
THE DEVELOPMENT OF LIVEWORKSHEET-ASSISTED PROBLEM BASED LEARNING TEACHING MATERIALS TO IMPROVE STUDENTS' LEARNING OUTCOMES ON SOCIAL ARITHMETIC

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ABSTRACT

This study intends to determine the feasibility and practicality of worksheets for students of Social Arithmetic material using the Liveworksheets-assisted Problem Based Learning learning model. The development model used is the 4D method which is limited to the third step which includes: define, design and development stages. Feasibility test data and practicality of LKPD were collected through observation and questionnaires. The feasibility of LKPD is analyzed based on the results of validation by experts and the practicality of LKPD seen from student questionnaire responses. The subjects of this study were 5 students on a small scale and 30 students on a broad scale. The results of this study show that the LKPD tested is very feasible and very practical to use for learning. This is seen based on the results of validation by experts who get an average of 95% with very valid categories and the practicality of LKPD taken from student response questionnaires with a percentage of 87.56% on a small scale and 88.33% on a broad scale. This shows that LKPD uses the Liveworksheets-assisted Problem Based Learning learning model on Social Arithmetic material is very valid and practical to use.

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INTRODUCTION

The 21st century is centered on the development of the Industrial Revolution Era 4.0 which prioritizes knowledge and technology. However, knowledge alone is not enough to realize the Industrial Revolution Era 4.0, there needs to be a balance between knowledge and skills as the basis of quality human resources. The world of education has also begun to apply various technological advances to support more efficient learning, including by utilizing technology for distance learning, and so on (Negeri, 2021).

Mathematics is one of the compulsory subjects for students in elementary to secondary school (Roza et al., 2019). The process of learning mathematics is used to train human thinking skills

in the process of solving mathematical problems, including through the use of ideas or ideas obtained while studying mathematics learned from elementary to higher education (Tunnajach, 2021).

There are many materials in mathematics learning related to everyday life, one of which is social arithmetic material where the material studies the value of an item, sales price, purchase, percentage of profit and loss, taxes and so on. Social arithmetic material is one branch of mathematics whose use is very close to complex problems in social life so it is necessary to show students the meaning of the social arithmetic material studied (Friantini et al., 2020) However, in reality in the field, based on the results of Hasanah's research (2022), student learning outcomes for social arithmetic material are still low. According to research Marlina et al., (2021) in social arithmetic material, many involve story problems in its presentation, this makes many students have difficulty solving the problems presented.

One way to overcome this is to use teaching materials in the form of the right student worksheets. The use of LKPD in mathematics learning can encourage students to learn teaching materials alone or together with their friends (Hidayat & Irawan, 2017). With the creation of LKPD, students are expected to increase learning activities and express their creative ideas both individually and in groups. Therefore, as a learning medium, the role of LKPD is very important in the learning implementation process because it is able to increase student activities in the learning process (Elfina & Sylvia, 2020).

In addition to the use of LKPD in learning, to help achieve learning objectives, they must use teaching methods or models that are in accordance with the problems faced (Wulandari et al., 2019), one of which is by using a problem-based learning model. According to Sulistyani & Retnawati (2015), problem-based learning is an innovation in 21st century learning, because in this learning the thinking ability of students is really optimized through systematic group or team work, so that students can develop their thinking skills continuously.

According to Widyastuti & Eliyen (2022), to create interesting teaching and learning activities is to create facilities so that students have high interest, one of which is to create learning media that implements information technology, namely a web-based system, because it can be accessed and used by everyone. One of them can take advantage of Live Worksheet web-assisted technology

According to Fitriani et al., (2021) Live worksheet is a media that converts traditional worksheets into interactive and presented online which can be designed for various materials. In the live worksheet there are text, images, animations and videos that make students not easily bored. So that the LKPD developed in this study is web-aided, namely a live worksheet that can be accessed on the live worksheet.com.

Based on the description above, researchers are interested in applying the Problem-based learning approach and web liveworksheet to develop worksheets for students.

METHOD

The research was conducted at MTS Al-Basyariyah located in Bandung, with class VII research subjects with 5 students on a small scale and 30 students on a broad scale. This type of research is a development research using 4D models (Thiagarajan, 1974) which includes: define, design, development and disseminate.



Figure 1. 4D Development Model Source: (Thiagarajan, 1974)

Due to time constraints, this research is limited to the third stage, namely: define, design, and development. This study aims to develop, validate products and see the practicality of LKPD used in teaching and learning activities. The steps in this study are: (1) Define, which is to determine the background and analyze the research objectives. (2) Design, which is to make a predetermined product design that produces a draft of LKPD. (3) Development is the activity of changing the product design into a product and testing the validity of the product. Previously, the author conducted interviews with mathematics teachers who aimed to obtain the information needed for the research process.

This research uses Lecturers of the Mathematics Education study program IKIP SILIWANGI as expert validators and Teachers of Mathematics subjects MTs Al-Basyariyah as practitioners. Expert validation questionnaire using Likert scale assessment. Where to change the assessment in qualitative form to quantitative, where each statement is scored. After the points are collected, the average of the assessments is calculated using the formula:

$$Vah = \frac{Tse}{Tsh} \cdot 100\%$$

Information:

Vah : Expert Validation

Tse : Total empirical score achieved

Tsh : Total Expected Score

100% : Constanta

After obtaining the validation value, then look at the validity criteria in table 1. Fitriani et al., (2021):

Table 1. Product Validity Criteria

Validity Criteria	Interpretation
$80\% < V \leq 100\%$	Very Good
$40\% < V \leq 80\%$	Good
$40\% < V \leq 60\%$	Enough
$20\% < V \leq 40\%$	Not enough
$0\% < V \leq 20\%$	Very Less

Meanwhile, in seeing the practicality of student worksheets, social arithmetic material assisted by live worksheets can be seen from the questionnaire of student responses to LKPD. Percentage values are assigned using the following formula:

$$P = \frac{F}{N} \cdot 100\%$$

Information:

P : Final Grades

F : Total Score achieved

N : Maksimum Score

100% : Constanta

After obtaining the final score, then look at the practicality criteria in table 2 (Agustina et al., 2022):

Table 2. Product Practical Test Criteria

Nilai	Kriteria
75,01% - 100%	Very Good
50,01 % - 75,00%	Good
25,01% - 50,0 0%	Enough
0,00% -25,00%	Very Less

RESULTS AND DISCUSSION

Results

The result of this study is to develop LKPD products for social arithmetic material using a PBL learning model assisted by liveworksheets. In addition to producing an LKPD product, researchers also look at the feasibility of developing LKPD. This research is in accordance with the 3D stage: define, design, and development.

The define stage is observation and collecting data to support research, including by conducting interviews with mathematics teachers, then researchers looking for information about LKPD in the form of components to making good LKPD to be developed with a PBL approach, the results of interviews can be taken important points including: LKPD teaching

Table 4. Expert Validation Results 2 Small-scale trials

No	Assessment Aspect	Score Total	Percentage	Categori
1	Material Eligibility	16	80%	Very Good
2	LKPD display	34	97%	Very Good
3	Language Compatibility	11	73%	Good
Total		61	87%	Very Good

Based on the validation results from validator 2, 80% were obtained for material eligibility, 97% for LKPD display and 73% for language suitability, the total percentage obtained was 87% which was in the Very valid category. Next is the assessment of validator 3 presented in table 5:

Table 5. Expert Validation Results 3 Small-scale trials

No	Assessment Aspect	Score Total	Percentage	Category
1	Material Eligibility	17	85%	Very Good
2	LKPD display	34	97%	Very Good
3	Language Compatibility	14	93%	Very Good
Total		65	93%	Very Good

Based on the validation results from validator 3, 85% were obtained for material feasibility, 97% for LKPD display and 93% for language suitability, the total percentage obtained was 93% which was in the Very valid category. The following are the results of student responses presented in table 6:

Table 6. Results of Student Responses in Small-scale Trials

No	Assessment Aspect	Score Total	Percentage	Category
1	Ease of Use	91	91%	Very Good
2	LKPD Display	150	85%	Very Good
3	Efficiency	86	86%	Very Good
4	View on Liveworksheet	67	89%	Very Good
Total		394	87,75%	Very Good

Based on the results of the questionnaire given to students, it can be seen that the developed LKPD gets a very practical category with different percentages in each aspect of the assessment, namely the aspect of ease of use 91%, the display of LKPD 85%, efficiency 86% and the display on liveworksheet 89%, and the average percentage is 87.75%. There are several inputs from validators 1 and 2 that there needs to be a re-examination of the spelling section that must refer to the EYD, as well as animations that must be in accordance with the learning learned Therefore, validation is carried out again before conducting wide-scale trials. After the fix, validation is again performed by validators 1,2 and 3. Here are the second validations performed before the wide-scale trial:

Table 7. Expert Validation Results 1 SmWide-scale trials

No	Assessment Aspect	Score Total	Percentage	Categori
1	Material Eligibility	25	100%	Very Good
2	LKPD display	33	94%	Very Good
3	Language Compatibility	13	86%	Very Good
Total		66	94%	Very Good

Based on the validation results from validator 1, 100% was obtained for material feasibility, 94% for LKPD display and 86% for language suitability, the total percentage obtained was 94% which was in the very valid category. Next is the wide-scale trial assessment of validator 2 presented in table 8:

Table 8. Expert Validation Results 2 Wide-scale trials

No	Assessment Aspect	Score Total	Percentage	Categori
1	Material Eligibility	20	80%	Very Good
2	LKPD display	35	100%	Very Good
3	Language Compatibility	15	100%	Very Good
Total		66	94%	Very Good

Based on the validation results from validator 2, 80% were obtained for material feasibility, 100% for LKPD display and 100% for language suitability, the total percentage obtained was 94% which was in the valid category. Next is a wide-scale trial assessment of validator 3 presented in table 9:

Table 9. Expert Validation Results 3 Wide-scale trials

No	Assessment Aspect	Score Total	Percentage	Categori
1	Material Eligibility	24	96%	Very Good
2	LKPD display	35	100%	Very Good
3	Language Compatibility	15	100%	Very Good
Total		69	98%	Very Good

Based on the validation results from validator 3, 96% were obtained for material feasibility, 100% for LKPD display and 100% for language suitability, the total percentage obtained was 98% which was in the valid category. Next are the results of student responses in wide-scale trials presented in table 10:

Tabel 10. Results of Student Responses in Wide-scale Trials

No	Assessment Aspect	Score Total	Percentage	Category
1	Ease of Use	547	91%	Very Good
2	LKPD Display	879	83%	Very Good
3	Efficiency	553	82%	Very Good
4	View on Liveworksheet	406	90%	Very Good
Total		394	88,33%	Very Good

Based on the results of the questionnaire given to students in wide-scale trials, it can be seen that the LKPD developed gets a very practical category with different percentages in each aspect of the assessment, namely the aspect of ease of use 91%, the display of LKPD 83%,

efficiency 92% and the display on liveworksheet 90%, and the average percentage of 88.33% there is an increase of 0.58% in wide-scale trials on student response results.

Discussions

This research and development resulted in a mathematical LKPD product with social arithmetic material using a problem based learning approach assisted by live worksheets. The LKPD developed is for grade VII junior high school students through development-based research. The development of LKPD is carried out in stages, the first of which is the define stage. Where researchers make observations about LKPD used in schools and the difficulties faced by teachers. Based on observations reinforced by interviews, it shows that it is necessary to develop a more attractive and efficient LKPD for students. This is in line with Haryonik & Bhakti's (2018) research that LKPD used by teachers and students in schools is one of the things that needs to be improved and developed.

In the next stage, namely the design of compiling product designs, starting from the preparation of learning tools and test instruments with reference to KD and GPA, continued by compiling the following framework with designs made first in the Canva application by presenting interesting animated images and videos so as to increase student interest and enthusiasm for learning. This is in line with Alfansyur & Mariyani's (2019) research that the colors and sounds that awaken students' enthusiasm for learning. LKPD is made using the PBL learning model on social arithmetic material. The use of media that researchers use is web live worksheets, media selection has been adjusted to learning conditions.

After the next design stage goes to the development stage, before being distributed to students, the product developed needs to know its validity. This validation aims to determine the feasibility of the developed LKPD. In line with Simbolon et al., (2023) Validation is carried out to produce decent teaching materials so that they can be tested on students. The validation of this research was carried out by IKIP Siliwangi Mathematics lecturers and mathematics teachers in schools according to their fields and ability criteria. After the LKPD is validated and uploaded on the web live worksheets, researchers will share the LKPD link with students which will later be accessed via Android or other devices that are connected to the internet. Furthermore, small-scale trials will be carried out for 5 students. In this trial stage, researchers provided questionnaires of student responses to LKPD. When learning, students are very enthusiastic about using LKPD assisted by liveworksheet because this LKPD is a new thing for them. Furthermore, researchers conducted a wide-scale trial, researchers gave questionnaires of student responses to LKPD to 30 students.

CONCLUSION

Based on the results of the analysis and discussion, it can be concluded that an LKPD assisted by Liveworksheet shows very feasible and very practical criteria. This shows that the developed LKPD is very well used for the learning process in the classroom

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REFERENCES

- Agustina, R., Irhasyuartha, Y., & Sauqina. (2022). Pengembangan media articulate storyline topik mekanisme pendengaran manusia dan hewan untuk peserta didik SMP. *JUPEIS : Jurnal Pendidikan Dan Ilmu Sosia*, 1(3), 81–89. <https://doi.org/https://doi.org/10.55784/jupeis.Vol1.Iss3.119>
- Alfansyur, A., & Mariyani, M. (2019). Pemanfaatan Media Berbasis ICT ‘Kahoot’ Dalam Pembelajaran PPKN Untuk Meningkatkan Motivasi Belajar Siswa. *Bhineka Tunggal Ika. Bhineka Tunggal Ika*, 6(2), 208–216. [http://repository.radenintan.ac.id/4286/1/SKRIPSI CAHYA KURNIA.pdf](http://repository.radenintan.ac.id/4286/1/SKRIPSI%20CAHYA%20KURNIA.pdf)
- Elfina, S., & Sylvia, I. (2020). Pengembangan Lembar Kerja Peserta Didik (LKPD) Berbasis Problem Based Learning (PBL) dalam Meningkatkan Kemampuan Berpikir Kritis Siswa Pada Mata Pelajaran Sosiologi di SMA Negeri 1 Payakumbuh. *Jurnal Sikola: Jurnal Kajian Pendidikan Dan Pembelajaran*, 2(1), 27–34. <https://doi.org/https://doi.org/10.24036/sikola.v2i1.56>
- 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. <https://doi.org/10.33603/jnpm.v5i1.4526>
- Friantini, R. N., Winata, R., & Permata, J. I. (2020). Pengembangan Modul Kontekstual Aritmatika Sosial Kelas 7 SMP. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, 4(2), 562–576. <https://doi.org/10.31004/cendekia.v4i2.278>
- Haryonik, Y., & Bhakti, Y. B. (2018). Pengembangan Bahan Ajar Lembar Kerja Siswa Dengan Pendekatan Matematika Realistik. *MaPan*, 6(1), 40–55. <https://doi.org/10.24252/mapan.2018v6n1a5>
- Hasanah, U. (2022). Implementasi Model Pembelajaran Kooperatif Contextual Teaching and Learning untuk Meningkatkan Hasil Belajar Matematika Pokok Bahasan Aritmatika Sosial bagi Siswa SMP Negeri 1 Pemenang. *Jurnal Paedagogy*, 9(1), 159. <https://doi.org/10.33394/jp.v9i1.4536>
- Hidayat, A., & Irawan. (2017). Pengembangan Lks Berbasis Rme Dengan Pendekatan Problem Solving Untuk Memfasilitasi Kemampuan Pemecahan Masalah Matematis Siswa. *Journal Cendekia: Jurnal Pendidikan Matematika*, 1(2), 51–63. <https://doi.org/https://doi.org/10.31004/cendekia.v1i2.20>
- Mariam Marlina, S., Setiawan, W., Al -Barokah Sindangkerta, S., Cikadu Kecamatan Sindangkerta, D., Bandung Barat, K., Siliwangi Bandung, I., & Terusan Jendral Sudirman, J. (2021). Analisis Kesulitan Siswa dalam Mengerjakan Soal pada Materi Aritmatika Sosial Kelas VII. *05(03)*, 2373–2384. <https://doi.org/https://doi.org/10.31004/cendekia.v5i3.650>
- Nuha Negeri, U. S. (2021). *Problem-Based Learning Model to Improve Elementary School Mathematics Learning Outcomes*. 4(6), 1369–1373. <https://doi.org/https://doi.org/10.20961/shes.v4i6.70568>
- Roza, Y., Matematika, P., Riau, U., & Bina Widya Jl Soebrantas, K. H. (2019). Desain Sumber Belajar Matematika Berbasis Aplikasi Android Pada Materi Perbandingan Trigonometri Segitiga Siku-Siku. *Journal Cendekia: Jurnal Pendidikan Matematika P-ISSN*, 03(02), 513–524. <https://doi.org/https://doi.org/10.31004/cendekia.v3i2.144>
- Simbolon, J., Sakti, I., Wardana, R., Sutarno, S., & Nursaadah, E. (2023). Pengembangan E-Modul Berbasis Sistem Pada Materi Suhu Dan Perubahannya Untuk Siswa Kelas VII Smp. *DIKSAINS: Jurnal Ilmiah Pendidikan Sains Pengembangan E-Modul Berbasis*

- Sistem Pada Materi Suhu Dan Perubahannya Untuk Siswa Kelas Vii Smp*, 3(2), 108–117. <https://doi.org/https://doi.org/10.33369/diksains.3.2.108-117>
- Sulistiyani, N., & Retnawati, H. (2015). *PENGEMBANGAN PERANGKAT PEMBELAJARAN BANGUN RUANG DI SMP DENGAN PENDEKATAN PROBLEM-BASED LEARNING*. 2(2), 197–210. <https://doi.org/https://doi.org/10.21831/jrpm.v2i2.7334>
- Thiagarajan, S. (1974). *Instructional Development for Training Teachers of Exceptional Children*. Bloomington: Indiana University. [https://doi.org/https://doi.org/10.1016/0022-4405\(76\)90066-2](https://doi.org/https://doi.org/10.1016/0022-4405(76)90066-2)
- Tunnajach, N. F. (2021). Analisis Kemampuan Pemecahan Masalah Matematis Siswa dalam Menyelesaikan Soal Berbasis Kontekstual pada Materi Trigonometri Ditinjau dari Perbedaan Gender. *Jurnal Riset Dan Inovasi Pendidikan Matematika*, 2(1), 7–14.
- Widyastuti, R., & Eliyen, K. (2022). Pengembangan Exercise Berbasis Web Dengan Metode Waterfall (Tipe Soal Realistic Mathematics). *Jurnal PETIK*, 8(1), 19–26.
- Wulandari, S., Darma, Y., & Susiaty, U. D. (2019). PENGEMBANGAN MODUL BERBASIS PENDEKATAN REALISTIC MATHEMATICS EDUCATION (RME) TERHADAP PEMAHAMAN KONSEP. *Jurnal Pendidikan Informatika Dan Sains*, 8(1), 143. <https://doi.org/10.31571/saintek.v8i1.1179>