Learning has a significant level of effectiveness. This is because the use of e-LKPD with Live worksheets based on Discovery Learning has many advantages over the use of conventional LKPD, including the presentation of material that is more interesting with interesting pictures, games that hone students' creativity and abilities, as well as presentation of material that is simpler and easier to understand (Syaifudin, 2022). Learning that is structured differently and interestingly, such as the use of technology-based teaching materials such as e-LKPD, will attract the interest and enthusiasm of students to take part in learning (Samsiah et al., 2022).

The use of innovative and fun learning media such as e-LKPD based on Discovery Learning in addition to improving student learning outcomes can also attract students' interest in participating in learning (Dwi Valencia et al., 2019). In this study, the use of e-LKPD based on Discovery Learning was arranged in an interesting way using the syntax of the Discovery Learning model which made students unconsciously able to discover the concept of understanding independently and was proven to be able to improve student learning outcomes on the concept of life organizational systems.

The effectiveness of student learning outcomes on the results of the Discovery Learning-based e-LKPD product trial is in line with relevant previous research. Based on the results of research by Nur Muhammad (2022), the use of e-LKPD based on Discovery Learning can improve the learning outcomes of class VII students of junior high school. The results of a study by Nurjannah et al., (2020) show that the use of e-LKPD based on Discovery Learning is effective in improving student learning outcomes. Another study by Rinda Salsabilla et al., (2022) showed that the use of Discovery Learning-based e-LKPD was able to improve the learning outcomes of class VII students of junior high school. Subsequent research that examines the same topic by Shaffitri et al., (2022) also shows that the use of Discovery Learning-based e-LKPD can improve learning outcomes for Class VII students of junior high school. Similarly, in this study, the use of Discovery Learning-based e-LKPD was able to improve participant learning outcomes as was done by Havina Putri et al., (2021) showing that learning activities using electronic learning devices provide comfort for teachers and students, besides it can train students critical thinking skills and improve student learning outcomes. Then the results of this study are in line with the results of Ramadhana & Hadi's research, (2022) which states that e-learning-based learning is effective on student learning outcomes

marked by an increase in learning outcomes, participation, and student activity in learning activities. Another study by Faradilla et al., (2018) stated that the use of LKPD is effective as an alternative teaching material that can improve student learning outcomes. In addition, it was found that the use of LKPD was effective in increasing the cognitive and affective competence of students in the research conducted by Lufri et al., (2021). The results of research conducted by Purwita et al., (2020) stated that LKPD applied in the learning process in addition to improving learning outcomes can also improve students critical thinking skills.

Conclusion

Electronic Student Worksheets (e-LKPD) with live worksheets based on Discovery Learning the concept of an effective life organization system on student learning outcomes. Electronic Student Worksheets (e-LKPD) in future studies are expected to be able to be applied and developed using other interactive learning media and other more diverse learning models

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