

THE EFFECT OF LIVEWORKSHEETS-BASED E-LKPD ON HIGH SCHOOL STUDENTS' INTERESTS AND LEARNING OUTCOMES IN MAGNETIC INDUCTION MATERIAL

Shofira Amatullah*, Alex Harijanto, Subiki Subiki

Physics Education Study Program, Faculty of Teacher Training and Education,
 Universitas Jember

Jl. Kalimantan No. 37, Jember 68121, Jawa Timur, Indonesia

*corresponding author: shofiraamatullah@gmail.com

Abstract. The liveworksheets-based E-LKPD implemented in SMA Negeri 3 Lumajang aims to assess whether there is an influence on the interest and learning outcomes of high school students on the subject of magnetic induction. The type and design of this research is true-experimental and posttest-only control design. The samples used were class XII-1 as the experimental class and XII-2 as the control class, which were determined using the purposive sampling area technique. After the application of e-LKPD based on liveworksheets, there were differences between the two sample groups on student interest and learning outcomes after hypothesis testing. The results show the value of Sig. (2-tailed) is 0.035 on learning interest and Sig. (2-tailed) is 0.047 on learning outcomes. It can be said that the liveworksheets-based e-LKPD has an effect on student interest in learning as shown by student focus, student activeness, and student involvement during learning and supported by student interviews after the study. The effect on student learning outcomes is due to differences in the treatment given and is shown by the results of posttests obtained by students.

Keywords: E-LKPD, liveworksheets, learning outcomes, learning interest, magnetic induction,

INTRODUCTION

The curriculum is an important aspect of learning because it allows students to apply science and technology (Ahmadi et al., 2021). The independent curriculum is a curriculum with a variety of intracurricular learning, with more optimal content so that students have enough time to explore concepts and strengthen their competencies. In a self-directed curriculum, students are given the freedom to learn in a more active and creative way and are given the opportunity to develop the competencies they need (Tuerah & Tuerah, 2023). Learning can be defined as the process of a teacher imparting knowledge to students, thereby increasing their skills and knowledge and influencing their behavior after the learning activity (Makhmudah, 2019). Physics learning is learning related to concepts, laws, theories, principles, and their application in daily life (Aprilia et al., 2022). Physics learning is also defined as a teaching and learning process that seeks to understand natural phenomena in daily life, taking into account physics concepts as processes, products, and attitudes (Lestari et al., 2022).

Learning can be supported by using technology that plays an important role in helping students understand and explore learning concepts and fostering their enthusiasm for learning, as the delivery of the material can attract students' attention (Manongga, 2021). If students can apply knowledge and technology, it can be said that the quality of education has improved. There are several issues with the learning system in schools, such as the imbalance of digital technology infrastructure, the unpreparedness of teachers and students, limited internet quotas, the digital divide, limited ability to utilize technology, and not all students having access to digital

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facilities (Wulandari, 2023). These issues can be addressed by providing training for teachers and students to enhance technology use, enabling each individual to adapt in resolving their problems.

Based on observations and interviews conducted with several students from classes XII-1 and XII-2, it was found that they were not very interested in physics lessons. They also stated that physics was one of the most difficult subjects. Amalishholeh et al. (2023) state that physics is considered difficult because it requires students to memorize abstract formulas. This affects their interest in learning physics. This is supported by the physics teacher's statement that students are less enthusiastic during lessons. Students' interest in learning physics can be said to be low. Interest in learning is defined as a person's enjoyment or attraction to learning, which is demonstrated by students' activity, enthusiasm, and participation during learning (Kurniasari et al., 2021). This falls under the psychological aspect demonstrated by students as behavioral changes through various activities. In addition, according to Rahmi et al. (2020), during the learning process, students' interest in learning is demonstrated by their interest, which leads to their activity. There are indicators of interest in learning according to Nursyaidah & Sari (2021), namely student involvement, student attention, feelings of joy, and student interest.

In addition, teachers have stated that workbooks are not allowed in schools and that only textbooks from the school and printed worksheets made by teachers themselves may be used. Thus, teachers have been using the same learning media, which can be said to be uninteresting and uninteractive, to stimulate students' interest in learning. To foster students' interest in learning, teachers must be able to develop learning media that will attract students' attention. If this is not done, it will also affect the learning outcomes achieved by students. According to Dakhi (2020) and Wati (2021), student learning outcomes are academic achievements attained by students through assignments, exams, and active participation or behavioral changes assessed during the learning process as supporting factors for achieving those learning outcomes. Learning outcomes can be obtained from various abilities or skills. In the book by Ariyana et al., (2018), Bloom states that learning activities are divided into six levels according to thinking skills from low to high, namely C1 (remembering), C2 (understanding), C3 (applying), C4 (analyzing), C5 (evaluating), and C6 (creating).

Teachers stated that students' learning outcomes were less than optimal. According to research conducted by Apriliana (2021), many students' physics test scores on the topic of magnetic induction did not meet the minimum passing grade. The causes were a lack of interest in learning, such as not bringing learning tools to class, and many students were absent without explanation. From this statement, it is clear that magnetic induction is one of the topics that can be taught in an interesting and interactive way. This is because there are phenomena that can be explained through direct experiments (Kolan & Rondonuwu, 2022). Therefore, teachers are required to create learning media that are interesting for students so that they have a positive impact on the learning outcomes achieved by students. One effort to create engaging learning media is by developing technology, such as converting printed worksheets into non-printed worksheets (e-LKPD). E-LKPD is a learning tool presented in electronic format as student exercises and is easily accessible via computers/laptops or smartphones (Lioba et al., 2021). The content within e-LKPD can include images, illustrations, and educational videos, accompanied by questions that students can answer directly. Additionally, it includes learning objectives, varied questions or problems, and simple practical activities (Nirmala et al., 2023). The provision of e-LKPD has made students more enthusiastic during learning.

Furthermore, e-LKPD fosters students' interest in learning, which also influences their learning outcomes. With that, there has been a development of LKPD that is easy to access online using liveworksheets (Shalahuddin & Hayuhantika, 2022).

Liveworksheets is a website platform that provides services for teachers to use existing e-LKPDs or design their own (Salsabila et al., 2023). This platform offers numerous customizable features. The advantages of Liveworksheets include the ability to incorporate images, videos, and audio, as well as various question types such as drop-down select boxes, multiple-choice questions, drag-and-drop exercises, and matching exercises. These features can motivate students to be more active during learning, reduce paper usage, and save time (Anjarwati et al., 2021). Having a smartphone or laptop and internet access to e-LKPD is a prerequisite for students before they can complete e-LKPD based on liveworksheets (Andres et al., 2023).

This study was conducted by implementing e-LKPD based on liveworksheets to determine students' interest and learning outcomes in magnetic induction material so that students no longer need to complete student worksheets on paper but can directly access the link online via smartphone/laptop. Additionally, the e-LKPD based on liveworksheets can include videos, images, audio, and various types of questions that can capture students' attention (Widiyani & Pramudiani, 2021). Thus, this e-LKPD based on liveworksheets is suitable for use as a learning medium, in line with research by Fauziyah & Mulyani (2024), which states that the percentage assessment by expert media validators for this e-LKPD based on liveworksheets is 90.9%, categorized as highly suitable. Therefore, by using e-LKPD based on liveworksheets, if students' learning interest is influenced by the emergence of their interest, then their learning outcomes will also be influenced.

This study differs from other studies because the material used is rarely researched in the application of e-LKPD based on liveworksheets. In the study by Afifah & Junaedi (2024), they analyzed the effect of e-LKPD based on liveworksheets on student learning outcomes, which included social studies material. Additionally, Jayanti & Zulfadewina (2024) discussed the impact of e-LKPD based on liveworksheets on science learning outcomes, specifically on the topic of the human circulatory system. Hurrahma & Sylvia (2022), in their study, examined the effectiveness of e-LKPD based on liveworksheets in improving sociology learning outcomes. Compared to previous studies, this research differs in the material used, which is magnetic induction material to determine the influence of interest and student learning outcomes.

Based on the above description, the researcher conducted a study on the application of e-LKPD based on liveworksheets for physics lessons on magnetic induction for 12th grade students at SMA Negeri 3 Lumajang. The purpose of this study was to determine the effect of implementing e-LKPD based on liveworksheets on student interest and learning outcomes. The use of e-LKPD based on liveworksheets is expected to facilitate teachers and assist students during learning and serve as a reference source for other teachers who can use it to develop learning media using other materials. The use of e-LKPD based on liveworksheets in the magnetic induction material has an effect on students' interest and learning outcomes, providing direct feedback to students to be more active in learning. Additionally, students can easily learn independently or in groups, and learning becomes effective and enjoyable when using e-LKPD based on liveworksheets. As stated by Modanggu et al., (2024), teachers can integrate e-LKPD based on liveworksheets as one of the alternative digital learning media that can influence students' learning outcomes on the topic of magnetic induction.

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METHOD

This type of research is classified as true-experimental using a posttest-only control design. This design is used to determine the final scores of students from their posttest results. According to (Sugiyono, 2022), the posttest-only control design can be illustrated as follows:

R ₁	X	O ₁
R ₂	-	O ₂

Figure 1. Posttest-Only Control Design Research Design

Description:

R₁ : Experimental group

R₂ : Control group

X : Treatment of e-LKPD based on liveworksheets

O₁ : Administration of posttests to the experimental group after treatment

O₂ : Administration of posttest to control group after treatment

This research was conducted in the odd semester of the 2024/2025 academic year at SMA Negeri 3 Lumajang. The research population consisted of 12th-grade students because the material used was taught in the 12th grade. Sampling was conducted using purposive area sampling, which means that the selection was based on specific criteria. The criteria were that the sample must have physics as a subject. It was found that only two classes had physics as a subject, namely Grade XII-1 and XII-2. To determine the experimental class or control class, the average scores from previous daily quizzes on the topic of static electricity were used. Grade XII-1 was selected as the experimental class because it had a higher average score than Grade XII-2, which was designated as the control class.

There is an independent variable in this study, namely e-LKPD based on liveworksheets, which was applied in the experimental class, unlike the control class, which continued to use printed LKPD. The dependent variables were interest and learning outcomes from a questionnaire and posttest. Meanwhile, the control variable was the material used in the topic of magnetic induction.

The research data collected was divided into two categories: primary data in the form of a questionnaire containing 10 statements on learning interest and a post-test containing 5 questions on learning outcomes, as well as supporting data taken from observations, interviews, and documentation during the learning process. The questions used for the post-test were created independently in accordance with the magnetic induction material that had been provided and from simple experiments that had been conducted. The statements in the questionnaire related to learning interest indicators were taken from Nusyaidah & Sari (2021) and presented in Table 1.

Table 1. Indicators of Interest in Learning

No.	Dimensions	Indicators
1.	Student Attention	Student attention during the learning process.
2.	Student engagement	Student activity during the learning process.
3.	Student Interest	Students have a curiosity about learning physics.
4.	Feelings of joy	Students' feelings during physics lessons.

The processing of data from the learning interest questionnaire and post-test learning outcomes was analyzed using SPSS version 25 to test homogeneity, normality, and hypotheses. Scoring for the posttest learning outcomes was calculated by summing all scores assessed on each question. Meanwhile, scoring for each

learning interest questionnaire indicator used the assessment criteria according to Sugiyono (2022), as shown in Table 2.

Table 2. Assessment Criteria

Criteria	Statement Score
Strongly Agree	5
Agree	4
Disagree Somewhat	3
Disagree	2
Strongly Disagree	1

Next, calculate by adding up all the scores assessed for each question. Each student's score is calculated using equation (1). Meanwhile, the score for each learning interest indicator is calculated using equation (2), as follows:

$$\text{Value} = \text{Score} \frac{\text{Generated}}{\text{Maximum Score}} \times 100 \quad (1)$$

$$\text{Average Value} = \frac{\text{The value obtained in each statement}}{\text{Number of statements for each indicator}} \times 100 \quad (2)$$

After obtaining the questionnaire and post-test data, the next step is to process the data by testing it using SPSS version 25 as follows:

Homogeneity Test

The homogeneity test aims to determine whether there are similarities between the two research sample groups, whose data was taken from previous test scores.

Decision Criteria:

If the Sig. value is ≥ 0.05 , it will be declared as homogeneous data.

If the Sig. value is < 0.05 , it will be declared as non-homogeneous data.

Normality Test

This normality test aims to determine whether the sample data is normally distributed using SPSS version 25, namely Kolmogorov-Smirnov, because it uses more than 50 data points.

Decision Criteria:

If the Sig. value is ≥ 0.05 , it will be declared as normal data.

If the Sig. value is < 0.05 , it will be declared as abnormal data.

Hypothesis Test

Hypothesis testing was conducted to examine the differences in student interest and learning outcomes from the application of liveworksheets-based e-LKPD in both sample groups. To test this, SPSS version 25 was used, namely the Independent Sample T-Test when the data was declared normal. When it was declared abnormal, the Mann-Whitney U-test was used to test it. 199

Decision Criteria:

$H_0 : \mu_1 = \mu_2$, There was no difference in student learning interest between the two sample groups from the application of liveworksheets-based e-LKPD. When the Sig. value > 0.05 , H_a was rejected and H_0 was accepted, meaning that there was no effect.

$H_a : \mu_1 \neq \mu_2$, There was a difference in student learning outcomes between the two sample groups from the application of liveworksheets-based e-LKPD. When the Sig. value was ≤ 0.05 , H_a was accepted and H_0 was rejected, indicating that there was an effect.

RESULTS AND DISCUSSION

Student Learning Interest

Student learning interest data collected from questionnaires was obtained during the last meeting in both sample groups. The questionnaire aimed to determine the effect on the control class, which did not receive treatment, compared to the experimental class, which received treatment in the form of liveworksheets-based e-LKPD. The learning interest indicators used in the questionnaire were student attention, student involvement, feelings of joy, and student interest. Each of the indicators of student attention and student engagement had two statements. Meanwhile, each of the indicators of student interest and feelings of joy had three statements. Thus, the total number of statements used in the questionnaire was 10. The scores obtained by the students were calculated according to equation (1), and the average scores for each indicator were calculated according to equation (2) in Microsoft Excel. The average scores for each indicator of student learning interest are shown in Figure 2.

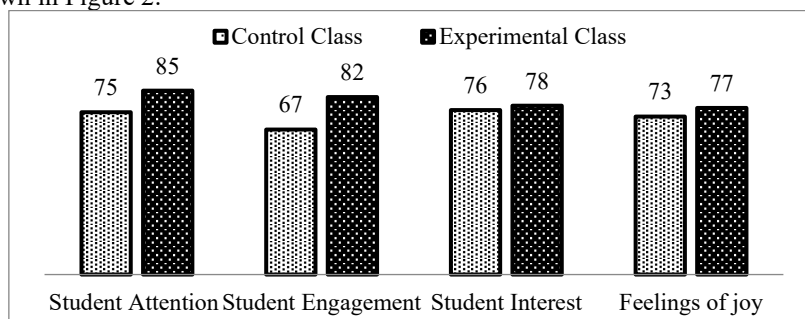


Figure 2. Average value diagram for each learning interest indicator

As shown in Figure 2, there are differences in the average of each learning interest indicator. Of all these indicators, the experimental class had the highest scores. The control class scores were as follows: the student attention indicator scored 75, the student involvement indicator scored 67, the student interest indicator scored 76, and the student happiness indicator scored 73. Meanwhile, in the experimental class, the student attention indicator has a value of 85, the student involvement indicator has a value of 82, the student interest indicator has a value of 78, and the feeling of joy indicator has a value of 77. After obtaining the data, it was processed using a normality test assisted by SPSS version 25. A summary of the normality test for the learning interest questionnaire is shown in Table 3.

Table 3. Summary of learning interest normality test

Class	Data	Value Max.	Value Min.	Mean	Asymp. Sig. (2-tailed)	Conclusion
Control Class	Questionnaire	88	60	73.11	0.000	Not Normal
Experimental Class	Questionnaire	92	64	80.00	0.047	Not Normal

Table 3 shows the difference in questionnaire scores between the two sample groups. The control class had an average score of 73.11, while the experimental class had an average score of 80.00. Thus, there was a difference, although not significant, but the experimental class still had a higher average score than the control class. The normality test results are shown in the Asymp. Sig. (2-tailed) section. The control class has $0.000 < 0.05$, and the experimental class has $0.047 < 0.05$. Furthermore, the

Mann-Whitney U-test was used as a hypothesis test because the data was known to be non-normal. A summary of the test can be seen in Table 4.

Table 4. Summary of Mann-Whitney U-test Learning Interest

Class	Data	Asymp. Sig. (2-tailed)	Conclusion
Control Class and Experimental Class	Questionnaire	0.035	There Are Differences

Table 4 shows the Asymp. Sig. (2-tailed) section, which is $0.035 \leq 0.05$, meaning that H_a is accepted and H_0 is rejected. Thus, there is a difference in the learning interest of high school students from the application of e-LKPD based on liveworksheets on the subject of magnetic induction. In accordance with the results of the two tests on the two sample groups, it means that the application of e-LKPD based on liveworksheets has an effect on the learning interest of high school students. After the hypothesis test was conducted, there was an effect on high school students' learning interest from the implementation of e-LKPD based on liveworksheets, which was caused by the difference in treatment by providing e-LKPD based on liveworksheets to the experimental class and reinforced by the results of interviews with students after the study. This is also shown by the higher scores of the experimental class compared to the control class on each learning interest indicator. The advantage of e-LKPD itself is that it can contain various types of questions with interesting pictures and can include videos from YouTube that can stimulate students' interest in learning. This differs slightly from the research by Afifah & Junaedi (2024), where the indicator of the benefits of e-LKPD based on liveworksheets was classified as the lowest index at 76.15%, meaning that the usefulness of e-LKPD based on liveworksheets during learning is still low.

During the learning process, it was evident that the experimental class was more active and enthusiastic than the control class. This was evident in the number of students who frequently asked questions, their enthusiasm, and their seriousness during group discussions in the experimental class. This was because, during the learning process using e-LKPD based on liveworksheets, students had to interact directly with the provided material through various features such as multiple-choice questions, short answers, essays, and matching exercises, which made the learning process less monotonous and motivated students to be more active in their learning. Thus, the classroom environment is not boring, which fosters students' interest in learning. According to Afifah & Junaedi (2024), the quality of content in e-LKPD based on liveworksheets has a percentage of 79.5%, indicating that students feel happy and interested in the features or appearance, which has a percentage of 78.45%. Based on the overall calculation of the variable index in e-LKPD based on liveworksheets, this medium can be applied during learning because it has a high category of 79.4% for creating an active and enjoyable learning atmosphere.

This study is in line with the findings of Mudaim et al., (2023) that there is an effect on students' learning interest after the implementation of e-LKPD based on liveworksheets, as indicated by an increase in percentage from 25% to 75%. Pertiwi & Rokhamaniyah (2024) also state that there is a positive effect on students' learning interest from the implementation of e-LKPD based on liveworksheets, as indicated by the percentage of the learning interest indicator. Therefore, this study can be said to be consistent or in line with the findings, as evidenced by the difference in enthusiasm or motivation among students from both sample groups during the learning process. Additionally, this is demonstrated by the differences observed after conducting tests

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to compare the two sample groups, with the results indicating that there is an impact on students' learning interest from the implementation of e-LKPD based on liveworksheets.

Student interest can also be seen from their activity during learning using liveworksheets-based e-LKPD. When students are more active, it can be seen that they enjoy the learning process. According to research by Jannah et al. (2024), the various features available in liveworksheets-based e-LKPD can trigger enthusiasm and confidence in students, which are forms of attention and feelings of joy in students. When students enjoy the learning process, their curiosity in learning becomes evident through their active participation and engagement during discussions. As stated by Putri & Raharjo (2024), student engagement encourages them to be more proactive in seeking knowledge and enhances their curiosity. Thus, this demonstrates the difference in student interest beyond academic performance assessments.

Student Learning Outcomes

The posttest results showed the learning outcomes achieved by students after being taught, where the control class continued to use printed worksheets and the experimental class used e-worksheets based on LiveWorksheets. The posttest was conducted during the last meeting after the teaching period. A summary of the normality test of the learning outcomes is shown in Table 5.

Table 5. Summary of normality test of learning outcomes

Class	Data	Value Max.	Value Min.	Mean	Asymp. Sig. (2-tailed)	Conclusion
Control Class	Post-test	100	42	74.54	0.062	Normal
Experimental Class	Post-test	95	42	81.92	0.064	Normal

Table 5 shows the difference in posttest scores between the two sample groups. In the control class, the average score was 74.54, with a maximum score of 100 and a minimum score of 42. In the experimental class, the average score was 81.92, with a maximum score of 95 and a minimum score of 42. Thus, there is a difference, although not significant, but both groups still show a difference, as the experimental class has an average score higher than the control class. The results of the normality test for the control class are shown in the Asymp. Sig. (2-tailed) section, which is $0.062 < 0.05$ and $0.064 < 0.05$ for the experimental class. Therefore, the data is declared normal, so the independent sample t-test is used as the hypothesis test. The test is summarized in Table 6.

Table 6. Summary of independent sample t-test results for learning outcomes

Class	Data	Sig. (2-tailed)	Kesimpulan
Control Class and Experimental Class	Post-test	0.047	There Are Differences

As shown in Table 6 regarding the Independent Sample T-Test, the Sig. (2-tailed) is $0.047 \leq 0.05$. This means that H_a is accepted and H_0 is rejected. Therefore, the learning outcomes of high school students in both sample groups differ in terms of the application of e-LKPD based on liveworksheets on the subject of magnetic induction. Based on the results of the two tests conducted on both sample groups, it can be concluded that there is an effect on the learning outcomes of high school students from the application of e-LKPD based on liveworksheets.

After the hypothesis test was conducted, there was an effect on the learning outcomes of high school students from the application of e-LKPD based on liveworksheets, which was caused by the difference in treatment by providing e-LKPD based on liveworksheets to the experimental class. This was also shown by the experimental class, which had a higher average posttest score than the control class. This is further supported by the questions in the e-LKPD, which cover learning outcome indicators to train students in their cognitive skills. For example, in the e-LKPD, students are expected to be able to identify problems and undergo an investigative process, which falls under the application category (C3). Additionally, students are expected to be able to analyze a video and draw conclusions, which falls under the analysis category (C4) (Nafiati, 2021). Therefore, students can be trained before taking the post-test, resulting in better learning outcomes. This is supported by research from Jayanti & Zulfadewina (2024) that students who practiced using e-LKPD based on liveworksheets demonstrated better conceptual understanding, which was reflected in their post-test results. According to research by Afifah & Junaedi (2024), overall student learning outcomes showed an improvement from before using e-LKPD based on liveworksheets to after using e-LKPD based on liveworksheets, from 73.45 to 88.55.

The results described above are consistent with the findings of Annida et al. (2022) that there is an effect on student learning outcomes from the application of e-LKPD based on liveworksheets that discuss the concept of cell division. This is shown by the learning outcomes obtained by the experimental class, which are higher than those of the control class. This is also supported by the findings of Mispa et al. (2022), who found that e-LKPD based on liveworksheets motivates students during learning and helps them understand the material, resulting in improved learning outcomes.

The weakness of this study is that the e-LKPD based on liveworksheets was only done using one cell phone per group, so not everyone could participate in the process. Another challenge encountered during this study was the mismatch between the learning activities and the school schedule, which made the process ineffective. This resulted in the learning process taking longer, thereby encroaching on the next class period. The solution is to strive to evaluate time management during the learning process. The next challenge to be faced is the implementation of learning activities that do not allow the use of smartphones, so there must be a plan to ensure that the learning activities remain engaging.

Based on the description presented, it is evident that students' interest and learning outcomes, which are still lacking, can be influenced by implementing e-LKPD based on liveworksheets. E-LKPD based on liveworksheets can be an alternative teaching material for students and teachers that can make the classroom more active, less boring, and more enjoyable. This e-LKPD based on liveworksheets can be used in various subjects, but it must still be adapted to the material being taught so that students can more easily understand how to use the e-LKPD based on liveworksheets during the learning process.

CONCLUSION

There is an influence of e-LKPD based on liveworksheets on the learning interest of high school students in the subject of magnetic induction, as indicated by the Sig. (2-tailed) value of $0.035 \leq 0.05$, and on student learning outcomes, as indicated by the Sig. (2-tailed) of $0.047 > 0.05$. The availability of e-LKPD-based liveworksheets as a learning tool can facilitate teachers in delivering instruction and students in understanding the material during lessons. Further research is needed to

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examine the application of e-LKPD-based liveworksheets using different materials to better understand their impact on other subjects.

REFERENCES

- Afifah, T. F., & Junaedi, A. (2024). Liveworksheet-Based E-LKPD and Interest in Learning Improves Science and Social Learning Outcomes for Elementary School Students. 8(3), 433–442. <https://doi.org/10.23887/jere.v8i3.78207>
- Ahmadi, A., Chairiyah, Y., & Baqi, S. Al. (2021). Perubahan Kurikulum di Madrasah Aliyah Negeri 2 Ponorogo Sebagai Upaya Peningkatan Kualitas Lembaga Pendidikan Islam. *Muslim Heritage*, 6(2), 219–237. <https://doi.org/10.21154/muslimheritage.v6i2.3373>
- Amalishholeh, N., Sutrio, Rokhmat, J., & Gunada, I. W. (2023). Analisis Kesulitan Belajar Peserta Didik pada Pembelajaran Fisika di SMAN 1 Kediri. *Empiricism Journal*, 4(2), 356–364. <https://doi.org/10.36312/ej.v4i2.1387>
- Andres, N., Alpusari, M., & Sari, I. K. (2023). Pengembangan E-LKPD Pada Pembelajaran Ipa Di Kelas V Sekolah Dasar. *Jurnal Kiprah Pendidikan*, 2(3), 241–254. <https://doi.org/10.33578/kpd.v2i3.185>
- Anjarwati, A., Qomariyah, R. S., Kurnia, A., Zahra, P. F. A., & Ulya, M. Y. N. (2021). Training and Assistance in Making E-LKPD Using “LiveWorksheets” Application at SD Alam Cordova Probolinggo. *GANDRUNG: Jurnal Pengabdian Kepada Masyarakat*, 2(2), 340–354. <https://doi.org/10.36526/gandrung.v2i2.2037>
- Annida, S. F., Putra, A. P., & Zaini, M. (2022). Pengaruh Penggunaan E-LKPD Berbasis Liveworksheets Terhadap Hasil Belajar Dan Keterampilan Berpikir Kritis Peserta Didik Pada Konsep Pembelahan Sel. *Quantum: Jurnal Inovasi Pendidikan Sains*, 13(2), 155–167. <https://doi.org/10.20527/quantum.v13i2.12111>
- Aprilia, A. D., Miftahul, Nuraini, L., & Sedayu, A. (2022). Efektivitas Model Pembelajaran Problem Based Learning dengan Pendekatan Scientific Berbantuan PhET Simulations terhadap Hasil Belajar Siswa. *Jurnal Pendidikan Fisika Undhiksa*, 12(2), 176–180. <https://doi.org/10.23887/jjpf.v12i2.40396>
- Apriliana, W. (2021). Penerapan Model Pembelajaran Kooperatif Tipe STAD (Student Team Achievement Division) untuk Meningkatkan Hasil Belajar Siswa Materi Induksi Magnetik Kelas XII MIA 3 MAN 1 Mataram Tahun Pelajaran 2017/2018. *Jurnal Ilmiah IKIP Mataram*, 8(1), 37–44. <https://e-journal3.undikma.ac.id/index.php/jiim/article/view/3669>
- Arifana, Y., Pudjiastuti, A., Bestary, R., & Zamroni. (2018). Buku Pegangan Pembelajaran Berorientasi pada Keterampilan Berpikir Tingkat Tinggi. In Direktorat Jenderal Guru dan Tenaga Kependidikan Kementerian Pendidikan dan Kebudayaan. https://repositori.kemdikbud.go.id/11316/1/01._Buku_Pegangan_Pembelajaran_HOTS_2018-2.pdf
- Dakhi, A. S. (2020). Peningkatan Hasil Belajar Siswa. *Jurnal Education and Development*, 8(2), 468–270. <https://doi.org/10.59141/japendi.v1i03.33>
- Fauziyah, L., & Mulyani, P. K. (2023). Pengembangan E-LKPD Berbantuan Liveworksheets Materi Organ Gerak Manusia Kelas V Sdn 02 Podo. *Prima Magistra: Jurnal Ilmiah Kependidikan*, 4(4), 522–532. <https://doi.org/10.37478/jpm.v4i4.3039>
- Hurrahma, M., & Sylvia, I. (2022). Efektivitas E-LKPD Berbasis Liveworksheet dalam Meningkatkan Hasil Belajar Sosiologi Peserta Didik di Kelas XI IPS SMA N 5 Padang. *Jurnal Sikola: Jurnal Kajian Pendidikan Dan*

- Pembelajaran*, 4(1), 14–22. <https://doi.org/10.24036/sikola.v4i1.193>
- Jannah, L. M., Arwadi, F., & Belajar, H. (2024). Penggunaan e-lkpd berbasis liveworksheets dalam meningkatkan hasil belajar siswa smk. 239–244.
- Jayanti, F. A., & Zulfadewina. (2024). Pengaruh Penggunaan E-LKPD Berbasis Liveworksheet Terhadap Hasil Belajar IPA Pada Materi Sistem Peredaran Darah Manusia Kelas V SDN Ciracas 01. *Jurnal Manajemen Pendidikan Dan Ilmu Sosial* (JMPIS), 5(5), 1700–1708. <https://doi.org/10.38035/jmpis.v5i5.2488>
- Kolan, Y. M., & Rondonuwu, F. (2022). Pembelajaran Induksi Magnet Melalui Aktivitas Mencipta. *Jurnal Media Edukasi Dan Pembelajaran*, 1(1), 1–12. <https://jurnal-mep.id/jmep/article/view/9>
- Kurniasari, W., Murtono, & Setiawan, D. (2021). Meningkatkan Minat Belajar Siswa Menggunakan Model Blended Learning Berbasis Pada Google Classroom. *Jurnal Educatio*, 7(1), 141–148. <https://doi.org/10.31949/educatio.v7i1.891>
- Lestari, I., B. K. Gultom, O., & Saputri Zebua, F. (2022). Penerapan Literasi Sains Dalam Pembelajaran Fisika Di Era Society 5.0. *Jurnal Inovasi Pendidikan Sains Dan Terapan* (INTERN), 1(2), 92–98. <https://doi.org/10.58466/intern.v1i2.1449>
- Lioba, T., Yuniasih, N., & Nita, C. I. R. (2021). Pengembangan E-LKPD Berbasis Aplikasi Liveworksheets pada Materi Volume Bangun Ruang Kelas V SDN Kebonsari 4 Malang. *Seminar Nasional PGSD UNIKAMA*, 5(1), 307–313. <https://conference.unikama.ac.id/artikel/index.php/pgsd/article/view/644>
- Makhmudah, N. L. (2019). Pengembangan Modul Fisika Berbasis Kearifan Lokal Permainan Tradisional Kalimantan Tengah Untuk Meningkatkan Hasil Belajar Pada Materi Momentum dan Impuls Di SMAN 1 Sampit. *Skripsi*, Jember: Jurusan Pendidikan MIPA Universitas Jember. <https://jurnal.unej.ac.id/index.php/JPF/article/view/15222>
- Manongga, A. (2021). Pentingnya teknologi informasi dalam mendukung proses belajar mengajar di sekolah dasar. *Pascasarjana Universitas Negeri Gorontalo Prosiding Seminar Nasional Pendidikan Dasar*, 1–7.
- Mispa, R., Putra, A. P., & Zaini, M. (2022). Penggunaan E-LKPD Berbasis Live Worksheet pada Konsep Protista terhadap Hasil Belajar Peserta Didik Kelas X Sman 7 Banjarmasin. *Jurnal Pendidikan Indonesia (Japendi)*, 3(1), 212–215. <https://doi.org/10.59141/japendi.v3i01.478>
- Modanggu, I., Pratama, M. I. L., & Masrurroh. (2024). Analisis Respon Peserta Didik Terhadap Penggunaan Lembar Kerja Peserta Didik Elektronik (E-LKPD) Berbasis Web Liveworksheets Pada Mata Pelajaran Geografi. *Jurnal Penelitian Geografi*, 3(2), 155–164. <https://doi.org/10.37905/geojpg.v3i2.30026>
- Mudaim, S., Yulianti, & Danawan, A. (2023). Pembelajaran Fisika Berbasis CTL Melalui E-LKPD Live Worksheet untuk Meningkatkan Minat dan Hasil Belajar Fisika Materi Pemanasan Global. *Jurnal Metaedukasi: Jurnal Ilmiah Pendidikan*, 5(2), 71–80. <https://doi.org/10.37058/metaedukasi.v5i2.8801>
- Nafiati, D. A. (2021). Revisi taksonomi Bloom: Kognitif, afektif, dan psikomotorik. *Humanika, Kajian Ilmiah Mata Kuliah Umum*, 21(2), 151–172. <https://doi.org/10.21831/hum.v21i2.29252>
- Nirmala, R., Wahyuni, S., & Ridlo, Z. R. (2023). Pengembangan E-LKPD Berbasis Liveworksheet Untuk Meningkatkan Creative Thinking Skill Siswa Smp Pada Materi Pencemaran Lingkungan. *Quantum: Jurnal Inovasi Pendidikan Sains*, 14(2), 266–278. <https://doi.org/10.20527/quantum.v14i2.16240>
- Nursyaidah, & Sari, L. N. I. (2021). Mengenal Minat Dan Bakat Siswa Melalui Tes STIFIn. Medan: Merdeka Kreasi Group.

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- Pertiwi, M., & Rokhamaniyah. (2024). Peningkatan Minat Belajar Peserta Didik Melalui Penggunaan LKPD Berbasis Liveworksheet Di Sekolah Dasar Kelas IV. *Social, Humanities, and Educational Studies*, 7(3), 1059–1065.
- Putri, M., & Raharjo, M. (2024). Pengembangan E-LKPD Berbasis Website Liveworksheets dengan Model Discovery Learning pada Pembelajaran IPAS di Sekolah Dasar. *SITTAH: Journal of Primary Education*, 5(1), 17–32. <https://doi.org/10.30762/sittah.v5i1.2653>
- Rahmi, I., Nurmalina, & Fauziddin, M. (2020). Penerapan Model Role Playing Untuk Meningkatkan Minat Belajar Siswa Sekolah Dasar. *Journal on Teacher Education*, 2(1), 197–206. <https://doi.org/10.31004/jote.v2i1.1164>
- Salsabila, N. L., Patras, Y. E., & Lathifah, S. S. (2023). Pengembangan E-LKPD Berbasis Liveworksheet Pada Tema 7 Perkembangan Teknologi Produksi Pangan. *Didaktik: Jurnal Ilmiah PGSD FKIP Universitas Mandiri*, 9(2), 1653–1663. <https://doi.org/10.36989/didaktik.v9i2.825>
- Shalahuddin, M. H., & Hayuhantika, D. (2022). Pengembangan E-LKPD Berbasis Kontekstual dengan Media Liveworksheets Pada Materi Lingkaran Di Kelas VIII. *Jurnal Tadris Matematika*, 5(1), 71–86. <https://doi.org/10.21274/jtm.2022.5.1.71-86>
- Sugiyono. (2022). Metode Penelitian Kuantitatif, Kualitatif, dan R&D. Bandung: ALFABETA.
- Tuerah, R. M. S., & Tuerah, J. M. (2023). Kurikulum Merdeka dalam Perspektif Kajian Teori: Analisis Kebijakan untuk Peningkatan Kualitas Pembelajaran di Sekolah. *Jurnal Ilmiah Wahana Pendidikan*, 9(19), 979–988. <https://doi.org/10.5281/zenodo.10047903>
- Wati, A. (2021). Pengembangan Media Permainan Ular Tangga untuk Meningkatkan Hasil Belajar Siswa Sekolah Dasar. *Mahaguru: Jurnal Pendidikan Guru Sekolah Dasar*, 2(1), 68–73. <https://doi.org/10.33487/mgr.v2i1.1728>
- Widiyani, A., & Pramudiani, P. (2021). Pengembangan Lembar Kerja Peserta Didik (LKPD) Berbasis Software Liveworksheet pada Materi PPKn. *DWIJA CENDEKIA: Jurnal Riset Pedagogik*, 5(1), 132–141. <https://doi.org/10.20961/jdc.v5i1.53176>
- Wulandari, R. (2023). Dampak Perkembangan Teknologi Dalam Pendidikan. *Jurnal PGSD Indonesia*, 9(2), 66–76. <https://doi.org/10.24036/jpol.v2i1.20>