

E-LKPD with PMRI Approach Using Liveworksheet on Cube and Block Materials

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Abstrak

Penelitian ini bertujuan untuk menghasilkan bahan ajar berupa E-LKPD berbasis pendekatan PMRI pada materi kubus dan balok yang valid, praktis, dan memiliki efek potensial terhadap kemampuan pemahaman konsep matematis peserta didik kelas VIII SMP Negeri 18 OKU. Metode penelitian yang digunakan adalah metode penelitian pengembangan yang terdiri dari tahap preliminary (tahap analisis dan tahap pendesainan) dan tahap prototyping menggunakan alur formative evaluation (self-evaluation, expert review, one-to-one, small group, dan field test). Pengumpulan data dilakukan dengan menggunakan angket, wawancara dan tes. Hasil dari penelitian ini adalah: (1) E-LKPD berbasis pendekatan PMRI yang dikembangkan valid secara kualitatif dilihat dari komentar dan saran dari validator, selain itu secara kuantitatif dengan hasil analisis lembar validasi dengan memperoleh skor rata-rata sebesar 80,9 pada tahap expert review. Hasil tersebut menunjukkan bahwa E-LKPD berbasis pendekatan PMRI masuk dalam kategori sangat baik. (2) E-LKPD berbasis pendekatan PMRI yang dikembangkan sangat praktis secara kualitatif dan kuantitatif dengan memperoleh skor rata-rata sebesar 84 pada tahap one-to-one, 88 pada tahap small group dan 88 pada tahap field test. (3) E-LKPD berbasis pendekatan PMRI yang dikembangkan memiliki efek potensial terhadap kemampuan pemahaman konsep matematis dengan rata-rata nilai 73,8.

Kata kunci: Kubus dan Balok, E-LKPD, Liveworksheet, PMRI

Abstract

This study aims to produce teaching materials in the form of E-LKPD based on PMRI approach on Cube and block material that is valid, practical, and has a potential effect on the ability to understand mathematical concepts of students in Class VIII of SMP Negeri 18 OKU. The research method used is a research development method consisting of preliminary stage (analysis stage and design stage) and prototyping stage using formative evaluation flow (self-evaluation, expert review, one-to-one, small group, and field test). Data collection was conducted using questionnaires, interviews and tests. The results of this study are: (1) E-LKPD based on PMRI approach developed qualitatively valid seen from the comments and suggestions of the validator, in addition quantitatively with the results of the validation sheet analysis by obtaining an average score of 80.9 at the expert review stage. These results show that the PMRI approach based on E-LKPD is in the very good category (2) e-LKPD based on PMRI approach developed is very practical qualitatively and quantitatively by obtaining an average score of 84 at the one-to-one stage, 88 at the small group stage and 88 at the field test stage. (3) E-LKPD based on PMRI approach developed has a potential effect on the ability to understand mathematical concepts with an average value of 73.8.

Keyword: Cube and beam, E-LKPD, Liveworksheet, PMRI

INTRODUCTION

E-LKPD is one of the alternative media that can be used to support the learning process consisting of materials and practice questions that are classified as computer-based media because to run it requires a computer or mobile phone that allows students to increase their insight into learning materials independently (Suwantini, 2022). In making E-LKPD, educators can use software that is already available on the online website, one of which is a liveworksheet (Haezer et al., 2023). Liveworksheet is a platform in the form of a website that provides services to educators to be able to use the available E-LKPD and make the E-LKPD itself interactive online (Fauzi et al., 2021). This interactive liveworksheet-based interactive e-LKPD can provide a variety of learning to students so that learning is not boring (Firtsianta & Khofifah, 2022). Students can work on worksheets online and submit their answers to teachers as well online (Lioba et al., 2021).

The difficulties experienced by students are difficulties in solving problems, as well as difficulties in determining the appropriate concepts that have been learned (Dila & Zanthi, 2020). The material must be reminded again to students so that students do not make mistakes in distinguishing the volume of cubes and blocks. Because of the lack of understanding of students on the concept of cube and block material. In short, in this case, the ability of students to understand mathematical concepts of cube and block material is still lacking. In order for students' understanding of concepts to develop, E-LKPD teaching materials are needed which are expected to support conceptual understanding of the material being studied (Putri et al., 2022). In addition, one of the mathematics learning models that can be used is PMRI (Dahlan, 2018). The Indonesian Realistic Mathematics (PMRI) education learning model in the E-LKPD teaching materials will be a learning that can connect mathematics learning with the real lives of students (Purnama & Suparman, 2020). The realistic mathematics approach is mathematics learning that is carried out by

making a reality and the living environment of students as the first step of learning (Paiza et al., 2021).

METHOD

The type of research that the researcher will use is research development. The subject of the Location Research that will be used in this study is SMP N 18 OKU. This research was carried out in the even semester of the 2022/2023 academic year. In development research, the focus is on two stages, namely the preliminary stage (preparation stage) and the second stage of formative evaluation (self-evaluation, expert review, one-one, small group, and field test).

The following is an image that contains the Formative Evaluation design flow

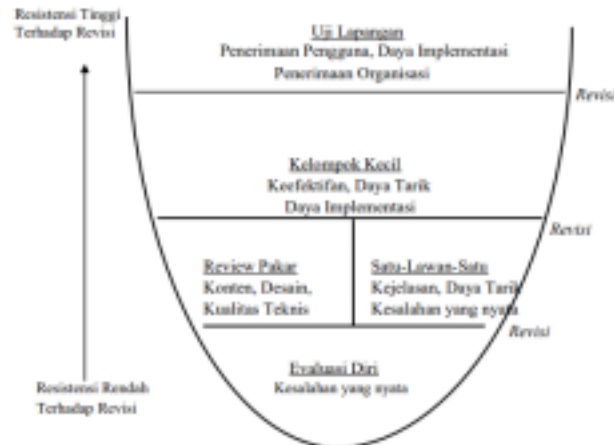


Figure 1. Tessmer Flow (1993)

1. Preliminary Stage

In the preliminary stage, the researcher carried out preparation and design. At the preparation stage, an analysis was carried out consisting of an analysis of the curriculum applied in the school where this research took place, an analysis of the material to be used, and an analysis of students. At the design stage, the researcher collects information from various sources related to the material to be used and designs teaching materials in the form of E-LKPD with a liveworksheet platform on the E-LKPD to be made.

2. Formative Evaluation Stage

This stage consists of a formative evaluation stage (self-evaluation, expert review, one one, small group, and field test). At the self-evaluation stage, the researcher reviewed the errors seen by asking for suggestions and comments with the supervisor. Comments and suggestions at this self-evaluation stage will produce prototype I. Then at the expert review stage, researchers involve expert experts to see and assess aspects of the content, design, language, and characteristics of PMRI from the E-LKPD that has been created. Along with the expert review stage, a one-to-one stage trial was also carried out on 3 students with different abilities, namely high, medium, and low abilities. The aspects assessed at this stage are ease of use, attractiveness of appearance, effectiveness, and effectiveness as well as errors seen in E-LKPD teaching materials. Then an interview was conducted regarding comments and suggestions on the one-to-one questionnaire, the result of the one-to-one revision was in the form of prototype II. Furthermore, the small group step consisting of 9 students to assess the practicality aspects consisting of ease of use, attractiveness of appearance, applicability, and effectiveness. The results of this questionnaire contain data with comments and suggestions which are then interviewed to produce prototype III. The following criteria for measuring the validity and practicality of the product are as follows

Table 1. Product Validity Criteria

Score	Criteria
$80 < P \leq 100$	Sangat Valid
$60 < P \leq 80$	Valid
$40 < P \leq 60$	Cukup valid

$20 < P \leq 40$	Kurang valid
$0 < P \leq 20$	Tidak valid

Modifications of (Nur Sa'adah, 2020)

Table 2. Product Practical Criteria

Score	Criteria
$80 < P \leq 100$	Sangat Praktis
$60 < P \leq 80$	Praktis
$40 < P \leq 60$	Cukup Praktis
$20 < P \leq 40$	Kurang Praktis
$0 < P \leq 20$	Tidak Praktis

Modifications of (Nur Sa'adah, 2020)

If the percentage of validity and practicality obtained > 40 , the developed E-LKPD can be used at the field test stage.

N = Maximum Score

Information:

P = Final Score

f = Score Acquisition

$$P = \frac{f}{N} \times 100$$

In the last stage, namely the field test stage, tests are carried out in the form of evaluation questions for students to see potential effects on students' ability to understand mathematical concepts. The test was carried out by giving 5 questions of cubes and blocks in the shape of a story. The qualifications for the ability to understand mathematical concepts are as follows::

Table 3. Potential Effect Criteria

Interval	Kategori
$80 \leq P \leq 100$	Sangat Baik
$70 \leq P < 80$	Baik
$60 \leq P < 70$	Cukup
$50 \leq P < 60$	Kurang
$0 \leq P < 50$	Sangat Kurang

Modifications of (Norsanty & Chairani, 2016)

The way to calculate the percentage of students' ability to understand mathematical concepts is as follows:

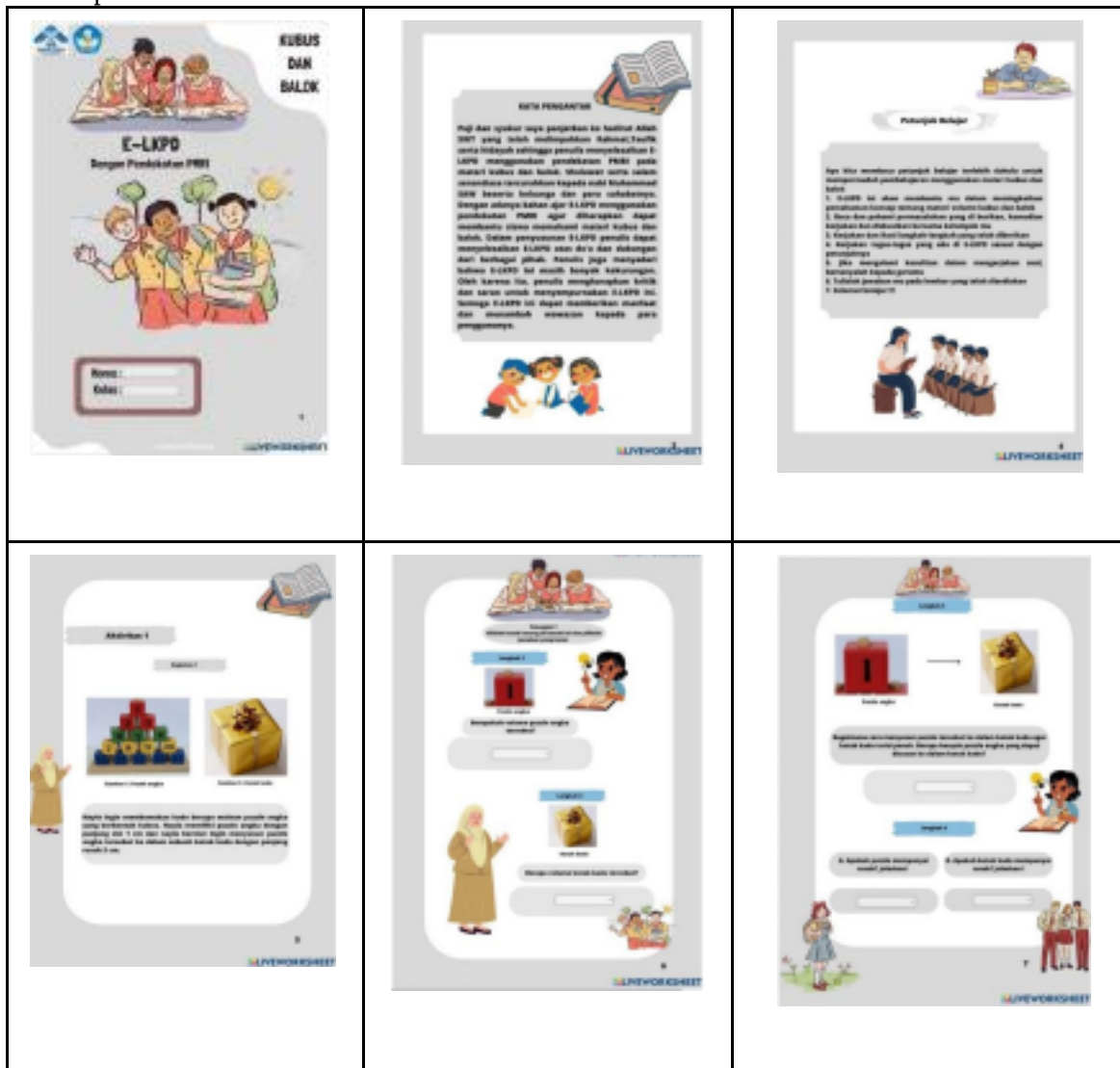
$$\frac{f}{N} \times 100$$

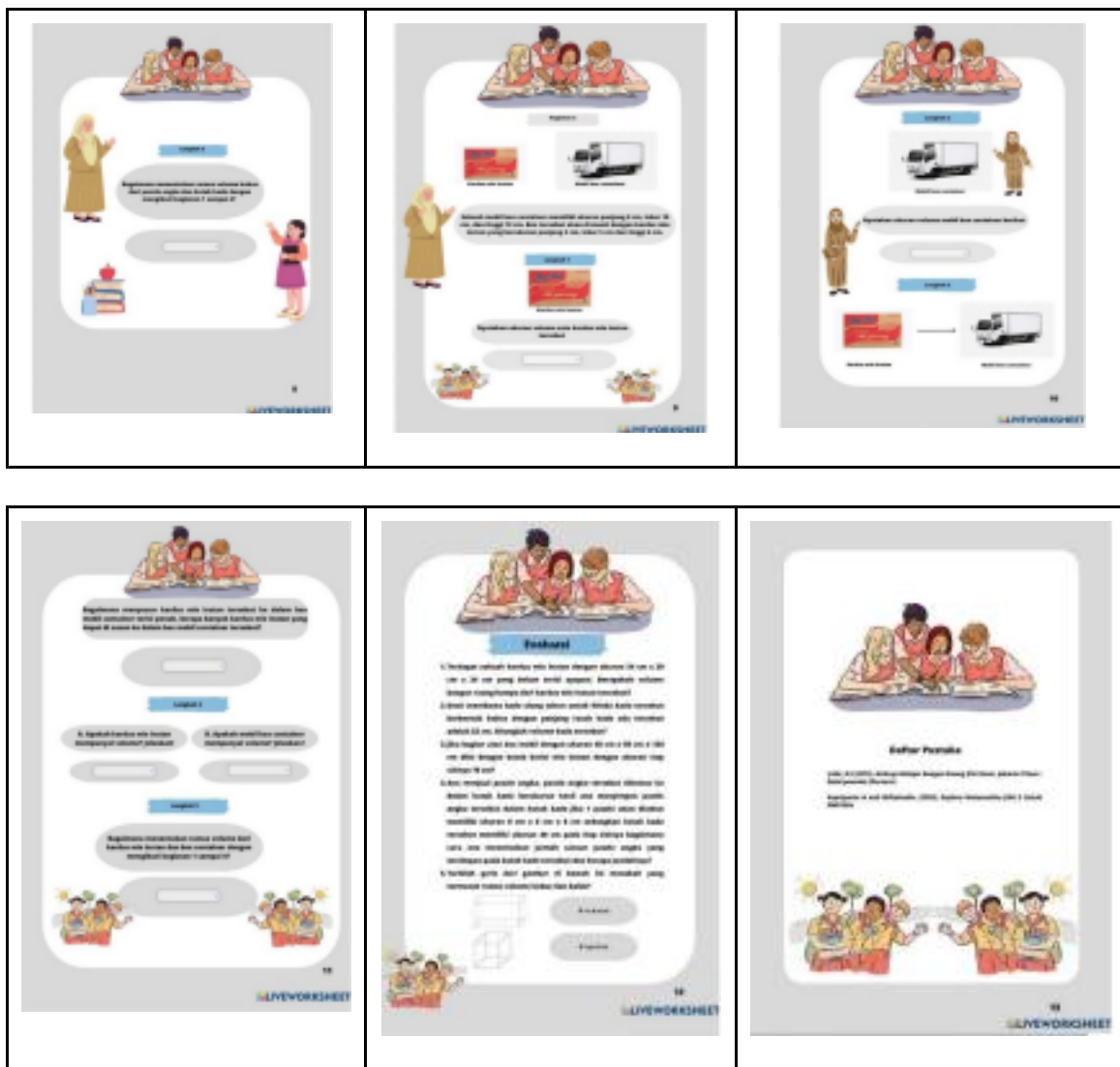
Information :

T = Many students completed

1. Preliminary Stage

Furthermore, the researcher carried out the design process of electronic teaching materials. The teaching material to be developed is E-LKPD. E-LKPD is designed through the Canva application and included in the website, namely liveworksheet. First, the researcher collects references related to cube and block material through books, the web or personal sources in the form of object images. The two researchers designed the material and also the order of PMRI implementation in E-LKPD through the iceberg created. The following is the appearance of the developed E-LKPD:





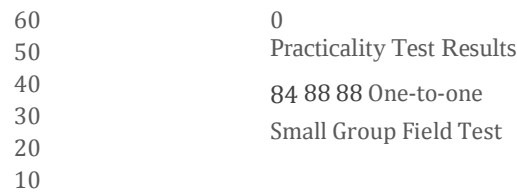
2. Formative Evaluation Stage

In this stage, the researcher conducts 5 stages, namely: self-evaluation, expert review, one-to-one, small group, and field test. At the self-evaluation stage, the researcher asked for suggestions and comments from the supervisor regarding the product developed as prototype I. Next, the researcher conducted an expert review from prototype I to 4 experts, namely 3 mathematics education lecturers and 1 mathematics teacher at the school where the research was conducted. The following are the results of the analysis of the questionnaire sheet at the expert review stage:

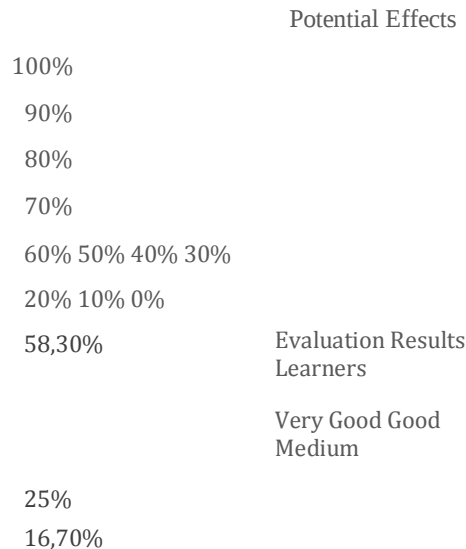
Validity Test Results	
	0
100	87,7
80	77,8
60	86,7
40	72,5
20	

Thus, it can be concluded from the results of the questionnaire that the E-LKPD products that have been developed are classified as valid by experts. After the E-LKPD product has been valid, the researcher conducts the next stage, namely one-to-one to 3 students with different levels of ability (low, medium, and high). This stage is carried out in conjunction with the expert review stage by looking at practicality including, ease of use, attractiveness of appearance, applicability, and effectiveness and errors seen in ELKPD teaching materials. At this stage, the researcher starts by giving an explanation by accessing the ELKPD with a smartphone or laptop that is done by the students themselves. Furthermore, the researcher provides a questionnaire sheet that must be filled out by students. The following is a summary of the results of the student questionnaire analysis:

100	90
80	
70	



Based on the results of the assessment of the questionnaire in the one-to-one, small group and field test stages, the practicality level of E-LKPD of cube and block materials with the PMRI approach is included in the very practical category. Furthermore, the researcher conducted a field test stage that was piloted on 24 students against E-LKPD propotype III to see the potential effect on the ability of mathematical concepts with minimum completeness criteria (KKM). The following are the results of the evaluation test at the field test stage.



Based on the results of the assessment of the evaluation results at the E-LKPD field test stage, cube and block materials with the PMRI approach have a potential effect on the ability to understand mathematics.

CONCLUSION

E-LKPD uses the PMRI approach to the developed cube and block material. The valid criteria in this study were obtained from the results of the assessment of validation sheets and interviews by experts at the expert review stage in terms of content, construction, language and characteristics of PMRI. E-LKPD uses the PMRI approach to the cube and block material developed in a very practical quantitative manner with an average score of 84 in the one-to-one stage, 88 in the small group stage and 88 in the field test stage and qualitatively based on the results of the interview. The practical criteria in this study are seen from the results of the questionnaire and the results of the interviews given. The results of questionnaires and interviews with students stated that the E-LKPD developed was easy to understand both in terms of use and the material presented. E LKPD using the PMRI approach to the developed cube and block material has a potential effect on the ability to understand mathematical concepts.

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