Development of E-LKPD Using Live Worksheets for Online Mathematics Learning during Covid-19

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Abstract

This study aims to obtain e-LKPD using a valid, practical, and effective live worksheet on derived material. This type of development research aims to produce a product in the form of e-LKPD. The development of live worksheet-based e-LKPD is carried out through ADDIE design development steps consisting of analysis, design, development, implementation, and evaluation. The test subjects in this study were Class XI students at SMA Negeri 8 Kendari in 2021. The data collection instruments in this study consisted of a validation sheet used to determine the validity of the e-LKPD, a response questionnaire on the use of e-LKPD was used to obtain information on the practicality of e-LKPD, and learning outcomes tests to determine the effectiveness of e-LKPD. The results showed that (1) the validation results with an average score of 4.04 which means that the live worksheet-based e-LKPD is in very valid criteria and is feasible to use (2) The results of the analysis of student responses to the use of e-LKPD show that the average The student's class response is 80.3 which means the class response is positive and is included in the practical category. (3) There is a difference between the pre-test and post-test values, which means that there is an effect of using e-LKPD on learning outcomes. Thus the live worksheet-based e-LKPD is valid, practical, and effective.

Keywords: e-LKPD, live worksheet, online, mathematic

A. Introduction

The Covid-19 pandemic that has hit the world, including Indonesia, has impacted various aspects of life, from the social, economic, and educational fields. The Covid-19 pandemic has forced all educational institutions to carry out learning activities that are usually face-to-face to online learning (Diva et al., 2021). Online learning policies by all educational institutions are

expected to suppress and break the chain of transmission of Covid-19 (Anugrahana, 2020; Arbain & Farman, 2021). In addition, the implementation of online learning is carried out to fulfill students' rights to obtain educational services during the covid-19 emergency.

However, online learning carried out during covid-19 has not been appropriately implemented. The study results show that participation in online learning is still meager, and students have difficulty understanding the material provided. Students who are not familiar with online learning patterns result in low participation and activity, high levels of student boredom because learning is considered monotonous to do assignments (Nurkhasanah, 2021). Sadiah & Tetep (2020) revealed that there are still many students who do not participate in online learning activities, lack of attention to the material and lack of initiative in asking questions when they do not understand the material. Students with difficulty in learning reach 69.1% of students, and as many as 54.0% of students feel bored following online learning carried out by teachers (Muhammad, 2020). This is because online learning carried out by teachers is dominated by doing assignments (Siahaan, 2020).

In an effort to support student participation in interactive online learning, it is necessary to provide learning support media. Learning media continues to develop and innovate along with technological developments. Online learning media innovation can provide a fun learning atmosphere, interest, and positive perceptions for students towards learning (Farman & Chairuddin, 2020a). Modern learning has made learning multimedia a mandatory tool that must be developed. However, the use of media needs to be adjusted to students' characteristics and learning styles (Farman et al., 2021). Learning media often used in schools is Student Worksheet (LKPD) (Lathifah et al., 2021). LKPD is a learning support facility structured in such a way that consists of brief material exposures and practice questions to train students to find and develop process skills and train students to solve and accelerate the learning process (Putra & Agustiana, 2021). LKPD has now transformed with more exciting innovations, namely technology-based LKPD, or E-LKPD.

E-LPKD is an electronic student worksheet that can be used anywhere and anytime using a laptop or smartphone (Apriliyani & Mulyatna, 2021). E-LKPD is a learning media used by educators to increase student involvement (Khotimah et al., 2020). The use of E-LKPD in learning impacts student learning activities to be more fun, learning becomes interactive and allows students to practice in learning (Puspita & Dewi, 2021). The advantage of ELKPD is that it can simplify and narrow space and time so that learning becomes more effective. Subakti et al., (2021) stated that the use of E-LKPD received a very positive response from teachers and students and concluded that it was practical and feasible to use. Putra & Agustiana (2021) stated that the developed LKPD media was valid, had strong reliability qualifications, and had excellent qualifications on the results of testing on students, so it was very suitable to be used in the learning process.

One application that can be used to create an E-LKPD is a live worksheet. Live worksheet is a web-based platform that can be accessed at https://www.liveworksheets.com. The advantages of this application are suitable for students because it is interactive and motivates students, while for teachers, it can save time and paper. Students can work on the worksheets online and send their answers to the teacher online. Live worksheet-based e-LKPD makes students enthusiastic during learning, independent, confident, and students' curiosity is getting higher (Andriyani et al., 2020). Live Worksheets can improve student activity and mathematical problem-solving skills with an outstanding category (Khikmiyah, 2021). The live worksheet-based e-LKPD developed has been declared valid, practical, and effective with excellent critical thinking skills (Zahroh, 2021). In addition, live worksheet-based e-LKPD can also be used to understand mathematical concepts (Amalia & Lestyanto, 2021), affect students' abstraction skills (Fitriani et al., 2021), and improve student learning outcomes (Prabowo, 2021; Prastika & Masniladevi, 2021).

This study aims to obtain a valid, practical, and effective e-LKPD based on live worksheets on derived materials. The importance of this research is because the live worksheet-based e-LKPD is attractive and easy to access by students in online learning during the pandemic. In addition, there has been no e-LKPD developed for derivative materials in several studies.

B. Methodology
1. Design and Development Procedure
This type of development research aims to produce a product in the form of e-LKPD that is valid, practical, and effective in learning. The development model used in this research is the ADDIE model.

a. Analysis
In this step, an analysis of the need for e-LKPD development is carried out. This is done through observing the condition of students and the learning process in schools, as well as studying concepts and theories relevant to product development
b. Design
In this step, an e-LKPD based on a live worksheet is designed according to the needs and the material that has been analyzed.
c. Development
In this step, realize the design that has been designed. In this step, the e-LKPD and e-LKPD tests are made by testing their validity, revising by redesigning the e-LKPD from the advice given by the expert/validator.
d. Implementation
In this step, the use (trial) of a live worksheet is carried out in a learning activity
e. Evaluation
In this step, an evaluation of the extent to which the live worksheet can be used according to the objectives to be achieved is carried out so that a good quality live worksheet is obtained. The evaluation aims to assess the validity, practicality, and effectiveness of the live worksheet being tested.

2. Trial Subject
The test subjects in this study were Class XI students of SMA Negeri 8 Kendari for the 2021/2022 academic year.

3. Instruments
The data collection instrument in this study consisted of a validation sheet used to determine the validity of the e-LKPD. A response questionnaire on the use of e-LKPD was used to obtain information on the practicality of the e-LKPD and a learning outcome test to determine the effectiveness of the e-LKPD.

4. The technique of Data Analysis
The data analysis technique in this study will be analyzed based on the grouping of product eligibility criteria. The criteria used in this development research are validity, practicality, and effectiveness. Products categorized as valid mean the product is feasible to use. The practicality of e-LKPD means that e-LKPD is easy to understand and easy to use. Finally, the effectiveness of e-LKPD means e-LKPD according to the desired learning objectives.

Product validity data analysis was carried out to assess the developed e-LKPD that met the valid criteria. First, the e-LKPD validation results were analyzed by looking for the average of each criterion and the average of each aspect in the validation sheet until, finally, the average total validator assessment could be obtained (Farman, 2020). The average total validator assessment is then adjusted to the established validity criteria.

Table 1. Criteria for validity

Value	Criteria
$4 \leq V \leq 5$	Very Valid
$3 \leq V < 4$	Valid
$2 \leq V < 3$	Sufficiently Valid
$1 \leq V < 2$	Invalid

The analysis of the practicality of the e-LKPD was obtained through a student response questionnaire. Student responses in the form of scores were analyzed by the steps (1) recap the score of each student, (2) converting the average score of each student into a scale of 0 - 100, ($\bar{S_1}$), (3) calculating the average score for all respondents, class response, $\bar{S}$, and (4) make conclusions based on the criteria, namely a positive response if $\bar{S} > 50$ or a negative response if $\bar{S} \leq 50$ (Farman & Chairuddin, 2020b). E-LKPD is categorized as practical if the class response is in a positive category.

Effectiveness data analysis was carried out by looking at using e-LKPD on student learning outcomes. This is measured through pretest and posttest after the use of e-LKPD. The determination is carried out by conducting a t test, after the normality test is carried out with the help of SPSS. If there are differences in learning outcomes before and after e-LKPD in learning activities, then e-LKPD is said to be effective.

C. Findings and Discussion

The development of live worksheet-based e-LKPD is carried out through ADDIE design development steps consisting of analysis, design, development, implementation, and evaluation.

1. Analysis

The analysis activities were conducted through classroom observations and discussions with the XI grade mathematics teacher at SMA Negeri 8 Kendari. The interviews with teachers obtained information that WhatsApp groups dominate online learning activities. This facilitates students in learning online less than optimally. There are still students who do not understand the material given by the teacher well. This low understanding affects students' mathematics learning outcomes. Therefore, we need media that can make it easier for students to understand the material. The media used in this development is e-LKPD using a live worksheet.

2. Design

This step is carried out by preparing material for derivative functions consisting of the concepts of derivative functions and derivatives of algebraic functions. The prepared material is then inputted into the live worksheet on the https://www.liveworksheets.com page. The design of the e-LKPD is done by writing the initial part about the identity, then materials or videos, instructions for use, and practice questions.

3. Development

The live worksheet design developed is then assessed by the validator. Validation is carried out by submitting a validation sheet that has been compiled in the form of a google form along with a live worksheet link attachment that has been developed on the validator (V). Product validation results are presented in Table 2

Table 2. Product Validation Results

Aspects of Assessment	V1	V2	Average	Category
Format	4	4,2	4,1	Very Valid
Contents	4	3,7	3,85	Valid
Language and Voice	4,3	4	4,17	Very Valid
Average	**4,1**	**3,96**	**4,04**	**Very Valid**

The validation results show that the e-lkpd product developed in every aspect of the assessment has an average value above a score of 4, meaning that the product developed is in the very valid category. Overall, e-LKPD is in very valid criteria and feasible to use.

4. Implementation

After obtaining a valid e-LKPD, the implementation stage of the e-LKPD is carried out in classroom learning. This media was used in two meetings with the sub-topics of discussing the concept of derivatives, derivatives of algebraic functions, and function derivative applications. In its implementation, the e-LKPD link is given to students via Edmodo. Before and after using the e-LKPD, a test was conducted. The test results are presented in Table 3 below

Table 3. Learning Outcomes of Pretest and Posttest

Score	Pretest	Posttest
Highest	80	100
Low	20	20
Mean	49	78,6

The results of the test-test and post-test were then tested to determine the effectiveness of using e-LKPD. Before testing the effectiveness, first tested the normality of the data. The results of the normality test of learning outcomes are given in Table 4 below

Table 4. Normality test results.

N	α	Sig.	
		Pre	Post
22	0,05	0,088	0,17

Based on Table 4, the pre significance and post significance values are > 0.05, which means the data is normally distributed.

Next, a paired t-test was conducted to determine the effectiveness of the developed e-LKPD. The results of the paired t-test are presented in Table 5 below.

Table 5. Paired sample test results.

		Mean	α	t	df	Sig.
Pair 1	Post-Pre	29,09	0,05	8,52	21	0,000

Based on Table 5, a significance value of 0.000 <0.05 is obtained, indicating a difference between the pre-test and post-test values. Furthermore, the mean post and pre-test difference is 29.09, indicating that the post-test score is better than the pre-test score.

In this step, a questionnaire was also given to students' responses to the developed e-LKPD. The analysis of student responses to the use of e-LKPD shows that the average class response of students is 80.3, which means it is in a positive category.

5. Evaluation

In summary, the results of data analysis one-LKPD development using a live worksheet are presented as follows

Table 6. Results of e-LKPD development using a live worksheet

Result	Category
Valid e-LKPD design	Valid
positive student response	Practical
There are differences in learning outcomes after using e-LKPD	Effectively

Based on Table 6 above, it can be concluded that the development of e-LKPD using a live worksheet meets the criteria of being valid, practical, and effective. This is in line with Prastika & Masniladevi (2021) and Zahroh, (2021) that the development of live worksheet-based e-LKPD meets the criteria of being valid and practical, and effective. This can be fulfilled because live worksheets can facilitate students in more interactive learning and invite student participation. Furthermore, in addition to being interactive, using live worksheets can automatically bring upgrades/awards from the teacher after students complete a math problem (Nissa et al., 2021).

The live worksheet-based E-LKPD product developed is presented in the following figure
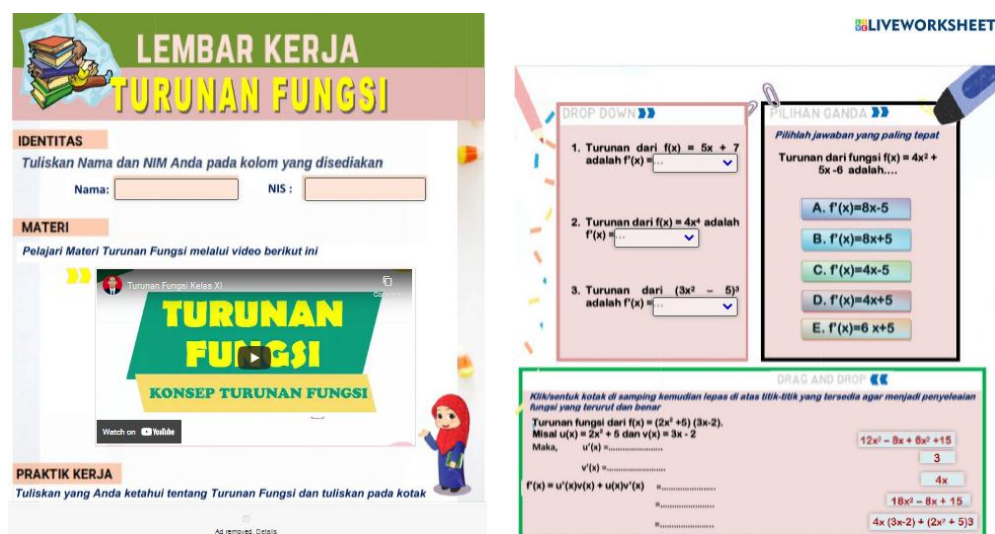
Figure 1. E-LKPD product based on live worksheet

E-LKPD contains identity, materials, work practices, and practice questions. Derivative materials for functions can be accessed at https://www.liveworksheets.com/fn1805167xe, materials for derivative algebraic functions can be accessed at https://www.liveworksheets.com/ug1821314ho and application materials for algebraic functions at https://www.liveworksheets.com /qo1845639sp.

D. Conclusion

Based on the results and discussions that have been described, it can be concluded that the live worksheet-based e-LKPD is valid, practical, and effective. The live worksheet-based E-LKPD that was developed is in very valid criteria and is feasible to use. This is shown from the validation results with an average score of 4.04. The results of the analysis of student responses to the use of e-LKPD show that the average class response of students is 80.3. These results indicate that e-LKPD is in the positive category, meaning that e-LKPD based on live worksheets is practically used in learning. There is a difference between the pre-test value and the post-test value, which

means that there is an effect of using e-LKPD on learning outcomes. The difference between the mean post and pre test is 29.09 which indicates that the post test score is better than the pre test score. Thus, the live worksheet-based e-LKPD is effectively used in learning.

E. References

Amalia, A. D., & Lestyanto, L. M. (2021). LKS Berbasis Saintifik Berbantuan Live Worksheets untuk Memahamkan Konsep Matematis pada Aritmetika Sosial. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *5*(3), 2911–2933. https://doi.org/10.31004/cendekia.v5i3.822

Andriyani, N., Hanafi, Y., Safitri, I. Y. B., & Hartini, S. (2020). penerapan model problem based learning berbantuan lkpd live worksheet untuk meningkatkan keaktifan mental siswa pada pembelajaran tematik kelas VA SD Negeri Nogopuro. *Prosiding Profesi Pendidikan Guru*, 9.

Anugrahana, A. (2020). Hambatan, Solusi dan Harapan: Pembelajaran Daring Selama Masa Pandemi Covid-19 Oleh Guru Sekolah Dasar. *Scholaria: Jurnal Pendidikan dan Kebudayaan*, *10*(3), 282–289. https://doi.org/10.24246/j.js.2020.v10.i3.p282-289

Apriliyani, S. W., & Mulyatna, F. (2021). Flipbook E-LKPD dengan Pendekatan Etnomatematika pada Materi Teorema Phytagoras. *SINASIS (Seminar Nasional Sains)*, *2*, Article 1. http://proceeding.unindra.ac.id/index.php/sinasis/article/view/5389

Arbain, A., & Farman, F. (2021). Pembelajaran daring masa darurat covid-19 pada mahasiswa pendidikan matematika. *HISTOGRAM: Jurnal Pendidikan Matematika*, *4*(2), 518. https://doi.org/10.31100/histogram.v4i2.720

Diva, A. S., Chairunnisa, A. A., & Mufidah, T. H. (2021). Pembelajaran Daring di Masa Pandemi Covid-19. *Entering 5.0 era: IST enhancement for society well-being*, *01*, 10.

Farman, F. (2020). Development of Mathematics Learning Design through Problem Posing Approach for Developing Mathematical Reasoning Ability. *Proceeding of USN Kolaka-ADRI International Conference on Sustainable Coastal-Community Development*, *1*(0), 167–174. https://doi.org/10.31327/icusn-adri.v1i0.1158

Farman, F., Arbain, A., & Hali, F. (2021). Learning Style Preferences Based on Class and Gender. *AL-ISHLAH: Jurnal Pendidikan*, *13*(1), 164–172. https://doi.org/10.35445/alishlah.v13i1.368

Farman, F., & Chairuddin, C. (2020a). Pembelajaran Flipped Classroom Berbantuan Edmodo Untuk Meningkatkan Minat Dan Hasil Belajar Siswa Pada Materi Pythagoras. *Jurnal Karya Pendidikan Matematika*, *7*(2), 92–100. https://doi.org/10.26714/jkpm.7.2.2020.92-100

Farman, F., & Chairuddin, C. (2020b). Pengembangan Media E-Learning Berbasis Edmodo Pada Materi Teorema Pythagoras. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, *9*(4), 872. https://doi.org/10.24127/ajpm.v9i4.3114

Fitriani, N., Hidayah, I. S., & Nurfauziah, P. (2021). Live Worksheet Realistic Mathematics Education Berbantuan Geogebra: Meningkatkan Abstraksi Matematis Siswa SMP pada Materi Segiempat. *JNPM (Jurnal Nasional Pendidikan Matematika)*, *5*(1), 37–50. https://doi.org/10.33603/jnpm.v5i1.4526

Khikmiyah, F. (2021). Implementasi Web Live Worksheet Berbasis Problem Based Learning Dalam Pembelajaran Matematika. *Pedagogy: Jurnal Pendidikan Matematika*, *6*(1), 1–12. https://doi.org/10.30605/pedagogy.v6i1.1193

Khotimah, S. K., Yasa, A. D., & Nita, C. I. R. (2020). Pengembangan E-LKPD Matematika Berbasis Penguatan Pendidikan Karakter (PPK) Kelas V SD. *Prosiding Seminar Nasional PGSD UNIKAMA*, *4*(1), 401–408.

Lathifah, M. F., Hidayati, B. N., & Zulandri, Z. (2021). Efektifitas LKPD Elektronik sebagai Media Pembelajaran pada Masa Pandemi Covid-19 untuk Guru di YPI Bidayatul Hidayah Ampenan. *Jurnal Pengabdian Magister Pendidikan IPA*, *4*(2). https://doi.org/10.29303/jpmpi.v4i2.668

Muhammad, H. (2020). *Menyiapkan Pembelajaran di Masa Pandemi: Tantangan dan Peluang*. Kementerian Pendidikan dan Kebudayaan. (https://spab.kemdikbud.go.id/wp-content/uploads/2020/07/Menyiapkan-Pembelajaran-di-Masa-Pandemi-1.pdf)

Nissa, I. C., Febrilia, B. R. A., & Astutik, F. (2021). Live worksheets matematika: Dalam perspektif siswa menurut model motivasi ARCS. *Prosiding Seminar Nasional Matematika Dan Pendidikan Matematika*, *6*, 266–273.

Nurkhasanah, S. (2021). Implementasi Model Pembelajaran Flipped Classroom dalam Pembelajaran Jarak Jauh untuk Meningkatkan Partisipasi Belajar IPA. *Jurnal Paedagogy*, *8*(2), 256. https://doi.org/10.33394/jp.v8i2.3532

Prabowo, A. (2021). Penggunaan Liveworksheet dengan Aplikasi Berbasis Web untuk Meningkatkan Hasil Belajar Peserta Didik. *Jurnal Pendidikan dan Teknologi Indonesia*, *1*(10), 383–388. https://doi.org/10.52436/1.jpti.87

Prastika, Y., & Masniladevi, M. (2021). Pengembangan E-LKPD Interaktif Segi Banyak Beraturan Dan Tidak Beraturan Berbasis Liveworksheets Terhadap Hasil Belajar Peserta Didik Kelas IV Sekolah Dasar. *Journal of Basic Education Studies*, *4*(1), 2601–2614.

Puspita, V., & Dewi, I. P. (2021). Efektifitas E-LKPD berbasis Pendekatan Investigasi terhadap Kemampuan Berfikir Kritis Siswa Sekolah Dasar. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *5*(1), 86–96. https://doi.org/10.31004/cendekia.v5i1.456

Putra, G. Y. M. A., & Agustiana, I. G. A. T. (2021). E-LKPD Materi Pecahan dalam Pembelajaran di Sekolah Dasar. *MIMBAR PGSD Undiksha*, *9*(2), 220–228. https://doi.org/10.23887/jjpgsd.v9i2.35813

Sadiah, H. H., & Tetep, T. (2020). Efektivitas Pembelajaran Ppkn Berbasis Daring Terhadap Partisipasi Belajar Peserta Didik Di SMAN 11 Garut. *Journal Civics & Social Studies*, *4*(1), 81–94. https://doi.org/10.31980/civicos.v4i1.872

Siahaan, M. (2020). Dampak Pandemi Covid-19 Terhadap Dunia Pendidikan. *Jurnal Kajian Ilmiah*, *1*(1), 73–80. https://doi.org/10.31599/jki.v1i1.265

Subakti, D. P., Marzal, J., & Hsb, M. H. E. (2021). Pengembangan E-LKPD Berkarakteristik Budaya Jambi Menggunakan Model Discovery Learning Berbasis STEM Untuk Meningkatkan Kemampuan Berpikir Kreatif Matematis. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *5*(2), 1249–1264. https://doi.org/10.31004/cendekia.v5i2.629

Zahroh, D. A. (2021). Pengembangan e-LKPD Berbasis Literasi Sains Untuk Melatihkan Keterampilan Berpikir Kritis Peserta Didik Pada Materi Pertumbuhan Dan Perkembangan. *Bioedu*, *10*(3), 12.