Research Article

Received: 8 December 2022 / Accepted: 28 February 2023 / Published: 5 March 2023

Designing Worksheets to Improve Reflective Thinking for Elementary School Students on the Solid Figure Subject

Agustan Syamsuddin[1]*

Idawati[1]

Hasdah Haking[1]

Wilda Syam Tonra[2]

Andi Syukriani[3]

[1]Magister of Elementary Education,
Universitas Muhammadiyah Makassar,
Jl. Sultan Alauddin No.259, Gn. Sari, Kec. Rappocini,
Kota Makassar, Sulawesi Selatan 90221, Indonesia
[2]Mathematics Education, Universitas Khairun,
Jalan Bandara Babullah, Ternate, Indonesia
[3]Mathematics Education, Universitas Patompo,
Jl. Inspeksi Kanal No.10, Tombolo, Kec. Rappocini,
Kota Makassar, Sulawesi Selatan 90233, Indonesia

DOI: https://doi.org/10.36941/ajis-2023-0054

Abstract

The aim of this study was to determine the level of validity, practicality and effectiveness of student worksheets on reflective thinking for fifth-grade elementary school students on the Solid Figure subject. This research is development research by applying a 4-D development model with 4 stages, namely define, design, develop and dissemination. The design stage of this student worksheet consists of three parts, namely (1) the introduction consists of a list of competency objectives which contains core competencies, basic competencies, indicators and learning objectives, (2) the core part consists of a description of the material which contains introductory material for studying geometric concepts in each learning activity with a problem solving approach based on reflective thinking, (3) the closing section which contains a collection of practice questions that train students' reflective thinking skills. The instruments were used to collect data with validation sheets, questionnaires and tests of reflective thinking skills in solving mathematics problems involving 105 students of fifth grade, 3 teachers and 3 experts in learning mathematics for elementary students. The data were then analyzed using a quantitative descriptive approach. The results of expert validation of both material aspects, constructs and language aspects fulfill the valid aspects. While data related to responses from students and teachers describe student worksheets fulfilling practical aspects. The results of observations regarding the activities of students and teachers in the learning process using student worksheet of reflective thinking describe a very active learning process. The results of data analysis related to students' reflective thinking skills showed that there was an increase in students' reflective thinking skills with an n-gain index of 0.62 which was in the medium category. This indicates that the student worksheet on reflective thinking (SWRT) is effective in improving students' reflective thinking skills.

Keywords: *student worksheets, reflective thinking, solid figure*

1. Introduction

Thinking skills are one of the focuses of the objectives of teaching mathematics to students in elementary schools. Therefore, teacher skills are needed to create innovative learning strategies in order to develop the potential that students have. Involving students in the learning process can be done to train students' thinking skills through a process of dialogue, discussion and question and answer (Alexander, 2020; Chin, 2006; Chin & Osborne, 2008). In the context of learning mathematics, the thinking skills that are in the spotlight are reflective thinking skills because these skills are central to the development of thinking skills in mathematics education (Demirel, Derman, & Karagedik, 2015). Thus, these reflective thinking skills are expected to serve as a forum for personal development and strategies to encourage skills in solving mathematical problems which have an impact on improving student mathematics learning outcomes. (NCTM, 2000; Tuncer & Ozeren, 2012; Funny, Ghofur, Oktiningrum, & Nuraini, 2019; Durak, 2020).

Reflective thinking skills are needed by students to face the life that is so complex in the 21st century. This is because reflective thinking is a problem-solving process that involves self-awareness in analyzing and explaining problems before making decisions (Schon, 2010, Syamsuddin, Juniati & Siswono, 2020, Rodgers, 2012). This reflective thinking skill needs to be developed because it can encourage students to seek the truth, be open-minded and tolerant of new ideas, be able to analyze a problem well, think systematically, be curious, mature in thinking and be independent (Ghanizadeh, 2017, Gurol, 2011). One of the strategies used to develop students' reflective thinking skills is to use mathematical problem solving strategies (Agustan, Juniati & Siswono, 2017a; Syamsuddin, Juniati & Siswono, 2017b). Problem solving strategies involving reflective thinking skills can be poured by the teacher through teaching materials used in the learning process in the classroom. For example, teachers can design problem-solving-based student worksheets that can practice students' reflective thinking skills in learning mathematics.

This study comes from the fact that the lack of teaching materials such as student worksheets that are oriented towards improving students' reflective thinking skills (Muhali, Yuanita, & Ibrahim, 2019; de Jager, 2019; Hendriana, Putra & Hidayat, 2019, Haking, Syamsuddin & Idawati 2020). The student worksheets used by teachers in schools tend to be simple, consisting of a summary of the material accompanied by practice questions without paying attention to the aspects of higher-order thinking skills that students in the 21st century need to possess, such as reflective thinking skills. In addition, the existing worksheets are only in the form of materials and questions without any activities that must be carried out by students to understand the concepts to be discussed. Therefore, we need a student worksheet that can guide students to be able to think reflectively in learning mathematics, especially at the elementary school level which needs special attention as a starting point for student's cognitive development (Yao, Liu, & Zhou, 2019; Baas et.al, 2015; Schonert-Reichl, et.al, 2015; Batista, 2004).

This student worksheet is used as a strategy to make it easier for students to understand a teaching material presented to students (Yasin, et.al., 2019; Siagan, Saragih, & Sinaga, 2019). Teaching material that is quite complex for students to understand is geometry material, especially geometric material (Hasmawati, Syamsuddin & Akib, 2020, Skemp, 2012). Even though this material has a lot to do with students' daily lives so this material is very important for students to understand both conceptually and in the form of its application in everyday life. Thus, a student worksheet is needed on the topic of geometry guides students to understand the concept by using aspects of mathematical problem solving that can train reflective thinking skills.

To construct student worksheets that are oriented on developing reflective thinking skills, this worksheet is based on the stages of reflective thinking developed by Agustan, Juniati and Siswono (2017). The 4 (four) stages used are (1) formulation and synthesis of the experience, namely the stage where a student formulates a problem by using the experiences he has and linking information explicitly stated in the problem; (2) orderliness of experience, namely students summarize ideas based on experience to construct problem-solving strategies; (3) evaluation of experience, namely

evaluating by considering the relevance of experience with information related to solving or solving problems that are carried out; and (4) testing the selected solution based on the experience, namely the process of testing the solutions or conclusions that have been made in the previous stage to reach a more reliable conclusion.

Referring to the aspects of reflective thinking above, it can be argued that reflective thinking is largely determined by students' learning experiences. Therefore, it is appropriate to use student worksheets that are oriented toward developing reflective thinking skills on the topic of geometry considering that this material is very closely related to students' daily lives (Gracin, 2018). This material is taught to fifth-grade students and aims to equip students in the context of developing initiative, creativity and independence in accordance with the talents, interests and physical and psychological development of students (BSNP, 2016). Thus, this student worksheet is expected to assist teachers in managing the learning process in class as an effort to make it easier to understand the material independently. Through teacher assistance, students are motivated to be active in exploring the learning material presented (Yang & Wu, 2012).

To practice the reflective thinking skills stated earlier, the LKS material developed requires mathematical problems that can explore problem-solving abilities by using or empowering students' experiences. This allows students to think so that students try to connect the knowledge they have acquired to solve new problems related to their previous knowledge (Tchoshanov, 2011). By empowering experience in the process of solving mathematical problems, it is possible to provide opportunities for students to use their reflective thinking skills in problem solving. Thus, if a worksheet is presented that contains material, activities and problem solving questions related to students' experiences and daily life, then there is a possibility that students' reflective thinking skills can also increase.

2. Methodology

The design used in this research was development research by applying a 4-D development model with 4 stages, namely define, design, develop and dissemination (Thiagarajan, 1974). The teaching materials developed in this study were student worksheets consisting of teaching materials, learning activities and assessments. Teaching materials were developed using a problem-solving approach guided by reflective thinking skills. The teaching materials were validated by three experts, namely in the fields of basic education, mathematics education and elementary school teachers who are experienced in mathematics. Data was collected using a validation sheet consisting of validation sheets for content, designed and used of language in the material being developed.

Meanwhile, to measure the practicality of student worksheets, teacher and student response questionnaires were used where this practicality provided value and convenience for students and teachers as users of the product. In addition, the effectiveness of student worksheets was measured using observation sheets of teacher and student activities, teacher and student response questionnaires and tests of students' reflective thinking skills. In addition to being validated, the test instrument for reflective thinking skills was also tested for reliability using instrument reliability calculations obtained from three validators using the Percentage of Agreement (R) formula which is described as follows.

Percentage of Agreement (R) : $\left[1 - \frac{\mathrm{A-B}}{\mathrm{A+B}}\right] \times 100\%$

Description:

R: instrument reliability tests reflective thinking skills

A: higher score than the rater

B: lower score than rater

The instrument is said to be reliable if the reliability index obtained is greater than 75% (Borich, 1994; Wragg, 2011).

The data obtained were then analyzed using a quantitative approach with quantitative and

qualitative descriptive analysis. The results of the analysis from the validation process carried out regarding the student worksheets which were developed were subsequently revised based on input from the validator to obtain valid teaching materials, activities and sources of assessment. Furthermore, teaching materials, activities and assessments contained in student worksheets were tested. As for the trial design in this study, a limited trial was conducted with 5 students in fifth grade SD Negeri 12 Biraeng to find out the practicality of problem solving-based student worksheets to improve students' reflective thinking skills.

The results of this limited trial will be revised again regarding the deficiencies obtained from the results of using the student worksheet from students regarding material in terms of language, content and instructions contained in the student worksheet. After revising the things that have been explained previously, the next step is to try out the product on fifth grade students as many as 105 students as a broad trial in 3 schools that have implemented the 2013 curriculum in learning mathematics. This extensive trial was conducted to determine the level of validity, practicality, and effectiveness of student worksheets with a problem solving approach to improve students' reflective thinking skills.

To determine the level of validity of the student worksheets that have been developed, the scoring guidelines for each validated component are used which are described as follows (Laurens & Ratumanan, 2011).

Table 1. Student worksheet validation scoring criteria

Category	Description	Score
G	Good	4
F	Fair	3
P	Poor	2
B	Bad	1

The assessment of the results of the validation is then converted on a scale of achievement levels and adjusted to the predetermined qualification level categories (Laurens & Ratumanan, 2011). The following is a table of assessment qualifications.

Table 2. Qualification level of eligibility

Achievement level	Qualification
3,6 – 4	Very Valid
3 – 3,5	Valid
2,1 – 2,9	Less Valid
1 – 2	Invalid

Based on Table 2, an assessment is said to be valid if it meets the achievement requirements starting from a score of 3 - 4 from all the elements contained in the assessment questionnaire, both assessments related to material or content, design/presentation and the use of language from the validator. Assessment must meet valid criteria. If the criteria are not valid, revisions are made, until they reach valid criteria. Meanwhile, to identify the level of practicality of the developed student worksheets, student and teacher response questionnaire sheets were used. Furthermore, the responses from students and teachers were categorized based on the scoring guidelines of each component which was measured by adapting the scoring guidelines from Lauran and Ratumanan (2011) which are described as follows.

Table 3. Criteria for scoring student worksheet practicality

Category	Description	Statement Score	
		Positive	Negative
SD	Strongly disagree	4	1
D	Disagree	3	2
A	Agree	2	3
SA	Strongly agree	1	4

The results of assessments or responses from students and teachers are then converted on a scale of achievement levels and adjusted to predetermined qualification level categories (Laurens & Ratumanan, 2011). The following is a table of assessment qualifications.

Table 4. Qualification level of eligibility based on the percentage

Achievement level	Qualification
3,6 – 4	Very practical
3 – 3,5	Practical
2,1 – 2,9	Less practical
1 – 2	Impractical

To measure the level of effectiveness of the developed student worksheets, the aspects that are measured are the activities of students and teachers during the learning process. This activity is measured using an observation sheet that has been previously validated by the validator. The learning activities of students and teachers are categorized based on the scoring guidelines of each component which is measured by adapting the scoring guidelines from Lauran and Ratumanan (2011) which are described as follows.

Table 5. Criteria for scoring student activities

Category	Description	Score
G	Good	4
F	Fair	3
P	Poor	2
B	Bad	1

The results of observing the activities of students and teachers are then converted on a scale of achievement levels and adjusted to predetermined qualification level categories (Laurens & Ratumanan, 2011). The following is a table of assessment qualifications.

Table 6. Qualification level of learning activity

Achievement level	Qualification
3,6 – 4	Very active
3 – 3,5	Active
2,1 – 2,9	Less active
1 – 2	Not active

In addition to the activities of the teacher and student students, another aspect that is of concern is the response of students and teachers and the scores on the reflective thinking skills test at the end of learning after using student worksheets. These three aspects determine the level of effectiveness of the use of the developed student worksheets. To measure the level of effectiveness, a formula adopted

from Maizora (2011) is used which is described as follows.

$$\bar{E} = \frac{(\bar{A}\times 30\%)+(\bar{R}\times 30\%)+(\bar{H}\times 40\%)}{100\ \%}$$

Description:

$\bar{E}$ = Effectiveness score

$\bar{A}$ = Average activity score

$\bar{R}$ = Average response score

$\bar{H}$ = Score of students' reflective thinking skills

The formula used to measure the activity of students and teachers is

$$\bar{A} = \frac{\sum_{I=1}^{n} Ai}{n}$$

Description:

$\bar{A}$ = Average score of teacher or student activity

Ai = Score of activity aspect to-i

n = the number of aspects observed

Next, the average activity value is determined using the formula:

$$\bar{A} = \frac{\bar{A}student+\bar{A}teacher}{2}$$

Description:

$\bar{A}$ = Average activity score

$\bar{A}student$ = Average score of student activity

$\bar{A}teacher$ = average teacher activity score

Meanwhile, to measure student and teacher responses, the following formula is used.

$$\bar{R} = \frac{\sum_{I=1}^{n} Ri}{n}$$

Description:

$\bar{R}$ = Average score of student responses

Ri= Student response score to-i

n = many students

Furthermore, the average response value of students and teachers is determined using the following formula.

$$\bar{R} = \frac{\bar{R}students+\bar{R}teachers}{2}$$

Description:

$\bar{R}$ =Average score of student and teacher responses

$\bar{R}students$ = Average score of student activity

$\bar{R}teachers$ = Average teacher activity score

Giving the average value of students' reflective thinking skills used a formula.

$$\overline{H} = \frac{\sum_{I=1}^{n} Hi}{n}$$

Description:

$\overline{H}$ = The average value of students' reflective thinking skills

Hi = The value of the student's reflective thinking skills i

n = many students

Determining the criteria for the level of effectiveness of using student worksheets is based on the categorization guidelines in the following table.

Table 7. Criteria for Categorizing the Effectiveness of Worksheet

Score intervals	Category
$3{,}6 \leq \bar{E} \leq 4$	Very Effective
$3 \leq \bar{E} \leq 3{,}5$	Effective
$2{,}1 \leq \bar{E} \leq 2{,}9$	Less effective
$1 \leq \bar{E} \leq 2$	Not effective

Furthermore, to identify improvements in students' reflective thinking skills obtained from the pretest and posttest of learning activities, student worksheets are used guided by students' reflective thinking skills. Assessment is carried out based on a predetermined assessment rubric. The results of the assessment are analyzed using the standard gain formula (g) which is presented as follows.

$$\text{Gain } (g) = \frac{\bar{x}postest - \bar{x}pretest}{Highest\ Score - \bar{x}\ pretest}$$

Description:

$\bar{x}postest$ = average value of posttest

$\dot{x}pretest$ = average pretest value

The standard gain (g) value obtained is then categorized based on the criteria presented in the following table (Hake, 1999).

Table 8. Standard gain interpretation

Value <g>	Criteria
$g \geq 0{,}7$	High
$0{,}7 > g \geq 0{,}3$	Moderate
$g < 0{,}3$	Low

3. Results and Discussion

The process of developing student worksheets is guided by reflective thinking skills developed using a 4-D model which consists of 4 stages, namely the defining, designing, developing and disseminating stages. The development of student worksheets is based on the characteristics of learning mathematics by using a guided problem-solving approach to practice reflective thinking skills. The teaching material developed on this student worksheet is geometry material on the subject of solid figure. The presentation of the material is based on a problem-solving approach combined with reflective thinking skills as a stage in solving mathematical problems. Various activities describe the process of reflective thinking in understanding the material, and selecting approaches or problem-solving strategies presented in the worksheets. Each learning activity presents tasks that guide students in solving problems with the stages of reflective thinking, namely (1) formulation and synthesis of the experience; (2) orderliness of experience; (3) evaluation of experience; and (4) testing the selected solution based on the experience (Agustan, Juniati & Siswono, 2017). The following presents the process of developing student worksheets using the 4-D model.

3.1 Define Stage

a) Curriculum Analysis

At this stage, an analysis of the curriculum related to the K-13 curriculum was carried out in the school that was the research location. The aspect that is of concern is the learning device used by the teacher in the learning process. By paying attention to these aspects, student worksheets based on problem solving are developed to foster students' reflective thinking skills. With the hope of being able to overcome various problems faced by students in understanding the material presented,

namely the volume of solid figure.

b) Compile Student Worksheet Needs Map

In this activity, the number of worksheets or student activities needed is determined by adjusting the basic competencies and indicators that must be achieved by students in geometric material. From the results of the needs map analysis carried out, it was obtained 4 (four) parts of the student worksheet which are described as follows.

Table 9. Map of student worksheet needs based on reflective thinking

Basic competence	Indicators of achievement of competence	Sequence
Explain and define the parts of a solid figure	Define and show the parts of a cube	SWRT1
	Define and show the parts of a cuboids	SWRT2
Solve problems related to the volume of solid figure using volume units (such as unit cubes) involving cubes and cube roots	Analyzing problems related to the volume of a cube and solving problems related to the volume of a cube	SWRT3
	Analyze problems related to the volume of blocks and solve problems related to the volume of blocks	SWRT4

From the table above, four student worksheets were developed where each student worksheet was based on indicators of competency achievement expected from each learning process carried out in class.

c) Preparing Teaching Materials

The preparation of teaching materials is carried out by referring to the building materials (cubes and cuboids). In the student worksheets, the material is presented as a complement to the various sources of teaching materials used in the classroom because during the learning process other learning resources such as textbooks are also used. This student worksheet is prepared by taking into account several components, namely titles, core competencies, basic competencies, indicators, learning objectives, material descriptions, and final assignments.

3.2 Design Stage

At this stage, the researcher makes a product design (prototype). The design was carried out to make student worksheets according to a conceptual model based on reflective thinking using a problem solving approach. The learning activities are also designed by simulating the use of reflective thinking stages guided by a small-scale problem-solving approach. The structure of the student worksheets developed in this study consisted of the introduction, core and closing sections which are described as follows.

a) The introduction section consists of the title of the student worksheet; a list of competency objectives containing core competencies, basic competencies, indicators and learning objectives. The presentation of student worksheets in this introductory section is presented in Figure 1 below.

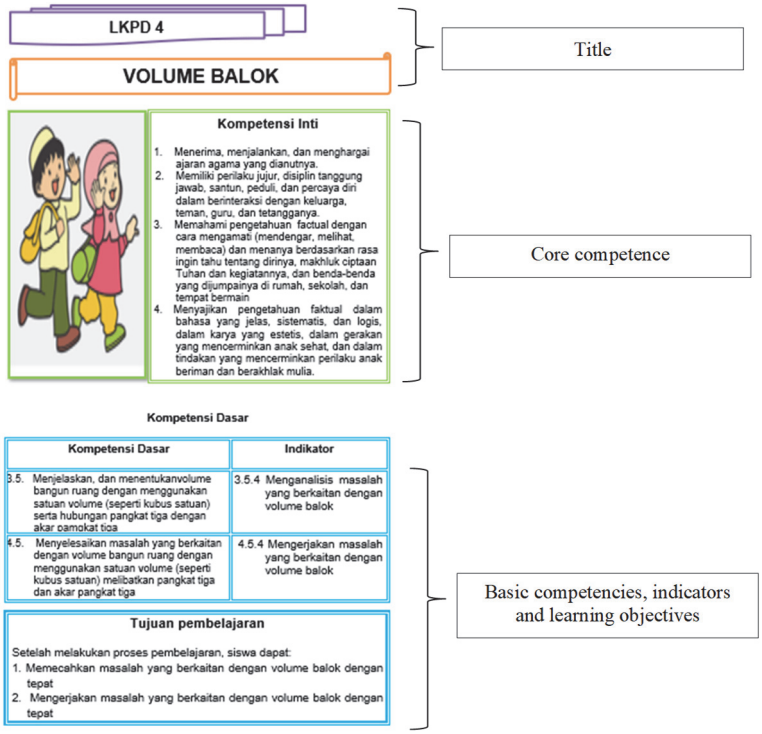

Figure 1. Introductory section

b) The core part consists of a description of the material which contains introductory material for studying each learning activity. After the description of the material is presented, the learning steps are presented with a problem solving approach based on reflective thinking which begins by giving a problem where the problem presented is geometric. In this section, mathematics learning activities to train students' reflective thinking skills are presented in the following table.

Table 10. Learning activities based on reflective thinking with a problem solving approach

Learning activities	Description of activities to train students' reflective thinking skills
Understanding problem	Students formulate problems and link information explicitly stated in the problem. For example, students can determine what information is known and what is asked in the problem to solve the mathematical problems presented
Developing problem-solving strategies	Students construct problem-solving strategies based on their learning experiences. For example, students apply various strategies or methods in the context of problem solving
Applying the right strategy	Students evaluate by considering the relevance of experience with information related to solving or solving problems that are carried out. For example, students need to check the steps of the problem-solving process, whether each step is correct and try to find deficiencies that have been made
Re-checking students' answers	Students test the solutions that have been carried out in the previous stage so that the answers obtained are more believed to be true. For example, after getting an answer to a problem, students need to check or review the answers obtained so that students can make conclusions and believe in the answers.

The presentation of student worksheets in the core section is presented in the following figure 2.

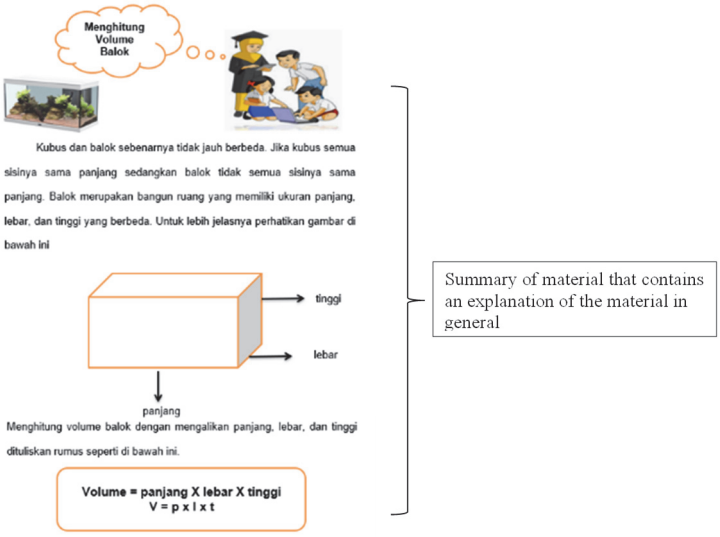

Figure 2. Core section

Next, learning activities are presented with a problem solving approach based on reflective thinking in Figure 3 below.

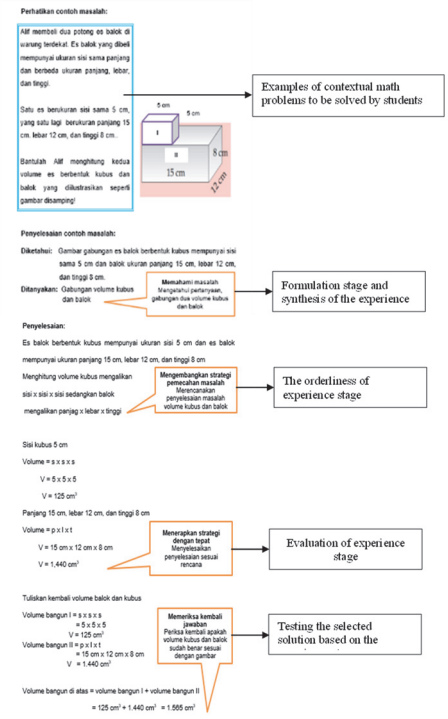

Figure 3. Activities of problem solving approach based on reflective thinking process

The closing part of this student worksheet is the final test. The final test is a test to determine the level of mastery or understanding of students related to the material that has been presented. This test is in the form of questions that cover all indicators and learning objectives of the basic competencies that have been developed previously. The presentation of student worksheets at the end is presented in Figure 4 below.

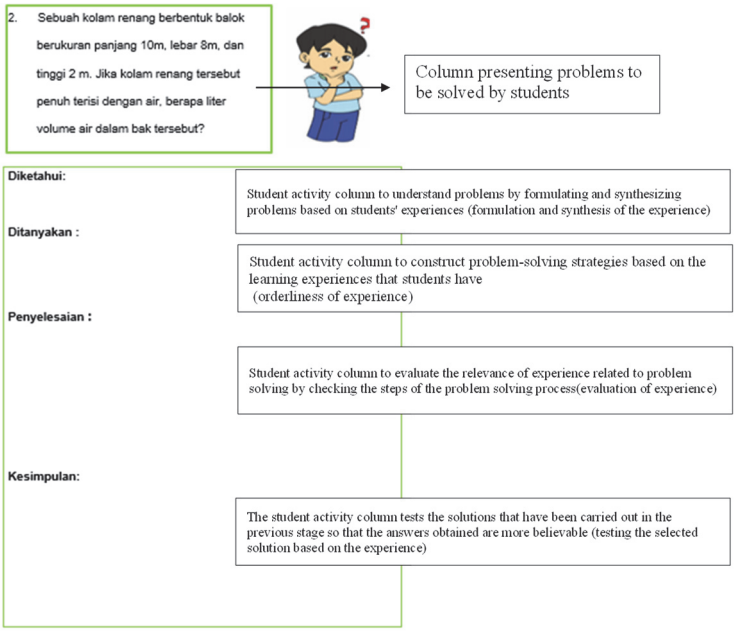

Figure 4. The test in determining the level of mastery or students' understanding

3.3 *Development Stage*

The development stage is carried out to produce student worksheets that are suitable for use. Therefore, a validation process was carried out from the student worksheets developed by testing the feasibility of the content of the material, the feasibility of presentation/display and the feasibility of language. This validation process is carried out by the expert test team and the practitioner test team (expert judgment) using a questionnaire developed by the author.

This questionnaire is equipped with a checklist and column of suggestions adapted to the guidelines for evaluating teaching materials for students issued by the Ministry of Education and Culture (Kemendikbud, 2016). The results of the assessment from experts are described as follows.

Table 11. Results of the material feasibility assessment

Eligibility content	Item	Expert 1	Expert 2	Expert 3
Scope of material	Depth of material	3	4	4
	Breadth of material	3	4	4
Material accuracy	Concept accuracy	4	3	4
	Linkage of concepts with material presentation	3	3	3
	Material presented contextually	3	3	3

Compatibility of basic competencies	The material is presented according to the learning objectives	4	3	3
	The sequence of material is systematic and adapted to basic competencies	3	3	4
	Materials are presented in accordance with basic competencies	3	3	3
References	References used are relevant and updated	3	3	3
Challenges for students	Interesting material and challenges students to be curious	3	3	3
Average		3.2	3.2	3.4
		3.27		

Table 12. The results of the feasibility assessment of the display of student worksheets

Feasibility of worksheet display	Items	Expert 1	Expert 2	Expert 3
Worksheet Display	Title	3	4	3
	Clue	3	3	4
	learning competencies	2	4	4
	Timing	3	4	4
	Availability of sufficient space for writing and drawing	3	3	4
	Combination of font size and type, image and color	3	4	4
	problem solving	3	3	4
	the stages of reflective thinking skills	3	4	4
	Directed learning flow	3	4	4
	Student-centred based	3	4	4
	According to the characteristics of students	3	3	3
Completeness of the presentation	Introduction	2	3	4
	Student activity	3	4	4
	Bibliography	3	3	4
Average		2.86	3.57	3.86
		3.43		

Table 13. The results of the language feasibility assessment

Language eligibility	Item	Expert 1	Expert 2	Expert 3
Use of terms	Familiar to students	3	3	4
	According to the cognitive level of students	3	4	4
	Conformity with symbols	3	3	3
	Consistency	3	4	4
	Compatibility with the concept	3	3	3
	Absorption of foreign terms	3	3	3
Sentence order	Structural precision	3	3	4
	Spelling accuracy	3	3	4
	Communicative	3	3	3
	Interactive	3	3	3
	No double meaning	3	3	3
	Simple and easy to understand	4	4	4
	Accuracy of sentences with illustrations	4	4	4
Use of rules	Writing accuracy	3	3	4
	Use and accuracy of letters	3	3	4
	Standard	3	3	3
Average		3.12	3.25	3.56
		3.31		

Based on Table 11, Table 12 and Table 13 above it can be explained that the feasibility of the developed student worksheets meets valid criteria based on the categorization of validity levels in Table 2.

Thus the student worksheet is suitable for use in terms of the feasibility of the material, appearance and feasibility of the language used in the student worksheet. In general, the three expert validators stated that this student worksheet can be used to train and improve students' reflective thinking skills in solving mathematical problems because of the problem-solving approach used in solving contextual mathematical problems.

Next, a practicality test was carried out from the student worksheet which was developed by analyzing the results of filling in the student response questionnaire. The following presents the results of student and teacher responses regarding the student worksheets developed in the following table.

Table 14. Student and teacher responses to student worksheets

No.	Observed aspects	Score average	
		Student	Teacher
1.	SWRT uses language that is easy to understand	3.30	4.00
2.	SWRT uses sentences that do not lead to multiple interpretations	3.63	3.75
3	The instructions for using and WSRT activities are clear so that it makes it easier to carry out all the activities in it	3.53	3.75
4.	The choice of font type and size makes it easier to read the contents of the SWRT	3.40	3.75
5.	At the beginning of learning, presented interesting things	3.87	3.5
6.	Easy to understand learning material by using SWRT	3.67	3.75
7.	Presentation of material is equipped with motivating images to study learning material using SWRT	3.57	3.50
8.	Facilitate in concluding the material	3.80	3.50
9.	Facilitate problem solving because it is equipped with a problem solving guide based on reflective thinking	3.73	3.50
10.	Interesting color combinations for learning the content of teaching materials on SWRT	3.63	4.00
Average		3.61	3.70

From Table 14 above it can be stated that the developed student worksheets fulfill practical aspects where the average scores of student and teacher responses respectively are 3.61 and 3.70. Based on the qualifications described in Table 4, it can be concluded that the practicality level of the student worksheets developed is in the very practical category. Furthermore, it is described regarding student activities using the student worksheet of reflective thinking (SWRT) in learning mathematics which is described as follows.

Table 15. Observation results of student activities using student worksheets

No	Rated aspects	Meetings				Average
		1	2	3	4	
1	Students respond to questions posed by the teacher	4	4	4	4	4
2	Students are interested in the topic of the material being studied	4	4	4	4	4
3	Students ask questions when experiencing difficulties	4	4	4	4	4
4	Students formulate hypotheses in solving problems according to their knowledge	3	4	3	4	3.5
5	Students search for information needed for problem solving	3	4	4	4	3,75
6	Students carry out learning activities according to the steps in the student worksheet	4	3	4	3	3,5
7	Students draw according to the activity steps in the student worksheet	3	4	3	4	3,5
8	Students conclude learning material based on activity steps	4	4	4	4	4

No	Rated aspects	Meetings				Average
		1	2	3	4	
9	Students ask questions when they have difficulty understanding the teacher's explanation	4	3	3	4	3,5
10	Students answer questions on the worksheet using material concepts that I understand	3	4	4	4	3,75
Total		36	38	37	39	37,50
Average		3,6	3,8	3,7	3,9	3,75

Table 16. Results of observations of teacher activities using student worksheets

No	Rated aspects	Meetings				Average
		1	2	3	4	
1	Open the lesson by doing apperception and motivation	3	4	4	4	3.75
2	Ask questions to increase student interest and curiosity	4	3	4	3	3.5
3	Receive students' responses openly to the questions asked	4	4	4	4	4
4	Delivering learning objectives at the meeting	4	4	4	4	4
5	Form groups of students for activities to find problems, discuss problems, and solve problems	4	4	4	4	4
6	Distribute worksheets to students	4	4	4	4	4
7	Guiding students who have difficulty working in groups to solve problems	4	4	4	4	4
8	Guide the course of class discussion to conclude the problem	3	4	3	4	3.5
9	Facilitating students to assess their own abilities by providing practice questions	3	3	4	3	3,25
10	Assess student activities	4	3	4	4	3,75
11	Guiding students to conclude problems on a class scale at the end of learning	4	3	4	4	3.75
Total		41	40	43	42	41.50
Average		3,72	3,63	3,90	3,81	3,77

From Table 15 and Table 16 above it can be explained that the average scores of student and teacher activities respectively are 3.75 and 3.77. Referring to the categorization of student and teacher activity in Table 6, the activity of students and teachers during the learning process using SWRTstudent worksheets is in the very active category.

Furthermore, it is described the results of students' reflective thinking skills tests which are one of the indicators of effectiveness related to the developed student worksheet of reflective thinking. The description regarding students' reflective thinking skills with the use of SWRTis described as follows.

Table 17. Description of students' reflective thinking skills test results

Description	Test	
	Pretest	Postest
Number of samples	30	30
Highest score	83.35	88.6
Lowest score	29.41	65,4
Average	46.50	79.43
complete	2	25
Not finished	28	5
Completeness	6.67%	83,33%
Not finished	93.33%	16.67%
Score	1.33	3.33

From the descriptions related to student and teacher responses, student and teacher activities and

the results of students' reflective thinking skills tests, data were obtained to get an overview of the effectiveness of using the student of reflective thinking (WSRT) worksheet in learning mathematics which is presented in the following table.

Table 18. Description of the effectiveness of the student worksheet of reflective thinking

Results	Aspect			
	Response	Activity	Reflective Thinking	n-gain index
Average score	3,65	3,75	2,49	0,62

From the table above, it can be described the level of effectiveness of the use of student worksheets to improve students' reflective thinking skills in learning mathematics by using the following formula.

$$\bar{E} = \frac{(\bar{A}\times 30\%)+(\bar{R}\times 30\%)+(\bar{H}\times 40\%)}{100\ \%}$$

$$\bar{E} = \frac{(3{,}75\times 30\%)+(3{,}65\times 30\%)+(2{,}49\times 40\%)}{100\ \%}$$

$$\bar{E} = 3{,}219$$

From the $\bar{E}$ score above, it is found that the use of student worksheets of reflective thinking (SWRT) in learning mathematics is effective in improving students' reflective thinking skills. This can be seen at the level of effectiveness categorization which is at an effective level so that the worksheet is feasible to be used to improve students' reflective thinking skills. In addition, other supporting data is the gain index score on the use of student reflective thinking (SWRT) worksheets of 0.62 which is in the medium category. Thus, the use of student reflective thinking (SWRT) worksheets can improve students' reflective thinking skills in learning mathematics on the topic of solid figure.

3.4 Disseminate Stage

After obtaining a student worksheet of reflective thinking (SWRT) which can train students' reflective thinking skills, the next stage is the deployment stage. Where this activity aims to disseminate student worksheets of reflective thinking (SWRT) that have been developed to colleagues at other schools. The student worksheet of reflective thinking (SWRT) was handed over to the class teacher to be used also in the mathematics learning process, especially in geometric geometry material. In addition, workshops were also held as a form of community service by providing training to teachers regarding student reflective thinking (SWRT) worksheets so that teachers would get information on how to use student reflective thinking (SWRT) worksheets and the strategies used as effort to train students' reflective thinking skills.

4. Conclusion

Student worksheet teaching materials of reflective thinking (SWRT) were developed to train students' reflective thinking skills in elementary schools. Reflective thinking skills can be trained by paying attention to the components of reflective thinking, namely (1) formulation and synthesis of the experience; (2) orderliness of experience; (3) evaluation of experience; and (4) testing the selected solution based on the experience. Where each of these components is presented in the problem solving process presented in the student worksheet of reflective thinking (SWRT). In its development, the student worksheet of reflective thinking (SWRT) fulfills valid aspects both in terms of material, construct and language in which material and contextual problems are also presented in accordance with students' experiences in everyday life. The design of the student worksheet consists of three parts, namely (1) an introduction consisting of the title of the student worksheet; a list of competency objectives that contains core competencies, basic competencies, indicators and learning objectives, (2) the core section consists of a description of the material which contains introductory material for studying each learning activity. The material is presented with learning steps based on

reflective thinking which begins by providing a problem where the problem presented is spatial then directed to be solved with a problem solving approach based on reflective thinking, (3) the closing part of this student worksheet is a thinking skill test reflective. This test is a test to determine the level of mastery or understanding of students regarding the geometric material that has been presented where students solve problems using the stages of the problem-solving process guided by reflective thinking skills. The use of student worksheets of reflective thinking (SWRT) is effective to improve students' reflective thinking skills where students can solve geometrical problems, especially building cubes and blocks. In the process of solving mathematical problems presented students can understand the concept of the problem, and plan the process of solving and solving problems presented based on the student experience. In addition, the completion that has been carried out by students is checked again to ensure that the completion is correct by linking the completion concept and students' previous learning experiences. Thus, students are always trained to solve mathematical problems using reflective thinking skills.

5. Acknowledgments

We would like to express our deepest appreciation to all those who provided us the possibility to complete this report. A special gratitude we give to Kemenristek dan Teknologi/Badan Riset dan Inovasi Nasional and LLDIKTI Wilayah IX who had funded this research in the scheme “Penelitian Tesis Magister” based on decree number 8/E1/KPT/2020 January 24, 2020 and B/87/E3/RA.00/2020 January 28, 2020

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