p-ISSN: 2086-4280
e-ISSN: 2527-8827

Development of Contextual Teaching and Learning-Based E-LKPD Mathematics with Malay Context to Improve Students' Mathematical Skills in Cube and Block Material

Syutaridho[1*], Harisman Nizar[2], Dyah Rahmawati[3], Muktir Rotul Rodoh[4], Risky Amelia[5], Salsabilla Fitri[6], Salsa Nur Asma[7]

Mathematics Education, Universitas Islam Negeri Raden Fatah Palembang
Jalan Prof. K.H. Zainal Abidin Fikri KM.3,5 Palembang, South Sumatera, Indonesia
[1*]*syutaridho_uin@radenfatah.ac.id*; [2]*harismannizar_uin@radenfatah.ac.id*;
[3]*dyahrahmawati_uin@radenfatah.ac.id*; [4]*rotulrodohnuktir@gmail.com*;
[5]*rskyamelia9@gmail.com*; [6]*salsabillafitri93@gmail.com*;
[7]*salsanurasmanadila00@gmail.com*

Article received: 17-08-2025, revision: 10-09-2025, published: 30-10-2025

Abstrak

Tuntutan kurikulum yang mengharuskan siswa memiliki kemampuan kritis dan bernalar yang baik dalam menyelesaikan masalah matematik, mengharuskan guru memiliki kemampuan mendesain pembelajaran, dalam penelitian ini memadukan teknologi dalam lembar kerja peserta didik menjadikan E-LKPD sebagai Solusi yang dapat digunakan dalam proses pembelajaran. Penelitian ini bertujuan menghasilkan E-LKPD materi kubus dan balok menggunakan Pendekatan CTL dengan Konteks Melayu yang valid dan praktis serta memiliki efek potensial terhadap kemampuan matematis siswa. Hasil penelitian memberikan gambaran bahwa ada capaian 61,1 % atau ada 22 siswa kemampuan matematis siswa kategori sangat baik, 19,4 % atau ada 7 siswa kategori Baik, 11,1% atau ada 4 siswa kategori cukup, dan 8,3% atau ada 3 siswa kategori kurang. Sehingga efektivitas E-LKPD berbasis pendekatan Contextual Teaching and Learning (CTL) yang dikembangkan dalam meningkatkan kemampuan pemahaman matematis siswa dapat disimpulkan memberikan efek potensial yang baik terhadap kemampuan pemahaman matematis siswa.

***Kata Kunci**: Contextual Teaching and Learning; Kemampuan Matematis Siswa; Konteks Pemainan Engklek.*

Abstract

Curriculum requirements that require students to have good critical and reasoning skills in solving mathematical problems require teachers to have the ability to design learning. In this study, integrating technology into student worksheets makes E-LKPD a solution that can be used in the learning process. This study aims to produce E-LKPD materials on cubes and blocks using the CTL approach with a valid and practical Malay context that has a potential effect on students' mathematical abilities. The results of the study show that 61,1% or 22 students achieved a very good level of mathematical ability, 19,4% or 7 students achieved a good level, 11,1% or 4 students achieved an adequate level, and 8,3% or 3 students achieved a poor level. Therefore, the effectiveness of E-LKPD based on the Contextual Teaching and Learning (CTL) approach developed to improve students' mathematical comprehension skills can be concluded to have a potentially positive effect on students' mathematical comprehension skills.

Keywords: Contextual Teaching and Learning; Students' Mathematical Ability; Engklek Game Context.

I. INTRODUCTION

Currently, technology has dominated almost every aspect of life, including education. The use of technology in learning can help meet various learning needs, simplify the learning process, and create a more efficient and effective learning environment to improve the quality of education (Rahmi & Samsudi, 2020). Teachers, as leaders in the classroom, are required to have the ability to design learning that is closely related to student activities (Afriansyah et al., 2023; Putri & Zulkardi, 2019; Zulkardi, 2013).

Technological developments have had an impact on the world of education (Kleemann et al., 2025; Costa et al., 2022). Initially, learning was only known through printed teaching materials, but now it has shifted to electronic media (Hidayat & Aripin, 2023). One of the media used is the Electronic Student Worksheet (E-LKPD), which is presented electronically and can make it easier for students to understand information and create more active learning, especially in mathematics learning (Apriyantini & Sukendra, 2023).

The current demands of the independent curriculum (Angio et al., 2025) are for students to become more independent in pursuing knowledge and to be free to seek information and acquire knowledge anywhere, so that they can become more active, creative, and independent mandiri (Taek, 2024; Fauzan et al., 2023). Teachers are required to carry out a series of learning activities, one of which is to use and develop effective and interactive teaching materials so that students have competencies and skills (Nurdin et al., 2023)

Mathematics is a subject that must be taught at every level of schooling (Nahdi, 2017; Arwadi et al., 2024) because mathematics is a discipline that contributes to technological advancement (Swanson, 2005; Pontes, 2019; Efwan et al., 2024). Therefore, the delivery of mathematics learning materials must be well planned so that students can easily understand the material in order to achieve learning objectives (Brijlall & Ivasen, 2022).

The Contextual Teaching and Learning (CTL) approach is a learning approach that links the material presented to the real world, encouraging students to connect their existing knowledge with its application in their lives (Dhani & Rahayu, 2023; Senjawijaya et al., 2021). The game of engklek was chosen as part of Malay culture. In this study, Malay culture refers to a term used to refer to various social groups in several countries in the Southeast Asian region, including Indonesia, which show similarities in several aspects of their culture (Rohana & Grafika, 2009). The Malay context can be used as a context in mathematics (Oktaviani et al., 2024; Hia et al., 2024). In an effort to develop E-LKPD mathematics for students, researchers utilize the Malay context. In this case, the researchers took the context of the engklek game engklek (Sari, Munawaroh, & Sumartini, 2025; Kristanto & Wibowo, 2023; Sukoyo et al., 2021).

The engklek game was chosen as the context because engklek is generally known to be square or rectangular in shape, with a structured or regular pattern, so the engklek context can represent the elements of cubes and blocks. In the

p-ISSN: 2086-4280
e-ISSN: 2527-8827

learning process, students are guided to arrange and think about the shapes produced when squares or rectangles are arranged to form a solid figure. This process serves as a conceptual bridge from two dimensions to three dimensions, ultimately achieving the goal of understanding the concepts of cube and block nets as well as cube and block solid figures.

II. METHOD

This research uses a development study type of design research, which consists of preliminary and formative evaluation stages. Formative evaluation itself consists of self-evaluation, expert reviews, one-to-one, small groups, and field tests (Tessmer, 1993; Zulkardi, 2006). The research subjects were junior high school students. In the one-to-one stage, there were 3 subjects with different abilities. In the small group stage, there were 9 students with different abilities. In the field test stage, there were 36 students.

The data collection techniques used in this study were walk through, observation, interviews, and tests. Walk through was used to obtain assessments from expert reviews. Still in one stage, one-to-one activities were carried out through observation and interviews to obtain information aimed at improving the E-LKPD. Then, the next stage was the small group stage, where students tested the E-LKPD, and the obstacles, comments, and difficulties encountered by students in working with the E-LKPD were recorded and used as a basis for further improvements to the existing E-LKPD. The final stage is the field test, which is used to determine the potential effect of the developed E-LKPD on students' mathematical abilities. Tests are administered at the field test stage after students have interacted with the developed E-LKPD. This research was conducted at SMP N 13 with the research subjects in the development of this E-LKPD being the ninth grade of junior high school.

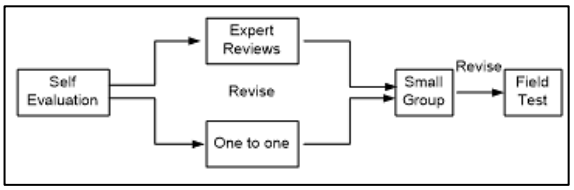

Figure 1. Formative Evaluation Design Flow ((Tessmer, 1993) (Zulkardi, 2006).

III. RESULT AND DISCUSSION

A. Result

The E-LKPD mathematics produced from mathematics development is E-LKPD Mathematics material on cubes and blocks with the context of the Malay game of engklek. There are two stages, namely the preliminary stage, which is the stage of analyzing students, the curriculum, and the analysis of teaching material needs. Researchers examine student characteristics. In detail, the class studied was a class with heterogeneous student abilities. Most students had good interaction skills and were willing to carry out activities when instructed by the teacher. These conditions became an asset for teachers to design learning by applying an independent curriculum that required students to be active in learning, bringing out their critical and creative thinking skills. The above student characteristics are believed to be very suitable for CTL, which

ultimately means that the learning presented will have an impact on students' mathematical abilities.

The formative evaluation stage includes self-evaluation, expert reviews, one-to-one, small group, and field tests. In the self-evaluation stage, the researcher designed learning based on the fulfillment of student needs as described in the paragraph above. Next, in the advanced stage, Expert Review and One-to-one are carried out. The Expert Review stage involves three panelists with the following detailed results.

Table 1.
Expert Review Results

Name	Comments
HA	• Improve sentence structure by considering standard words and imperative sentences, such as "conclude," then align the video and audio to clarify the instructions in the E-LKPD. • The use of context should be able to direct students to activities that will give them an understanding of how cube and block formulas are formed. • Activities in finding formulas should be based on student activities in composing, changing shapes, and identifying the results of using the Engklek context.
RP	• Worksheets in E-LKPD must provide sufficient space for students to write their answers. • The use of Engklek context must guide students towards the objective, such as guiding students to find formulas, guiding students to understand that space or volume is related to content, and considering the base area x height. • Evaluation questions should be tailored to the competencies being tested. • Illustrations used to explain surface area should consider shapes that can be opened up, so that students' understanding leads them to calculate all the surfaces of a solid shape.
SK	• The use of evaluation questions considers question levels with low, medium, and high categories so that in the conclusion, researchers can explain the percentage of students who have low, medium, and high mathematical abilities. • For questions, the wording must be to the point so that students can solve the math problems correctly. • A good context is one that does not need to be reinforced with explanatory sentences; students can solve the questions directly by translating the questions from the context used.

The next stage was the one-to-one stage, with three students as subjects representing high, medium, and low ability levels. In the one-to-one stage, students were asked to use the E-LKPD developed by the researcher using their own smartphones. The researcher gave the students time to access the E-LKPD link, read and understand the E-LKPD, use the E-LKPD according to the instructions, and complete the activities contained in the E-LKPD. The researcher observed and interacted directly with the students to find out what obstacles they encountered when using the E-LKPD, which would become reference material for the researcher to revise the E-LKPD.

Table 2.
One-to-One Results

Name	Comments and Suggestions
VA	• The use of E-LKPD is very good and interesting because it helps me understand the material on cubes and blocks, but in the activity of arranging engklek, I am unsure about arranging engklek because I don't understand the pattern. • It would be better if the pattern arranged on the engklek was clarified in the instructions.

p-ISSN: 2086-4280
e-ISSN: 2527-8827

Name	Comments and Suggestions
MD	• I am very interested because with just one click, the material can be opened immediately, making it easier for me to access and learn the content more quickly and efficiently. • In the surface area activity, it should be emphasized that the illustrations of the open space of the block and cube are part of the instructions for calculating all areas on the plane.
MG	• In my opinion, the presentation of material on cubes and blocks has been well organized and systematic, making it easier for me to understand the concepts and their application in everyday life.

The researchers also conducted face-to-face interviews with students to explore their perceptions and understanding of the E-LKPD content. The following are excerpts from the interviews with students.

R : What are your thoughts on this E-LKPD?
S : It looks attractive and is easy to understand when using it
R : Did you encounter any difficulties when using this E-LKPD?
S : Yes, especially with the instructions for the questions. I sometimes had trouble understanding what the instructions meant
R : Were there any other difficulties when using this E-LKPD?
S : Another difficulty was with the hopscotch game itself, where some of my friends couldn't play, so during the trial, they were busy with the instructions on how to play, which distracted them from the hopscotch game, which was meant to teach them how to calculate surface area.
R : Okay, so it means that there needs to be clear illustrations in the E-LKPD.
S : Yes.
R : In understanding volume, did you also have difficulty understanding it?
S : Not in practice, but I made a mistake in concluding that volume is the base area multiplied by the height.
R : What caused that?
S : Because during the illustration and practice process, the researcher did not provide focus on that reinforcement.
R : Okay, thank you for your input. We will consider all of this input for improvement

The results of the expert review and one-to-one review were used as the basis for making improvements to the E-LKPD, which was then continued in the small group stage involving nine students as subjects to assess the practicality of the developed E-LKPD. The development of the E-LKPD was assessed by students based on the effectiveness of media use (benefits), student interest in using the E-LKPD (attractiveness), and the applicability (practicality) of the E-LKPD. In this stage, students were divided into three groups consisting of students with high, medium, and low abilities. In the process of answering the activities, students discussed with their group members to discover the concepts of volume and surface area through the context of Engklek.

Table 3.
Small Group Results

Name	Comments and Suggestions
AK, KK, XD (High Ability)	• The E-LKPD presented is easy to understand, with clear instructions and illustrations that help students carry out activities in the E-LKPD. • The E-LKPD presented encourages students to be active and work independently in discovering mathematical formulas. • It makes it easier for students to learn anywhere because it can be accessed via mobile phones. • The use of the Engklek context

Name	Comments and Suggestions
	makes students more realistic in their mathematical reasoning and understanding.
AR, CA, AA (Medium Ability)	• The E-LKPD presented is more interesting because all the help can be clicked on and helps students in their learning. • The E-LKPD presented is enjoyable because it is complete with learning activities and can be used for independent learning.
MA, DA, NA (Low Ability)	• The E-LKPD presented is easy to use and requires teacher assistance. • Learning activities will be more effective if guided and explained by the teacher first, so that learning will run smoothly.

Small group data was supported by the results of the researcher's interviews with students, along with the information obtained.

R : What are your thoughts on this E-LKPD?
S : The E-LKPD presented is very good and comes with clear instructions.
R : What do you think about the activities in the E-LKPD?
S : The activities in the E-LKPD help students understand the material and help them discover mathematical concepts for themselves.
R : Did you encounter any difficulties when working on the E-LKPD?
S : The difficulty I encountered was in my understanding of the mathematics presented, my inability to translate mathematical language into existing mathematical symbols.

The interview results explained that, in principle, students could use the E-LKPD completely in terms of content, structure, and language. The findings indicated that students' ability to understand mathematical problems and then translate them into symbols still needed to be addressed. The researchers then made improvements to the E-LKPD to continue to the field test stage.

The field test stage was the final stage of prototyping. In the learning process, the researcher distributed links to the E-LKPD that could be accessed via mobile phones. The learning approach used was CTL. The learning activity began with questions about the game of hopscotch as an introduction to relate the material on cubes and blocks to the students' real experiences. The CTL approach used in this learning included seven components, namely as follows.

1. Constructivism

Learning using E-LKPD based on the CTL approach on the subject of cubes and blocks begins with the constructivism stage, which connects students' real experiences with the concepts to be learned. At this stage, the researcher began the activity by asking students if they had ever played hopscotch. The question aimed to rekindle students' experiences and memories of familiar games in their daily lives. Next, through the “Let's Remember” section, students were directed to associate hopscotch with spatial structures as an introduction to understanding the concepts of cubes and blocks.

2. Learning Community

Next, learning is carried out in groups. Students are divided into small groups, where each group works together to complete the assigned tasks. Each group chooses one member to be the player in the hopscotch game. After the game is over, the group is asked to build a cube or block model based on the game squares. This activity is designed to encourage

p-ISSN: 2086-4280
e-ISSN: 2527-8827

students to share ideas, discuss, and learn from each other in a collaborative atmosphere.

Figure 2. Learning Community.

3. Questioning

The Questioning stage is applied throughout the learning process through questions asked by both the researcher and those listed in the E-LKPD. Examples of questions such as “Are all sides the same length?” or “How many corners does the shape have?” are used to encourage students to think critically and deepen their understanding of each activity. Through this stage, students not only provide answers, but also reflect on and reorganize their understanding independently.

Figure 3. Questioning.

4. Inquiry

The next stage is Inquiry, which is a learning process that actively involves students in discovering concepts through observation and exploration. At this stage, students observe the squares on the hopscotch game and arrange them concretely into cubes and blocks. Students are not immediately given definitions, but are guided to discover the characteristics of shapes themselves through questioning, measuring sides, and calculating area and volume based on their observations. This activity emphasizes that mathematical concepts can be discovered through real situations, not merely by memorizing formulas.

Figure 4. Inquiry.

5. Modeling

The Modeling component is evident through the use of hopscotch as a representation of nets and three-dimensional shapes. Through E-LKPD, real examples are presented of how the squares in the game can be used as models for building cubes and blocks. The researcher also shows the stages of arranging the squares, the measurement process, and the discovery of the surface area and volume formulas of the resulting shapes. In this way, students can more easily relate real shapes to abstract concepts in mathematics.

Figure 5. Inquiry Modeling.

6. Reflection

After completing various learning activities, students are invited to engage in Reflection. In the E-LKPD section, they are asked to write down what they have learned and explain how the engklek game supports their understanding of cubes and blocks. This reflection activity serves as a means of self-evaluation of the learning process, while also deepening understanding through the expression of learning experiences in writing.

Figure 6. Reflection.

7. Authentic Assessment

The final stage is Authentic Assessment. In E-LKPD, practice questions are provided that are related to real-life situations, such as calculating the volume of a toy box or the surface area of a rectangular cabinet. These questions not only assess calculation skills, but also test students' ability to apply concepts in everyday life. Thus, the assessment is not only conducted at the end, but also reflects thinking skills, analytical abilities, and a deep understanding of concepts.

Figure 7. Inquiry.

The evaluation material in E-LKPD is designed by applying the CTL approach, which focuses on indicators of mathematical concept comprehension. Before use, all questions have been validated by experts through an expert review stage. The evaluation instrument consists of five questions given to 36 students in the field test stage. Each question is designed to measure five indicators of conceptual understanding, namely: (1) the ability to restate a concept, (2) the ability to give examples and non-examples, (3) the ability to present concepts in various forms of mathematical representation, (4) the ability to select and use appropriate procedures, and (5) the ability to classify concepts or algorithms in problem solving. The analysis of the students' evaluation answers was carried out with reference to the indicators of mathematical concept understanding. Question number 1 was designed to measure students' ability to restate a concept. The following is an example of one of the answers given by the students.

p-ISSN: 2086-4280
e-ISSN: 2527-8827

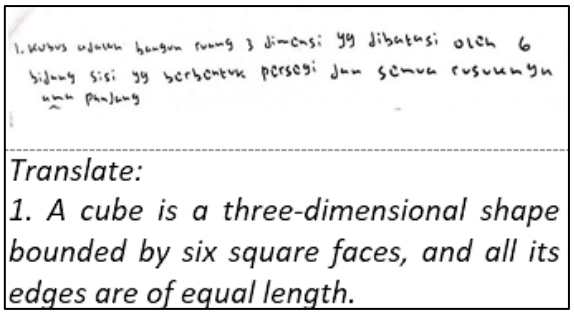

Figure 8. Student's Answer.

According to (Sari, 2017), this ability shows the extent to which students can understand the concepts given in their own way. Based on the student's answer, it can be seen that he is able to convey the definition of the concept of a cube accurately. Furthermore, question number 2 is intended to measure the ability to provide examples and non-examples of the concept in question. The following is one example of a response provided by a student.

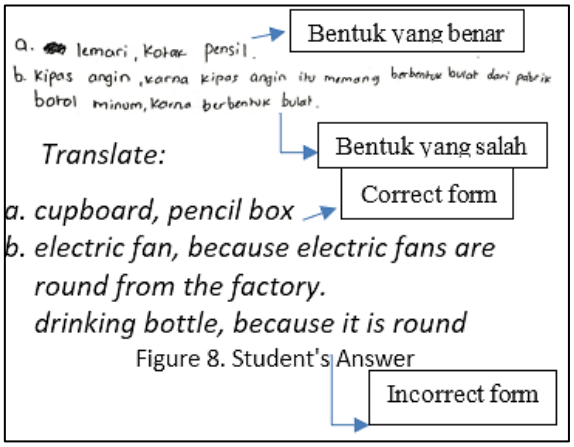

Figure 9. Student's Answer.

Students' ability to identify examples and non-examples of a concept reflects their level of understanding of the material being studied (Setiani et al., 2022; Rahmadiani et al., 2024). Based on these answers, students were able to provide correct examples and non-examples of rectangular prisms. Furthermore, question number 3 focuses on the indicator of presenting concepts in various forms of representation. The following is one of the answers given by students.

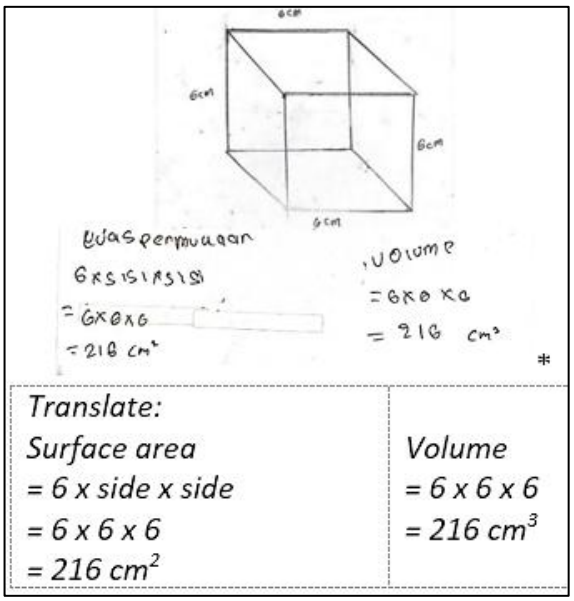

Figure 10. Student's Anwer.

The ability to present concepts in various mathematical representations demonstrates students' skills in communicating mathematical ideas through mathematical models (Damanik et al., 2025; Lestari & Kusno, 2023; Afriansyah & Turmudi, 2022). Based on the answers provided, it appears that students are able to draw a cube as a representation of the problem accurately and solve it using the correct steps and procedures. Question number 4 is aimed at measuring the ability to use, utilize, and select specific procedures. The following is one of the answers provided by students.

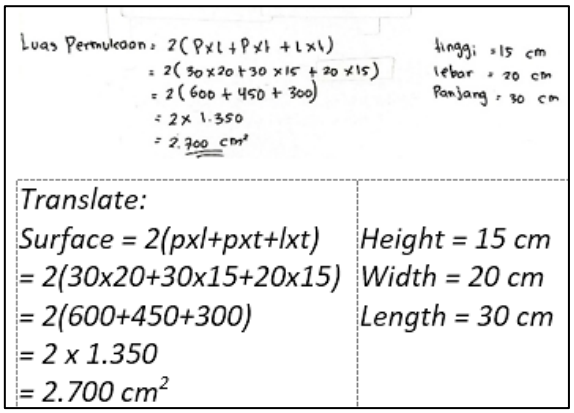

Figure 11. Student's Anwer.

This ability includes the application, selection, and use of appropriate steps or methods in solving a problem (Satriani et al., 2012) (Liu et al., 2019). Based on the answers provided, it appears that the students have used the correct procedure, namely by applying the formula for the surface area of a block and solving the problem through the correct steps. Question number 5 focuses on the indicator of the ability to apply concepts to new situations. The following is one of the answers provided by the students.

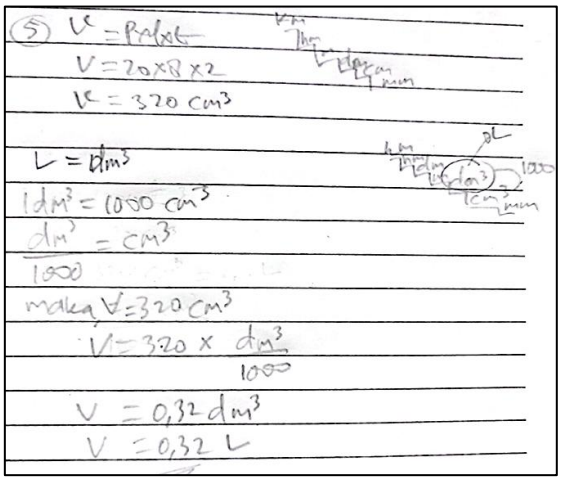

Figure 12. Student's Anwer.

Students are considered to understand a procedure if they are able to recognize and identify the sequence of steps in an activity, including the application of the appropriate algorithm or calculation method (Abdurrahman & Nofriyandi, 2022) (Munfarikhatin et al., 2022). Based on the answers provided, students were able to identify that the problem presented was related to calculating the volume of a rectangular prism. Students also demonstrated a good understanding of grouping the steps of the solution correctly, as well as converting units from m^3 to liters correctly.

B. Discussion

The development of E-LKPD based on CTL with the context of the Malay game engklek shows that students feel happy, interested, and enthusiastic about learning (Dewi & Wijiastuti, 2017). The application of CTL can significantly increase student engagement and learning outcomes (Yasin et al., 2023).

The procedure used in the development was Tessmer's (1993) flow, a product that produces valid, practical criteria and has potential effects through two stages, namely Preliminary and Prototyping, carried out with a formative evaluation flow. The preliminary stage is divided into two stages: preparation and design. In the preparation stage, the researchers analyzed the students, curriculum, and E-LKPD requirements. After that, in the design stage, the researchers designed an E-LKPD based on the CTL approach with a Malay context as the initial prototype. The formative evaluation stage consists of several stages, namely self-evaluation, expert review, one-to-one, small group, and field tests (Zulkardi, 2006). The E-LKPD product was designed with the help of Liveworksheets, Canva, and Microsoft Office Word applications. The results showed that the development

p-ISSN: 2086-4280
e-ISSN: 2527-8827

of Liveworksheets E-LKPD met the criteria of being valid, practical, and having a potential effect on students' mathematical concept comprehension skills.

The validity of E-LKPD using the CTL approach. The validity of E-LKPD is proven by the validator's evaluation at the expert review stage, which states that the developed product meets the criteria in terms of content, construct, and language, so that it can be used and proceed to the next stage. Improvements at this stage were made simultaneously with the expert review and one-to-one stages. The results of the expert review and one-to-one review concluded that the product was suitable for use in accordance with the comments and suggestions from the validators. The expert review and one-to-one review provided input for refinement and entered the small group stage or the stage to see the practicality of the research results (Zulkardi, 2013).

The practicality of E-LKPD based on the CTL approach with a Malay context was assessed through experiences in one-to-one, small group, and field test stages. The research was conducted offline. Students carried out the learning process using E-LKPD. Data collection was conducted through documentation and interviews. Tessmer (1993) emphasized aspects of practicality, such as clarity, interest, effectiveness, application, and acceptance by users and organizations. Students carried out the learning process and then provided comments and suggestions. Students provided various comments and suggestions on the E-LKPD, both during one-to-one and small group sessions. The E-LKPD was then refined, and prototype III was produced and tested in the field test stage with students. During the field test phase, in addition to students completing all activities in the E-LKPD and the final test, the researchers also interviewed several students representing their groups to obtain supporting data so that they could draw conclusions regarding the practicality of using the E-LKPD.

Based on the interview results, it was found that students were more interested in learning because it combined the use of liveworksheets (Zinchenko & Turka, 2022). Furthermore, students became more active in the learning process due to the interesting activities in the E-LKPD. They also said that the activities could be done with friends and discussed so that they were active in learning. Learning can make students more active during learning because it connects students' knowledge with real-life contexts to build meaningful knowledge (Putri & Zulkardi, 2019) (Hartono & Karnasih, 2017) (Dhani & Rahayu, 2023).

Potential Effects on Students' Mathematical Comprehension Skills At the field test stage of the evaluation, which utilized indicators of mathematical concept comprehension skills, the analysis results showed that students' mathematical comprehension skills reached 61.1% or 22 students in the excellent category, 19.4% or 7 students in the good category, 11.1% or 4 students in the adequate category, and 8.3% or 3 students in the poor category. Thus, the effectiveness of E-LKPD based on the CTL approach developed to improve students' mathematical

comprehension skills can be concluded to have a good potential effect on students' mathematical comprehension skills.

The research conducted left behind findings that could serve as a basis for further research, such as students' inability to convert cm3 to liters. This ability should be a basic mathematical skill that can be recalled in learning situations.

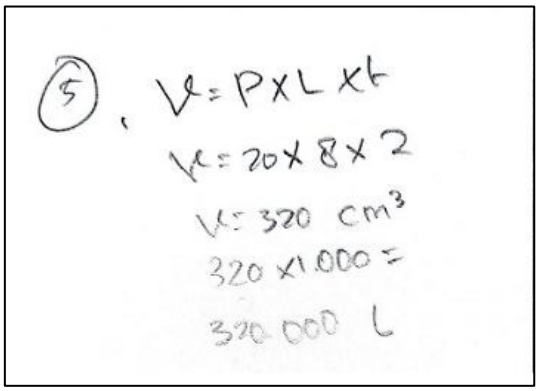

Figure 13. Students' Errors in Converting cm^3 Values to Liters

Students' inability to translate language into mathematical symbols is also a problem, leading to errors in solving mathematical problems. The final obstacle is the inability of students to utilize their mathematical reasoning skills, as demonstrated in situations where students do not fully understand the process of transforming a hopscotch game into a three-dimensional space, which provides a comprehensive understanding of the surface area and volume of cubes and blocks.

IV. Conclusion

The conclusions of this study are 1) the development of mathematics E-LKPD based on the CTL approach with the Engklek context. 2) The development of mathematics E-LKPD based on the CTL approach with the Engklek context has been validated in terms of content, construct, and language. It is also practical in the use of E-LKPD in research activities. 3) The development of mathematics E-LKPD based on a CTL approach with a Malay context has a potential effect on students' mathematical comprehension skills, reaching 61.1% or 22 students in the excellent category, 19.4% or 7 students in the good category, 11.1% or 4 students in the fair category, and 8.3% or 3 students in the poor category. The limitation of this study is that it is limited to cube and block material, which provides room for further researchers to expand the material to the surface area and volume of other spatial figures. Thus, further contributions can be broader in the content of geometry in general.

References

Abdurrahman, A., & Nofriyandi, N. (2022). Profile of Students' Difficulties to Learn Geometry of Mathematics Education Study Program. *EDUKATIF : Jurnal Ilmu Pendidikan*, *4*(1). https://doi.org/10.31004/edukatif.v4i1.2102

Afriansyah, E. A., & Turmudi, T. (2022). Prospective teachers' thinking through realistic mathematics education based emergent modeling in fractions. *Jurnal Elemen*, *8*(2), 605-618.

Afriansyah, E. A., Nuraeni, R., Puspitasari, N., Sundayana, R., Jejen, J., Sumia, S., ... & Lesmana, A. (2023). Training of Realistic Mathematics Education Learning Approach in Salawu Village. *Indonesian Journal of Community Empowerment (IJCE)*, *4*(01), 26-32.

p-ISSN: 2086-4280
e-ISSN: 2527-8827

Angio, S. T., Pitaloka, W. P., Sitopu, J. W., & Naibaho, Tutiarny, Rizqi, Vini, Saragi, D. P. (2025). Integrasi Keterampilan 4C (Critical Thinking, Creativity, Communication, Collaboration) dalam Kurikulum Berdampak untuk Pembeajaran Matematika. *Jurnal Edu Research Indonesian Institute For Corporate Learning And Studies*, *6*(2).

Apriyantini, N. P. D., & Sukendra, I. K. (2023). Penerapan Pembelajaran Berdiferensiasi Berbantuan E-LKPD untuk Meningkatkan Keaktifan Belajar Matematika Siswa. *Jurnal Pendidikan (Widyadari)*, *24*(1).

Arwadi, F., Haris, H., Fudhail, A., Afriansyah, E. A., & Zaki, A. (2024). Kemampuan TPACK Mahasiswa PPL Program Studi PPG Pendidikan Matematika Universitas Negeri Makassar. *Issues in Mathematics Education (IMED)*, *8*(2), 167-172.

Brijlall, D., & Ivasen, S. J. (2022). Exploring Possible Strategies in Improving Teacher and Learner Mathematics Performance. *Global Conference on Business and Social Sciences Proceeding*, *13*(1). https://doi.org/10.35609/gcbssproceeding.2022.1(17)

Costa, A. C. J. da, Oliveira, F. J. V. E. de, & Malcher, G. T. (2022). Ensino Híbrido E Tecnologias Digitais Como Suporte No Processo De Ensino E Aprendizagem. *Revista Electrónica de Enseñanza de Las Ciencias*, *21*(1).

Damanik, T. A. P., Julyanti, E., & Pasaribu, L. H. (2025). Analysis of the Mathematical Concept Understanding Ability of VII Grade Junior High School Students. *EduMatSains : Jurnal Pendidikan, Matematika Dan Sains*, *9*(2). https://doi.org/10.33541/edumatsains.v9i2.6397

Dewi, F. N., & Wijiastuti, A. (2017). Increasing Students' Capabilities in Writing Simple Present Tense through Engklek Modification with CTL Approach. *Jurnal Penelitian Dan Pengembangan*, *4*(2).

Dhani, M. I., & Rahayu, W. (2023). Literatur Review: Contextual Teaching and Learning (CTL) dalam Pembelajaran Matemati. *Jurnal Ilmiah IKIP Mataram*, *10*.

Efwan, N. S., Afriansyah, E. A., Luritawaty, I. P., Arwadi, F., & Yadav, D. K. (2024). The Level of students' mathematical creative thinking skills as measured by their self-confidence. *International Journal of Didactic Mathematics in Distance Education*, *1*(2), 125-136.

Fauzan, F., Ansori, R. A. M., Dannur, M., Pratama, A., & Hairit, A. (2023). The Implementation of the Merdeka Curriculum (Independent Curriculum) in Strengthening Students' Character in Indonesia. *Aqlamuna: Journal of Educational Studies*, *1*(1). https://doi.org/10.58223/aqlamuna.v1i1.237

Hartono, J. A., & Karnasih, I. (2017). Pentingnya Pemodelan Matematis dalam Pembelajaran Matematika. *Semnastika Unimed*.

Hia, L., Sihite, E. B., Sihombing, H., Tambunan, H., & Simanjuntak, R. M. (2024). Eksplorasi Ornamen Rumah Adat Melayu Terhadap Konsep

Geometri. *INNOVATIVE: Journal Of Social Science Research*, *4*(5).

Hidayat, W., & Aripin, U. (2023). How to Develop an E-Lkpd With a Scientific Approach to Achieving Students' Mathematical Communication Abilities? *Infinity Journal*, *12*(1). https://doi.org/10.22460/infinity.v12i1.p85-100

Kleemann, R., Machado, C. C., & Pereira, E. C. (2025). Tecnologias Digitais e Educação: Desafios No Processo De Ensino E Aprendizagem. *Educ. Form.*, *10*. https://doi.org/10.25053/redufor.v10.e14557

Kristanto, W., & Wibowo, H. (2023). Use of Engklek in Character Education: Early Childhood Education. *Journal of Clinical Imaging Science*, *30*(2). https://doi.org/10.18848/2327-7939/CGP/v30i02/53-72

Lestari, D., & Kusno. (2023). Studi Literatur: Keterampilan Komunikasi Matematis Siswa dalam Materi Bangun Ruang Sisi Datar. *Jurnal Ilmiah Matematika Realistik (JI-MR)*, *4*(2).

Liu, Q., Guan, W., Li, S., & Kawahara, D. (2019). Tree-Structured Decoding for Solving Math Word Problems. *EMNLP-IJCNLP 2019 - 2019 Conference on Empirical Methods in Natural Language Processing and 9th International Joint Conference on Natural Language Processing, Proceedings of the Conference*. https://doi.org/10.18653/v1/D19-1241

Munfarikhatin, A., Natsir, I., & Rahajaan, A. D. (2022). Proses Siswa Dalam Menyelesaikan Soal Literasi MatematikaSerupa PISA Pada Konten Quantity. *Proceedings Seminar Nasional Pendidikan Matematika, Sains, Geografi Dan Komputer*, *3*.

Nahdi, D. S. (2017). Self Regulated Learning sebagai Karakter dalam Pembelajaran Matematika. *The Original Research of Mathematics*, *2*(1).

Nurdin, I. T., Putra, H. D., & Hidayat, W. (2023). The Development of Problem Based Learning Google Sites-Assisted Digital Teaching Materials to Improve Students' Mathematical Critical Thinking Ability. *JIML: Journal Of Innovative Mathematics Learning*, *6*(4). https://doi.org/10.22460/jiml.v6i4.18520

Oktaviani, C., Herwin, H., Adiwardana, M. R., Fianto, Z. A., & Dahlan, S. C. (2024). Harmonizing Math and Culture: Exploring Ethnomathematics in Malay Culture through Children's Storybooks. *Journal of Innovation in Educational and Cultural Research*, *5*(2). https://doi.org/10.46843/jiecr.v5i2.1155

Pontes, E. A. S. (2019). Os Quatro Pilares Educacionais no Processo de Ensino e Aprendizagem de Matemática TT - The Four Educational Pillars in the Teaching and Learning Process of Mathematics. *Revista Iberoamericana de Tecnología En Educación y Educación En Tecnología*, *24*.

Putri, R. I. I., & Zulkardi, Z. (2019). Designing Jumping Task on Percent using PMRI and Collaborative Learning. *International Journal on Emerging Mathematics Education*,

3(1). https://doi.org/10.12928/ijeme.v3i1.12208

Rahmadiani, R., Alfisyahra, A., Lefrida, R., & Pathuddin, P. (2024). Concept Understanding Students on the Two-Variables Linear Equation System Material in Terms of Mathematics Ability. *Prisma Sains : Jurnal Pengkajian Ilmu Dan Pembelajaran Matematika Dan IPA IKIP Mataram*, *12*(1). https://doi.org/10.33394/j-ps.v12i1.10532

Sari, N. D. L., Munawaroh, S., & Sumartini, T. S. (2025). Efektivitas lkpd digital dan manual dalam pembelajaran persamaan linear satu variabel pada siswa smp. *Jurnal Inovasi Pembelajaran Matematika: PowerMathEdu*, *4*(1), 141–150. https://doi.org/10.31980/pme.v4i1.2406

Satriani, I., Emilia, E., & Gunawan, M. H. (2012). Contextual Teaching and Learning Approach to Teaching Writing. *Indonesian Journal of Applied Linguistics*, *2*(1). https://doi.org/10.17509/ijal.v2i1.70

Senjawijaya, M., Susilawati, W. O., & Saputra, R. (2021). Pengaruh Model Contextual Teaching and Learning (CTL) terhadap Kemampuan Pemecahan Masalah Matematika. *Journal of Vocational Education and Information Technology*, *2*(2).

Setiani, N., Roza, Y., & Maimumah. (2022). Analisis Kemampuan Siswa Dalam Pemahaman Konsep Matematis Materi Peluang Pada Siswa SMP. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, *06*(02).

Sukoyo, J., Kurniati, E., & Utami, E. S. (2021). Engklek Game and Its Benefits for Early Children's Development. *International Journal of Early Childhood Special Education*, *13*(1). https://doi.org/10.9756/INT-JECSE/V13I1.211003

Swanson, D. M. (2005). School Mathematics: Discourse and the Politics of Context. In *Challenging Perspectives on Mathematics Classroom Communication*.

Taek, V. (2024). Teachers' Perspectives on Differentiated Learning in the Independent Curriculum: Context Indonesia. *Panicgogy International Journal*, *2*(1). https://doi.org/10.59965/pij.v2i1.149

Tessmer, M. (1993). *Planning and Conducting Formative Evaluations: Improving the Quality of Education and Training*. In Planning and Conducting Formative Evaluations. Kogan Page.

Yasin, B., Yusuf, Y., Mustafa, F., Khairuddin, Safina, D., & Sarinauli, B. (2023). Introducing Contextual Teaching and Learning as a Transition from Textbook-Based Curriculum to the National Curriculum. *European Journal of Educational Research*, *12*(4). https://doi.org/10.12973/eu-jer.12.4.1767

Zinchenko, I. V., & Turka, T. V. (2022). Sing Liveworksheets Web Service for Creating and Checking Math Homework. *E-Learning TeXnology*, *6*. https://doi.org/10.31865/2709-840062022270271

Zulkardi. (2006). *Formative Evaluation: What, Why, When, And How*.

Zulkardi, Z. (2013). Designing Joyful and Meaningful New School Mathematics Using Indonesian Realistic Mathematics Education. *Southeast Asian Mathematics Education Journal*, *3*(1). https://doi.org/10.46517/seamej.v3i1.22

AUTHOR'S BIOGRAPHY

Syutaridho, M.Pd.

Born in Palembang, South Sumatra, on June 17, 1988. In 2009, he completed his bachelor's degree in mathematics education at Muhammadiyah University Metro. In 2021, he completed his master's degree in mathematics education at Sriwijaya University. In addition to being a mathematics education lecturer at Raden Fatah State Islamic University in Palembang, he has also served as a visiting lecturer.

Harisman Nizar, M.Pd.

Born in Palembang, South Sumatra, on September 22, 1994. In 2016, he completed his bachelor's degree in mathematics education at Sriwijaya University. In 2018, he completed his master's degree in mathematics education at Sriwijaya University. In addition to being a mathematics education lecturer at Raden Fatah State Islamic University in Palembang, he has also served as a visiting lecturer.

Dyah Rahmawati, M.Pd.

Born in Palembang, South Sumatra, on December 19, 1989. In 2013, she completed her bachelor's degree in mathematics education at the State Islamic Institute. In 2018, she completed her master's degree in mathematics education at Sriwijaya University. She has been a mathematics teacher for 9 years and currently works as a mathematics education lecturer at the State Islamic University Raden Fatah Palembang. She has also served as a visiting lecturer.

Muktir Rotul Rodoh, S.Pd.

Born in East OKU, South Sumatra on July 10, 2003. she attended Semendawai Suku III Public High School and graduated in 2021. She is currently completing her bachelor's degree in mathematics education at Raden Fatah State Islamic University in Palembang, which she will complete in 2025.

Risky Amelia, S.Pd.

Born in Pangkalan Balai, South Sumatra, on April 7, 2003. She attended Madrasah Aliyah Negeri (MAN) 1 Banyuasin and graduated in 2021. She is currently completing her bachelor's degree in mathematics education at Raden Fatah State Islamic University in Palembang, which she will complete in 2025.

Salsabilla Fitri, S.Pd.

Born in Lintau, West Sumatra, on September 12, 2003. She attended SMA Negeri 13 Palembang and graduated in 2021. She is currently completing her bachelor's degree in mathematics education at Raden Fatah State Islamic University in Palembang, which she will complete in 2025.

Salsa Nur Asma Nadila, S.Pd.

Born in Lintau, West Sumatra, on May 27, 2003. She attended SMA Negeri 1 Sungai Lilin and graduated in 2021. She is currently completing her bachelor's degree in mathematics education at Raden Fatah State Islamic University in Palembang, which she will complete in 2025.