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Development of Student Worksheets (LKPD) Based on Socio-Scientific Issue (SSI) on Flat Form Topics to Improve Reading Literacy and Numeration Skills

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ABSTRACT

This study explores the development and effectiveness of student worksheets (LKPD) based on Socio Scientific Issues (SSI) to enhance reading literacy and numeracy skills among fifth-grade students. Conducted at SDN Jabontegal, SDN Lebaksono, and SD Islam Nahrul Ulum, the research identifies the challenges faced by students in implementing independent learning policies and the inadequacy of existing teaching materials in improving literacy and numeracy. The LKPD was designed to integrate reading and numeracy skills through contextual issues related to the students' environment, such as historical events and objects in Mojokerto. Validity and reliability tests, involving expert validators in material, language, and media, confirmed the LKPD's high validity and reliability, with scores of 86%, 83%, and 90%, respectively. The effectiveness of the LKPD was demonstrated through significant improvements in students' literacy and numeracy skills, as evidenced by N-Gain scores of 0.82 in the experimental class, compared to 0.65 and 0.47 in control classes. Student and teacher responses indicated high levels of agreement on the practicality and readability of the LKPD, with percentages ranging from 72% to 100%. These findings suggest that the SSI-based LKPD is a practical and effective tool for enhancing literacy and numeracy skills in primary education.

Keywords: Socio Scientific Issues, Literacy, Numeracy, Student Worksheets, Primary Education, Teaching Materials

INTRODUCTION

Education is a conscious effort made by society to prepare students for the future, both inside and outside school. The "free learning" policy was introduced to address public complaints about the existing national education system, with four main points: elimination of USBN, replacement of National Examination with AKM and character survey, simplification of RPP, and more proportional PPDB regulations (Kusumaryono, 2020).

In the era of globalization and technological developments in the 21st century, literacy and numeracy skills have become very important. Reading literacy and numeracy include logical thinking and reasoning skills using the concepts and knowledge learned (Wijaya et al., 2016). Learning that contains literacy and numeracy is needed to improve this ability (Kemendikbud, 2020).

Reading literacy helps students understand and interpret reading, which can be applied in other learning activities (Sholikhah et al., 2023). Numeracy, on the other hand, is the ability to think using mathematical concepts

and tools to solve everyday problems (Kemendikbud, 2020).

One way to develop literacy and numeracy skills is to use student worksheets (LKPD) based on socio-scientific issues (SSI). SSI LKPD helps students understand the social conditions around them and improve problem-solving skills (Putriana, 2020).

Research shows that the use of SSI-based LKPD is valid and practical in learning and can improve students' problem-solving skills (Putriana et al., 2020). However, SSI-based teaching materials are still difficult to find in Indonesia (Sa'adah et al., 2022).

Observations in several schools in Mojokerto Regency show that teachers have not used SSI-based LKPD and only rely on textbooks and general LKPD, which makes it difficult for students to understand the material. The questions used are also not related to surrounding environmental issues.Based on this background, it is necessary to increase student literacy and numeracy through "Development of Student Worksheets (LKPD) based on the Socio Scientific Issue (SSI) on the Flat Figure Topic to Improve Reading Literacy and Numeracy Skills.".

MATERIALS & METHODS

This research uses a development research (R&D) model that adopts the ADDIE model, which consists of five steps, namely, (1) analysis, (2) planning (design), (3) development, (4) implementation (implementation)., and (5) evaluation. (Tegeh et al., 2014:15)

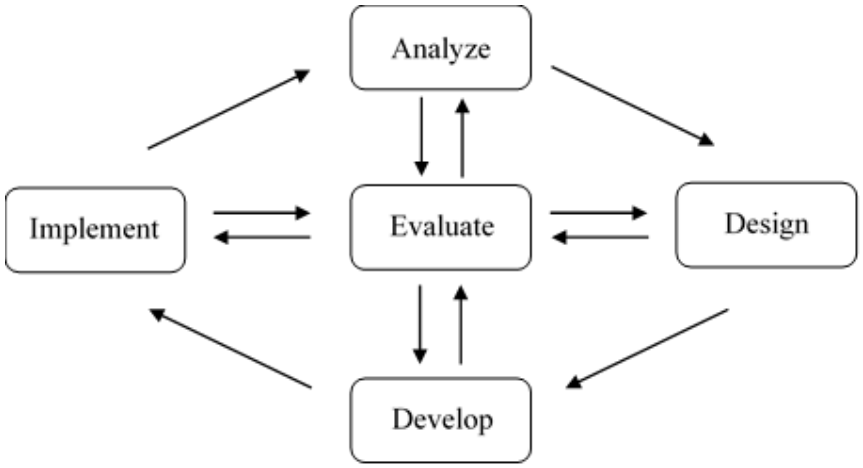


Figure 1 Stages of the ADDIE Development Model (Tegeh, 2014: 42)

The variables in this research consist of independent and dependent variables. The independent variable used in this research is LKPD based on Socio Scientific Issues (SSI), and the dependent variables used in this research are reading literacy ability and numeracy ability. The data sources for this research come from sources, documents, and learning processes obtained from class V students and class V teachers from 3 schools, namely SDN Jabontegal, SDN Lebaksono, and SD Islam Nahrul Ulum. The research subjects were divided into two, namely expert lecturers and class 5 teachers for the subject of testing the validity of Socio Scientific Issue (SSI)-based LKPD questions and class 5 students at SDN Jabontegal, SDN Lebaksono, and SD Islam Nahrul Ulum for the subject of implementing Socio Scientific-based LKPD teaching materials.

This research uses qualitative and quantitative data collection techniques. Qualitative data was obtained through observation, interviews, and document studies in several schools to collect information about the factual conditions and use of LKPD. Unstructured interviews were conducted to obtain open answers from information sources, while validation questionnaires were given to experts to assess the suitability of socioscientific issue (SSI)-based LKPD teaching materials. Quantitative data was obtained through small and large-scale trials to assess the validity

and effectiveness of SSI-based LKPD. The research instruments used include observation sheets, questionnaires, and tests to ensure the data obtained is valid and reliable. All of these data collection techniques aim to develop student worksheets that are effective and appropriate to the educational needs of the schools studied.

This research tested the validity, reliability, and effectiveness of Socio Scientific Issue (SSI)-based LKPD teaching materials through trials and data analysis. The validity of teaching materials is assessed by material, language, and readability expert validators using the Aiken formula (Afifah & Suhery, 2021), with validity results categorized based on the validity table.

$$V = \frac{\sum s}{[n\,(c-1]}$$

V = Validity
s = r – lo
r = number given by the assessor
lo = lowest validity assessment number
n = number of validators/expert lecturers who assess the product
c = highest validity assessment number

Table 1 Validity Levels

Mark	Criteria
V ≤ 0,4	Low Validity
0,4 > V < 0,8	Medium Validity
V ≥ 0,8	High Validity

Reliability was tested using the correlation coefficient between raters and the Cronbach's Alpha formula with the help of the SPSS 25.0 program (Sugiyono, 2019), where good reliability is indicated by an index ≥ 0.70 (Mardapi, 2017).

ri = $[\frac{k}{(k-1)}]$ $[1-\frac{\Sigma \alpha i^2}{\alpha t^2}$

Information:
Ri = reliability coefficient
k = number of items in the instrument
αi^2 = item variance
αt^2 = total variance

The data analysis technique used is quantitative analysis for the validity and readability of the LKPD, with assessments carried out by four expert validators, and the results are classified based on the appropriateness criteria for teaching materials. Next, the validation sheet is analyzed using the following formula (Afifah & Suhery, 2021).

P = $\frac{\Sigma}{N}$100%

Information:
P = percentage of score sought
∑ = number of answers given by the validator
N = maximum number of scores

Table 2 Material Expert Assessment Questionnaire Criteria

No	Achievement Level (%)	Qualification
1	67 < x ≤ 100	Valid, without revision
2	34 < x ≤ 66	Valid, with revisions
3	0 < x ≤ 33	Invalid

The effectiveness of LKPD is assessed by increasing students' reading literacy and numeracy skills based on pretest and posttest results, analyzed using the t test and N-Gain test.

$$g = \frac{Spost - Spre}{100 - Spre}$$

g = N-gain
Spost = reading literacy and numeracy skills score
Spre = reading literacy and numeracy skills score

Table 3. Gain Score Index

Mark	Criteria
g > 0,71	Tall
0,31 > g < 0,70	Currently
g < 0,30	Low

The data analysis technique used is quantitative analysis for the validity, readability, and practicality of the LKPD, with assessments carried out by four expert validators, and the results are classified based on the appropriateness criteria for teaching materials.

RESULT AND DISCUSSION

Characteristics of Student Worksheets (LKPD) Based on Socio Scientific Issues

(SSI) on the Topic of Flat Figures to Improve Literacy and Numeracy Skills

Characteristics of Student Worksheets (LKPD) based on Socio Scientific Issues (SSI) were developed based on the results of field study analysis in several elementary schools to identify problems in the use of LKPD and students' literacy and numeracy abilities. Observations and interviews show that students experience obstacles in implementing the independent learning policy because the teaching materials used are not helpful enough in improving literacy and numeracy. The SSI-based LKPD was developed to overcome this problem by presenting information that combines reading literacy and numeracy, as well as introducing environmental issues. Observations/Results of your study should be written in this section along with tables/charts/figures etc. write serial numbers and appropriate heading/title of tables and legend/caption of figures.

The following are the characteristics of the LKPD being developed, including:

1. LKPD was developed by presenting detailed information containing historical buildings in Mojokerto. The appearance of information descriptions in the form of historical buildings in Mojokerto can be seen in Figure 2.

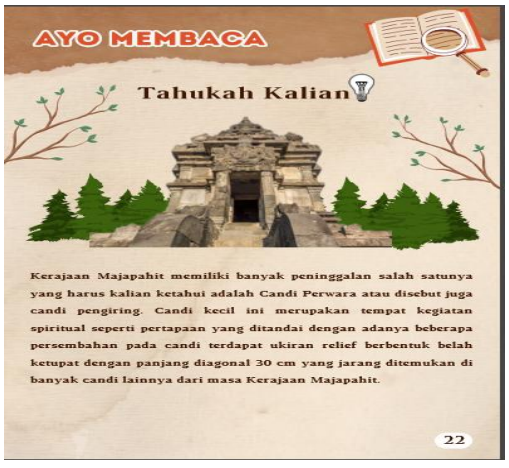


Figure 2: Information on Historical Buildings in Mojokerto

The LKPD was developed by presenting detailed information containing historical buildings in Mojokerto. In line with Hasanah & Deiniatur (2019), literacy skills can be sharpened through the use of books. In line with research by Firmansyah et al. (2022), strengthening literacy through books can be done by presenting historical events.

2. LKPD was developed using Socio Scientific Issues (SSI) guidelines, which contain historical buildings around the students' environment, namely Mojokerto Regency. It is hoped that students will be able to recognize historical events and objects as well as learn to find knowledge about social-scientific issues presented in the form of information. The historical appearance of Mojokerto can be seen in the picture.

Figure 3: LKPD with an introductory nature to Mojokerto

The LKPD was developed using Socio Scientific Issues (SSI) guidelines, which contain historical buildings around the students' environment, namely Mojokerto Regency. It is hoped that students will be able to recognize historical events and objects as well as learn to find knowledge about social-scientific issues presented in the form of information. Depicting problems from multiple perspectives based on morality in implementing SSI learning can increase students' literacy (Rohmaya, 2022). It is hoped that students will be able to recognize historical events and objects as well as learn to find solutions to problems in line with the research results of Sukroyanti & Sufianti (2017), which are presented in the form of information or reading literacy and numeracy questions.

3. LKPD has a dual role, namely to improve reading and numeracy skills. This aims to

train reading and numeracy skills simultaneously after using Socio Scientific Issues (SSI)-based LKPD through historical buildings in Mojokerto in the learning process. The role of LKPD in building literacy and numeracy skills can be seen in Figure 4.

Figure 4: LKPD for Developing Literacy and Numeracy

LKPD has a dual role, namely to improve reading and numeracy skills. This aims to train reading and numeracy skills simultaneously after using Socio Scientific Issues (SSI)-based LKPD through historical buildings in Mojokerto in the learning process. The information presented in making LKPD is to improve reading and numeracy literacy skills through the use of learning media (Kemendikbud, 2020). In line with Rohim (2021), the concept of product development evaluation questions focuses on achieving learning objectives, which in this case is increasing reading literacy and numeracy. Feasibility of Student Worksheets (LKPD) Based on Socio Scientific Issues (SSI) on the Topic of Flat Figures Developed to Improve Literacy and Numeracy Skills

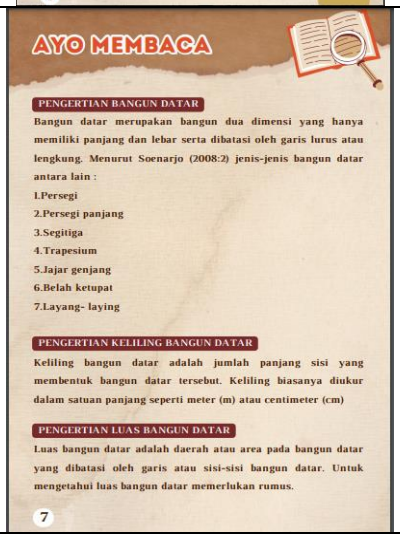
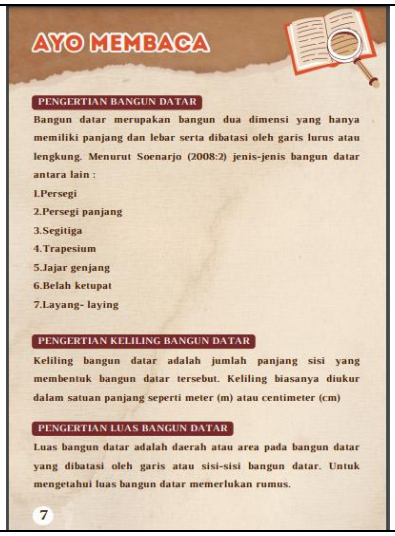
This research tested the validity and reliability of Socio Scientific Issue (SSI)-based LKPD teaching materials through small-scale trials and data analysis using the SPSS application. The validity of teaching materials was measured by completing test questions by 10 students, with the results showing that all question items were valid and met high criteria. The reliability of teaching materials was tested using the Cronbach's alpha coefficient, with a result of 0.966, which indicates high reliability. Testing the suitability of teaching materials is also carried out by distributing questionnaires to material, media, and language experts.

Table 4 Small Scale Validation Test Results

Number	Question Items	Pearson Correlation	Criteria	Significance Level	Validity Decision
1	Question Item 1	0,828	Tall	0,003	Valid
2	Question Item 2	0,870	Tall	0,001	Valid
3	Question Item 3	0,870	Tall	0,001	Valid
4	Question Item 4	0,870	Tall	0,001	Valid
5	Question Item 5	0,890	Tall	0,001	Valid
6	Question Item 6	0,827	Tall	0,003	Valid
7	Question Item 7	0,897	Tall	0,000	Valid
8	Question Item 8	0,897	Tall	0,000	Valid
9	Question Item 9	0,870	Tall	0,001	Valid
10	Item Question 10	0,870	Tall	0,001	Valid

Analysis of the validity of teaching materials is carried out by reviewing three aspects: material validation, learning media, and language. Validation by material, language, and learning media experts was each carried out once, with the results showing that the SSI-based LKPD was considered suitable for use in the learning process. The feasibility assessment by material expert validators received a score of 86%, language experts 83%, and media experts 90%, with several suggestions for improvement that have been implemented by the author.

Table 5 LKPD Based on Socio Scientific Issues (SSI) Before and After Revised by Material Expert Validator

No	Suggestion	Before Revision	After Revision
1	Question number 1 requires a depiction that is consistent with social life and is abundant in the news.		
2	Added news/information to Let's Read activities		
3	Writing error (typo) on page 7 of the word kite		

4	It's best to use right and left alignment		

Analysis of the feasibility of the Student Worksheet (LKPD) product based on Socio Scientific Issues (SSI) was carried out through small-scale trials and validity and reliability testing. The validity test results show that all question items are valid and meet high criteria, while the reliability test shows a value of 0.966, which means reliable. Validation by material, language, and learning media expert validators showed scores of 86%, 83%, and 90%, respectively, all of which are included in the valid criteria and do not require revision. This analysis is important to ensure that the LKPD developed is effective in improving students' reading literacy and numeracy skills. Validity analysis through expert validators in assessing the suitability of development products in the form of teaching materials has also been carried out by Arianty et al. (2021).

Student and Teacher Responses to Student Worksheets (LKPD) Based on Socio Scientific Issues (SSI) on the Topic of Flat Figures Developed to Improve Literacy and Numeracy Skills

Measuring students' and teachers' responses to socioscientific issue (SSI)-based LKPD aims to measure the practicality and readability of teaching materials in the learning process. Measurements were carried out through a questionnaire involving 24 students and 3 teachers, with the results showing that this LKPD was in the strongly agree category. This shows the high enthusiasm of students when using SSI-based LKPD, which is considered practical and able to improve their reading skills.

Table 6 Results of Teacher Response Trial

No	Teacher	Questionnaire Score	Category
1	R1	100%	Strongly agree
2	R2	80%	Strongly agree
3	R3	87%	Strongly agree

Table 7 Results of Student Response Trial

No	Student	Questionnaire Score	Category
1	R1	100%	Strongly agree
2	R2	100%	Strongly agree
3	R3	100%	Strongly agree
4	R4	96%	Strongly agree
5	R5	100%	Strongly agree
6	R6	72%	Agree
7	R7	82%	Strongly agree

8	R8	78%	Strongly agree
9	R9	88%	Strongly agree
10	R10	78%	Strongly agree
11	R11	94%	Strongly agree
12	R12	98%	Strongly agree
13	R13	98%	Strongly agree
14	R14	100%	Strongly agree
15	R15	100%	Strongly agree
16	R16	100%	Strongly agree
17	R17	96%	Strongly agree
18	R18	100%	Strongly agree
19	R19	72%	Agree
20	R20	82%	Strongly agree
21	R21	78%	Strongly agree
22	R22	88%	Strongly agree
23	R23	78%	Strongly agree
24	R24	94%	Strongly agree

Measurement of student responses shows a percentage of 72% to 100% in the agree and strongly agree category, while teacher responses show a percentage of 80% to 100% in the strongly agree category. These results indicate that SSI-based LKPD is suitable for use in the learning process, especially for class V elementary school, because it is able to attract students' interest and improve their literacy skills.

CONCLUSION

Based on the results of research at SDN Jabontegal, SDN Lebaksono, and SD Islam Nahrul Ulum, Student Worksheets (LKPD) based on Socio Scientific Issues (SSI) were developed according to the needs of students in the learning process. This LKPD has distinctive characteristics such as presenting information that combines reading and numeracy literacy, using historical events and objects around the students' environment, and being equipped with evaluation questions to improve reading and numeracy skills. The SSI-based LKPD is considered valid and reliable with a reliability value of 0.966, which is greater than 0.70. The validity of this teaching material was also assessed by several experts, with a validity percentage of material experts at 86%, language experts at 83%, and learning media experts at 90%. These results indicate that SSI-based LKPD is suitable for use in the learning process.

Declaration by Authors

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Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Ambarwati R., Dwijanto, & P. Hendikawati. 2015. Keefektifan Model Project Based Learning Berbasis GQM Terhadap Kemampuan Komunikasi Matematis Dan Percaya Diri Siswa Kelas VII. *Unnes Journal of Mathematics Education*. 4(2): 180-186.
2. Amir., Faisal, Mohammad., & K.W., Mahardika Darmawan. 2017. Pengembangan Domino Pecahan Berbasis Open Ended Untuk Meningkatkan Kemampuan Berpikir Kreatif Siswa SD. *Aksioma Jurnal Pendidikan Matematika FKIP*. 6(2): 178-188.
3. Apertha, Fanny K.P., Zulkardi, & Muhammad Yusup. 2018. Pengembangan LKPD Berbasis Open Ended Problem Pada Materi Segiempat Kelas VII. *Jurnal Pendidikan Matematika Universitas Sriwijaya*. 12(2): 47-62.
4. Craft, Ashley M., Robert M. Capraro. 2017. Science, Technology, Engineering, and Mathematics Project-Based Learning: Merging Rigor and Relevance to Increase Student Engagement. *Electronic International Journal of Education, Arts, and Science*. 3(6): 140-158.
5. Daryanto. 2014. *Pendekatan Pembelajaran Saintifik Kurikulum 2013.* Yogyakarta: Gava Media.

6. Han, Sunyoung., dkk. 2014. In-service Teachers' Implementation and Understanding of STEM Project Based Learning. *Eurasia Journal of Mathematics, Science & Technology Education.* 11(1): 63-76.
7. Hanipah, Sri., T.S. Florentinus, Achmad Rifai R.C. 2018. The Effectiveness of Problem Based Learning and Project Based Learning Model to Improve Natural Science Study Outcomes. *Innovative Journal of Curriculum and Educational Technology.* 7(1): 1-6.
8. Latifah, Eni., Heru Kuswanto. 2018. Pengembangan Blog sebagai Media Pembelajaran Berbasis Proyek. *Jurnal Pendidikan Matematika dan Sains.* 4(1): 93-104.
9. Mahendra, I Wayan Eka. 2017. Project Based Learning Bermuatan Etnomatematika Dalam Pembelajar Matematika. *Jurnal Pendidikan Indonesia*. 6(1): 106-114.
10. Öztürk, Elçin Ölmezer. 2016. Types Of Questions Used In EFL Classrooms: A Reflective Study On A Turkish EFL Teacher's Practices. *International Journal of Language Academy.* 4(3): 167-173.
11. Rahmawati, Hesti kusuma., Syahrilfuddin, Noviana. 2016. Penerapan Model Project Based Learning Untuk Meningkatkan Hasil Belajar Matematika Siswa Kelas V SD Negeri 018 Sungai Keranji. Jurnal Universitas Riau. 3(2): 1-10.
12. Savitri., dkk.2013. Keefektifan Pembelajaran Matematika Mengacu Pada Missouri Mathematics Project Terhadap Kemampuan Pemecahan Masalah. *UNNES Journal Of Mathematics Education*. 2(1): 28-33.
13. Shoimin, A. 2014. *Model Pembelajaran Inovatif Dalam Kurikulum 2013.* Yogyakarta: AR-RUZZ MEDIA.
14. Sugiyono. 2015. *Metode Penelitian Pendidikan pendekatan Kuantitatif, Kualitatif, dan R&D*. Bandung: Alfabeta.
15. Surya, Andita Putri., Stefanus C. Relmasira, & Agustina Tyas Asri Hardini. 2018. Penerapan Model Pembelajaran Project Based Learning (PjBL) Untuk Meningkatkan Hasil Belajar dan Kreatifitas Siswa Kelas III SD Negeri Sidorejo Lor 01 Salatiga. *Jurnal Pesona Dasar*. 6(1): 41-54.
16. Susanto, Ahmad. 2016. *Teori Belajar Dan Pembelajaran Di Sekolah Dasar*. Jakarta: Prenada Media Group.
17. Trisnadati, Ida. 2018. Pendekatan Matematika Realistik Dengan Model PBL Dan PjBL Ditinjau Dari Kemampuan Interpersonal, Berpikir Kritis, dan Prestasi Belajar. *Pythagoras: Jurnal Pendidikan Matematika*. 13(1): 99-109.

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