DEVELOPMENT OF STUDENT WORKSHEETS BASED ON REACT ON QUADRILATERAL MATERIAL

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Abstrak

Beberapa hasil penelitian menunjukkan bahwa masih banyak siswa mengalami kesulitan menyelesaikan masalah terkait bangun segiempat terutama layang-layang dan belahketupat. Salah satu strategi pembelajaran untuk mengatasi permasalahan tersebut ialah strategi *REACT* yang berfokus pada pengajaran dan belajar dalam prinsip konstruktivis. Penelitian ini bertujuan untuk mendeskripsikan proses dan hasil pengembangan lembar kerja siswa berbasis *REACT* pada materi segiempat yang valid, praktis dan efektif. Penelitian ini menggunakan model pengembangan 4D (*Define, Design, Develop and Disseminate*) dengan desain *One Shot Case Study*. Subjek penelitian ialah 32 siswa kelas VII SMPN 1 Mojosari semester genap tahun ajaran 2019/2020. Data penelitian dikumpulkan dengan menggunakan tes, angket, dan wawancara. Hasil penelitian menunjukkan bahwa LKS memenuhi kriteria valid dengan rata-rata total kriteria kevalidan LKS untuk menemukan sifat-sifat, rumus keliling serta rumus luas belahketupat dan layang-layang berturut-turut yaitu 3,25; 3,71 dan 3,57. LKS juga sudah memenuhi kriteria praktis dan dapat digunakan dengan sedikit revisi serta rata-rata hasil analisis terhadap observasi keterlaksanaan pembelajaran yaitu 3,13. Lebih lanjut, LKS juga memenuhi kriteria efektif dengan hasil angket respon siswa tergolong kategori positif dengan persentase rata-rata sebesar 89,4 % dan persentase ketuntasan belajar klasikal atau hasil tes belajar siswa sebesar 78%. Sehingga LKS ini bisa digunakan sebagai salah satu sumber dan media pembelajaran oleh guru matematika SMP pada pembelajaran materi segiempat khususnya belahketupat dan layang-layang.
Kata Kunci: Lembar kerja siswa, segiempat, *REACT*

Abstract

Some studies have showed that students still struggle to solve problems involving quadrilaterals, particularly kites and rhombuses. One of learning strategy that can be used is REACT strategy, which emphasizes teaching and learning of constructivist principles, performs one of the suitable learning strategies. This research aims to describe the process of developing and producing REACT-based student worksheets which satisfy the following criteria: valid, practical, and effective. This study used the 4D model (Define, Design, Develop and Disseminte) and utilizing a *One-Shot Case Study* research design. The study involves 32 students of the grade VII of SMPN 1 Mojosari during the even semester of the academic year 2019-2020. Test, interview, questionnaire are utilized to obtain the data of this study. The results emphasize that the LKS is valid with the average total validity criteria for the LKS with respect to circumference and area formulas, as well as for rhombus and kite are 3.25; 3.71; and 3.57 respectively. The LKS satisfies the practical criteria with a few minor with the average score on the learning observation analysis is 3.13. Finally, The LKS fulfills also as the effective criteria with the student's questionnaire responses indicate that the student response is positive with an average percentage of 89.4% and the percentage of classical learning completeness or student learning test is 78%. So that this LKS can be used as a source and medium of learning by junior high school mathematics teachers in learning quadrilateral material, especially rhombuses and kites.
Keywords: Student worksheet, quadrilateral ,*REACT*

INTRODUCTION

A quadrilateral is one of the mathematical disciplines that is commonly employed in everyday life, as evidenced by the numerous surfaces of items that have a rectangular shape, such as floor tiles, the shape of a football field, wall clocks, doors, tables, etc. The shape of the surface varies, some resemble a trapezium, parallelogram, rectangle, rhombus,square and kite. However, empirical evidence

indicates that many students continue to struggle with quadrilateral problems.

Some studies indicate that studenst encounter difficulties and make mistakes when solving tasks using quadrilateral material. Chasanah (2014) revealed that seventh-grade junior high school students made several mistakes in mastering concepts and principles on quadrilateral. Among the errors made by students were challenges in recognizing a rhombus from a kite and errors in applying the formulas for the rhombus's circumference and area. Research conducted by Ningrum and Budiarto's (2016) also revealed that seventh-grade students had misconceptions regarding the definition of quadrilaterals and were unable to identify the related qualities of rhombuses and other rectangular shapes. The aforementioned research indicates that students struggle with the flat form material, particularly the rhombus and kite.

The research by Husamah (2018), based on the aforementioned description, the selection of appropriate learning strategies for these students should include methods for overcoming their difficulties, such as strategies that invite students to actively participate in learning, use students' knowledge to construct their own concepts being studied, and apply these concepts in everyday life. The level of mathematical understanding of students can be impacted by the learning experiences of students (Markaban, 2006:3). Moreover, learning will be valuable for students if they can independently discover and apply the learned concepts (Bruner,1960).

In learning, Piaget's theory also emphasizes that cognitive growth is not only about acquiring knowledge, but also about constructing students' minds so that they can freely process their thinking power to construct their own understanding (Lourenco, 2014). In order for students to have a broad learning experience, the role of the instructor in establishing an appropriate learning environment is essential. Based on the above explanation, learning consists of students developing their own knowledge based on their own experiences.

One of the learning strategies that fit the criteria above is the REACT strategy.. The REACT strategy is a strategy that focuses on teaching and learning in the fundamental constructivist principles in order to assist students in acquiring the necessary concepts (Crawford, 2001). This strategy is a learning strategy that contains *Relating, Experiencing, Applying, Cooperating and Transferring* stage First, relating is the process of creating a relationship between the actual context and the content to be studied in addition to understanding the concept. After students get an understanding of a subject from their own experience , they are directed to apply those concepts. Students are able to cooperate with their peers in the process of problem solving. Following Tzuo (2007), Vygotsky's theory necessitates cooperative learning in a constructivist classroom. Students are able to interact with one another in order to convey their perspectives or problem-solving strategies. So that students would have access to a variety of problem-solving techniques that will make it easier for them to solve these problems. Finally, students attempt to transfer the knowledge learned from the provided exercises.

Depdiknas (2008) explained that in addition to learning strategies, classroom learning also requires learning resources as a resource for teachers and students. Written and unwritten educational materials are a source of knowledge. Lee (2014) stated, "*Instructional written materials play important roles as teachers' agents in effective teaching practices. Worksheets are one of the most frequently used materials.*" Worksheets are one of the most utilized teaching materials. Consequently, worksheets play a significant role as a tool for teachers in efficient teaching practice. Teachers have used worksheets for a very long time. In recent times, the usage of student worksheets, also known as LKS, is a driving force of the curriculum in several countries. Based on the observations, some schools use LKS while others do not. Current LKS offer merely a summary of material and exercises; however the 2013 curriculum requires constructivist and contextual learning.

The researcher intends to develop worksheets using the REACT strategy for quadrilateral content based on the problems and descriptions presented above. LKS that helps students through the available REACT stages to locate concepts independently. LKS that encourages student engagement in the learning process. Thus, a study entitled "Development of Student Worksheets Based on REACT on Quadrilateral Material" was conducted".

METHODS
2.1 LKS Development Process
This study is a form of development research that uses Four-D model development method, which consists of Define, Design, Develop, and Disseminate. The study design used is the One Shot Case Study, with the following research design:

X → O

Description :

X = *Treatment* is when the. LKS was developed

O = Test, used to determine mastery of the material after learning.

The description of the 4D phases is as follows.

1. Define stage

At this stage, activities include defining and establishing development requirements, analyzing development needs, and determining the most

appropriate development model for the product to be built. In this stage, curriculum analysis, student characteristics analysis, material analysis, and the formulation of learning objectives are performed.

2. Design stage

At this stage, LKS designs and various supplementary instruments, including validity sheets, learning implementation sheets, learning outcomes test sheets, student response questionnaires, and lesson plans, are developed. The purpose of the validity sheet is to evaluate the validity of the worksheets. Implementation sheet for evaluating the praticality of worksheets. Learning outcomes test and student response questionnaires are used to evaluate the efficacy of REACT-based LKS and lesson plans as a reference for implementing learning using LKS.

3. Develop stage

The objective of the development stage is to create valid, practical, and effective quadrilateral worksheets based on REACT. This stage includes two steps: the validity test and the developmental testing. One Mathematics Lecturer from the State University of Surabaya and one Mathematics Teacher of SMPN 1 Mojosari conducted the validity test to see whether the LKS developed was feasible. The outcomes of this validity test are utilized to enhance the developed LKS. The test was conducted once the worksheets had been validated and corrected according to suggestions from the validator. The developmental testing aims to establish the practicability and effectiveness of LKS in the classroom implernentation of learning.

4. Disseminate stage

This stage is perfomed by socializing the LKS through distribution in lirnited quantities to teachers and students. The LKS will be implemented in another class at the same school. LKS will be implemented after the LKS is declared valid, practical and effective.

2.2 Developed worksheets quality

Product quality is good if it meets the valid, practical and effective aspects (Nieveen, 1999: 126). The explanation of each aspect is as follows.

1. Validity

Several aspects of validity are evaluated, including: (1) the suitability of the worksheet with the to-be-attained indicators; (2) the suitability of the sequence of students' work or activities with the REACT strategy; (3) the suitability of the task with the order of the material; (4) its role in encouraging students to find concepts; and (5) the suitability of the image with the concept or material. Then, construct validity, including format, language, and time considerations. The format criteria include: (1) the completeness of the LKS

structure, which comprises the title, study instructions, competencies to be attained, supporting information, tasks, and work processes; (2) the suitability of the letter type and size; and (3) the arrangement of space or layout. In addition, the language aspect comprises the following: (1) the suitability of the usage of the language according to excellent and correct Indonesian language rules; (2) the simplicity of the language used; and (3) the clarity of instructions and directions. The time element refers to the appropriateness of the time application used to work on the LKS. LKS is considered valid if it falls into the categories of good or very good.

Determine the category of LKS validity by matching the total average with the validity criteria derived from Widoyoko (2019: p.238), namely:

$X > 3,4$	: Very Good
$2,8 < X \leq 3,4$	: Good
$2,2 < X \leq 2,8$	: Fair
$1,6 < X \leq 2,2$	: Poor
$X \leq 1,6$	: Inadequate

2. Practicality

The developed LKS is practical if it can be implemented with minirnal or no revision by the validators. The practicability of the LKS is also determined by the score of the implementation of learning in class, which is determined by a Mathematics teacher who observes class activities as an observer. LKS is practical if it comes into the category of good or very good.

The assessment of students' practicality categories was adapted from Widoyoko (2019: p.238) as follows.

$X > 3,4$	: Very Good
$2,8 < X \leq 3,4$	: Good
$2,2 < X \leq 2,8$	: Fair
$1,6 < X \leq 2,2$	: Poor
$X \leq 1,6$	: Inadequate

3. Effectiveness

The developed LKS can be categorized effective if ≥75% of the students have achieved the learning outcomes. If a student's test result exceeds the school's Minimum Criteri of Mastery Learning , he or she is considered to be complete. In this study, schools used a minimum citeria of 75. In addition to the assessment of learning outcomes, the effectiveness of the LKS was determined by the acquisition of student response questionnaires. LKS was effective if student responses to a questionnaire is the positive or very positive category.

According to Khabibah (2006: 97), the following are the categories of student responses:

Percentage of Student Response (%)

$Rs \geq 85$: Very Positive

$70 \leq Rs < 85$: Positive

$50 \leq Rs < 70$: Less Positive

$Rs < 50$: Not positive

Note:

Rs = Percentage of Student Response

RESULT AND DISCUSSION

a. Define stage

Based on interviews with the SMPN 1 Mojosari Mathematics Teacher, it was determined that SMPN 1 Mojosari adheres to the 2013 curriculum. Mathematical education in the classroom still follows the conventional model in which the teacher explains and students listen. Government-obtained electronic school books are used as government-provided learning tools. The ability features of class VII students in each class at this school are diverse. There is no distinction between students with high, medium, and low ability in terms of class.

These analyses serve as a basis for constructing REACT-based LKS teaching materials that use the 2013 curriculum as the basis for developing rectangular LKS, KI, and KD material taken from Permendikbud Number 24 of 2016, which will be developed into learning indicators that will be attained after mastering this LKS. The material discussed in the LKS based on material analysis includes the properties, perimeter and area formulas for rhombus and kite. This worksheet verifies that students have received information on lines and angles, types of angles, angle calculation, and parallelism, which are prerequisites for learning quadrilaterals. Thus, it can be stated that the purpose of REACT-based LKS is for students to discover the properties, perimeter and area formulas for rhombuses and kites.

b. Design stage

The second stage included the initial design of the LKS design and the preparation of research instruments. The explanation are:

1) LKS Design

With the preparation of the LKS draft, the initial design of the LKS is initiated. The development of LKS is based on the 2008 Ministry of National Education Teaching Materials Development Guidebook and is tailored to the REACT stages of Relating, Experiencing, Applying, Cooperating, and Transferring. In this study, the researcher created three

types of worksheets: LKS 1 to discover the features of rhombuses and kites' flat shapes, LKS 2 to find the formula for the circumference of a rhombus and kite, and LKS 3 to find the formula for the area of a rhombus and kite. Each LKS includes a REACT stage. Some of LKS displays.

Figure 1. LKS Cover

On the cover of the LKS contains the title, student identity, study instructions and the objectives of learning using REACT-based LKS.

Figure 2. LKS 1

Figure 3. LKS 2

Figure 4. LKS 3

On the first page of LKS 1, LKS 2, and LKS 3, there are basic competencies, indicators to be achieved, processing time, and brief information. Each LKS starts from relating, experiencing, applying, and then transferring. In each stage there are illustrations that are expected to help students in working on the LKS.

2) Research instruments preparation

Developing REACT-based worksheets requires validation sheets, student learning outcomes tests, student response questionnaires, learning implementation sheets, and lesson plans.

c. Develop stage

1) Validity Test

Validators conduct validity tests by filling out validation forms and making necessary revisions. Validation is carried out by experts. The validators are one Mathematics Lecturer from the State University of Surabaya and one Mathematics Teacher of SMPN 1 Mojosari. This stage attempts to produce valid worksheets for implernentation in

the trial class. The following are the criteria for validators of student worksheets based on REACT.

Table 1. Validator Criteria

No.	Validator	Criteria
1	Unesa Mathematics Lecturer	- Lecturer in mathematics at Unesa - Has taken a master's degree in mathematics or mathematics education. - Mastering quadrilateral material - Learning media design expert
2	Mathematics teacher at SMPN 1 Mojosari	- Mathematics teacher at SMPN 1 Mojosari - Class teacher (homeroom teacher) - Have taken at least the S-1 level of education in a mathematics study program or mathematics education. - Have a minimum of 10 years teaching experience. - Mastering quadrilateral material

Table 2. LKS 1 validation results

No.	Assessed Aspects and Criteria	Validator Assessment I	Validator Assessment II	Ii	Ai
	Format Aspect				
1	Completeness of LKS structure	4	4	4	
2	Compatibility of type and size of letters	4	3	3,5	3,5
3	Room arrangement or layout	3	3	3	
	Content Aspect				
4	LKS conformity with the indicators to be achieved	4	4	4	
5	The suitability of the sequence of students' work/activities with the REACT strategy	4	3	3,5	
6	The suitability of the task with the order of the material	4	4	4	3,75
7	Its role in encouraging students to find concepts	3	4	3,5	
8	The suitability of the irnage with the concept or material	4	3	3,5	
	Language Aspect				
9	The suitability of the use of language with good and correct Indonesian rules	4	4	4	
10	The sirnplicity of the language used	4	3	3,5	3,6
11	Clarity of instructions and directions	4	3	3,5	
	Time Aspect				
12	Assessed Aspects and Cri application	4	4	4	4
Average total validity criteria of LKS (V_a)					3,7125

Table 3. LKS 2 validation results

No.	Assessed Aspects and Criteria	Validator Assessment		I*i*	A*i*
		I	II		
	Format Aspects				
1	Completeness of LKS structure	4	4	4	
2	The suitability of the type and size of the letters	4	3	3,5	3,5
3	Room arrangement or layout	3	3	3	
	Content Aspects				
4	LKS conformity with the indicators to be achieved	3	4	3,5	
5	The suitability of the sequence of students' work/activities with the REACT strategy	3	3	3	
6	The suitability of the task with the order of the material	3	4	3,5	3,3
7	Its role in encouraging students to find concepts	3	4	3,5	
8	The suitability of the image with the concept or material	3	3	3	
	Language Aspects				
9	The suitability of the use of language with good and correct Indonesian rules	3	4	3,5	
10	The simplicity of the language used	3	3	3	3
11	Clarity of instructions and directions	2	3	2,5	
	Time Aspects				
12	Suitability of time application used to work on LKS	3	4	3,5	3,5
Average total validity criteria of LKS (V_a)					3,25

Table 4. LKS 3 validation results

No.	Assessed Aspects and Criteria	Validator Assessment		I*i*	Ai
		I	II		
	Format Aspect				
1	Completeness of LKS structure	4	4	4	
2	Compatibility of type and size of letters	4	3	3,5	3,5
3	Room arrangement or layout	3	3	3	
	Content Aspect				
4	LKS conformity with the indicators to be achieved	4	4	4	
5	The suitability of the sequence of students' work/activities with the REACT strategy	3	3	3	
6	The suitability of the task with the order of the material	3	4	3,5	3,5
7	Its role in encouraging students to find concepts	4	4	4	
8	The suitability of the image with the concept or material	3	3	3	
	Language Aspect				
9	The suitability of the use of language with good and correct Indonesian rules	4	4	4	
10	The simplicity of the language used	3	3	3	3,3
11	Clarity of instructions and directions	3	3	3	
	Time Aspect				
12	Assessed Aspects and Criteria time application	4	4	4	4
Average total validity criteria of LKS (V_a)					3,575

Based on the table above, the average values given by the validator on LKS 1, LKS 2 and LKS 3 are 3.25, 3.7125 and 3.575, respectively. (valid) and slightly revised. So that the REACT-based LKS on rectangular material meets the validity aspect.

2) Developmental testing

Following the validity test is the developmental testing through trials. Before the trial, the validation result of prototype I was altered based on the suggestions of the validators, resulting in the creation of prototype II. The trial was conducted with 32 students in grade VII-A of SMPN 1 Mojosari. The limited trial produced data regarding the implementation of learning, answers from students, and test scores for learning outcomes.

Based on the conducted trials, the following information was obtained.

Table 5. Learning Implementation Results

No.	Observed aspects	Meeting		K_i	A_i
		1	2		
	Introduction				
1	Remind prerequisite material	3	2	2,5	2,83
2	Motivate students to learn	3	3	3	
3	Informing learning objectives	3	3	3	
	Main activity				
4	Explaining the learning activities carried out	4	4	4	3,55
5	Divide students into groups	4	4	4	
6	Distribute worksheets to each group	4	4	4	
7	Ask students to study the LKS and work on the activities in the LKS in pairs.	3	3	3	
8	Provide opportunities for students to ask questions if they have difficulty	4	4	4	
9	Observing students working in groups and guiding them to do activities	4	3	3,5	
10	Rernind students to do activities in LKS and also remind to solve problems in LKS	3	3	3	
11	Choose several groups at random to present their work in front of the class	4	4	4	
12	Ask other groups to comment or provide feedback.	3	3	3	
13	Guiding the discussion process and providing feedback and comments	3	3	3	
	Closing				
14	Guiding students to surnmarize the topics studied	3	3	3	3
16	Remind students to study the material at the next meeting.	3	3	3	
KM					3,13

Table 6. Study Test Result

No.	Student's name	Score	Description
1	WYU	80	Complete
2	SR	77	Complete
3	NSA	83	Complete
4	JNF	73	Incomplete
5	DPE	80	Complete
6	DR	90	Complete

7	ARA	75	Complete
8	RN	95,5	Complete
9	YSA	70	Incomplete
10	MRN	70	Incomplete
11	SOS	80	Complete
12	HD	77,5	Complete
13	MNH	80	Complete
14	JSW	87,5	Complete
15	JAK	87,5	Complete
16	AAR	95	Complete
17	LPS	65	Incomplete
18	YN	82,5	Complete
19	WST	87,5	Complete
20	NKM	82	Complete
21	NDR	87,5	Complete
22	ND	87,5	Complete
23	NRDS	87,5	Complete
24	FDQA	100	Complete
25	DSP	85	Complete
26	MKT	65	Incomplete
27	AAN	57,5	Incomplete
28	YNA	80	Complete
29	NAS	65	Incomplete
30	SW	85	Complete
31	NL	85,5	Complete
32	AAF	87,5	Complete

Table 7. Student Response Results

No.	Statements and Questions	RS Yes	RS No	% RS	Criteria
1.	Is this REACT-based worksheet easy to understand and can increase your knowledge about kites and rhombus material?	31	1	90,8 %	Very positive
2.	Learning with REACT-based LKS is not boring if it is studied.	29	3	90,6 %	Very positive
3.	Does the presentation of this REACT-based LKS arouse your motivation in learning?	27	5	84,3 %	Positive
4.	Is this REACT-based worksheet easy to understand and understand?	30	2	93,7 %	Very positive
5.	Does the presentation of the material interest in learning about kites and rhombus?	30	2	93,7 %	Very positive
6.	Do you find it easier to learn the material after using this worksheet?	31	1	96,8 %	Very positive
7.	Can you follow the learning stages in the REACT-based LKS?	28	4	87,5 %	Very positive
8.	The activities carried out in this worksheet are clarified with appropriate and interesting pictures	30	2	93,7 %	Very positive
9.	This REACT-based LKS uses good and effective language	28	4	87, 5 %	Very positive
10.	After using this worksheet, does maths become less boring?	24	8	75 %	Positive

Based on Table 5, the results of the implementation of learning are 3.13 (good). Table 6 shows the average value of all student responses, including the extremely positive and positive categories. 25 students, or 78% of 32 students, earned a score ≥75, according to Table 7., which displays the percentage of students achieving classically complete learning. 7 students, or 22 percent of 32 students, scored <75.Based on the aforesaid validity test and trial, it can be concluded that the produced LKS is valid, practical, and effective.

d. Dissminate stage

This study's expansion consists of applying REACT-based worksheets that have been considered valid, practical, and effective to grade VII in addition to the trial class. The distribution class subject is class VII B. The selection of this class is based on a simple random sample, as this worksheet is intended for use by all students, regardless of their ability level.

Table 8. Study Test Results

No.	Student Name Code	Score	Description
1	JCR	80	Complete
2	ANR	77	Complete
3	MYA	75	Complete
4	TFR	73	Incomplete
5	YSA	87,5	Complete
6	EDJ	90	Complete
7	EFS	75	Complete
8	RPA	85,5	Complete
9	RMM	55	Incomplete
10	MRA	90	Complete
11	SIS	65	Incomplete
12	IAN	75,5	Complete
13	GSR	90	Complete
14	ITN	87,5	Complete
15	MWD	70	Incomplete
16	BTW	90	Complete
17	DJC	80	Complete
18	RL	87,5	Complete
19	MKA	85	Complete
20	NDA	95	Complete
21	KJL	60	Incomplete
22	APA	87,5	Complete
23	NUY	87,5	Complete
24	AGD	87,5	Complete
25	IUP	65	Incomplete
26	WKI	80	Complete
27	AND	75,5	Complete
28	YKL	70	Incomplete
29	QWE	65	Incomplete
30	PIY	82	Complete
31	IOP	85	Complete
32	MBS	89,5	Complete

Based on Table 8. the percentage of classical completeness is 75% so the worksheet developed by the author was considered effective.

CLOSING

Conclusion

Based on the analysis and discussion of the data, student worksheets based on REACT on quadrilateral material is declared valid, practical, and effective. The researcher may draw   some conclusions as follows.

1. Defining Stage (*Define*)

   The purpose of the development of REACT-based worksheets is to assist students in finding the properties, perimeter formulas, and area formulas for rhornbus and kite shapes, with the worksheets' stages adjusted to the 2013 curriculurn.

2. Design Stage *(Design)*

   The REACT-based LKS is divided into three sections: REACT-based LKS 1 for rhombus and kite properties, REACT 2-based LKS for rhombus and kite circumference formulas, and REACT 3-based LKS for rhombus and kite area formulas. According to the Ministry of National Education, the LKS consists of titles, study instructions, competencies to be achieved, supporting information, and tasks and work steps. The tasks and work steps include the REACT stages: Relating, Experiencing, Applying, Communicating, and Transferring..

3. Development Stage *(Develop)*

   The results of the validation of LKS 1 , LKS 2 and LKS 3 are 3.25 , 3.7125 and 3.575, so all LKS are valid. The validation results show that this worksheet can be used with a slight revision and the results of the implementation of learning in the trial class are 3.13, so that the worksheet is practical. The results of student responses after learning using LKS are in the very positive and positive category, while the test scores for student learning outcomes indicate the percentage of student learning completeness is 78%. So that LKS is effective.

4. Disseminate stage *(Disseminate)*

   Studenst worksheet based on REACT that have been valid, practical and effective are re-implemented in another class to determine the effectiveness of the worksheets. From the results of the learning carried out, it was obtained that 75% of students in the class have scored above the Minimum..Criteri..of..Mastery..Learning.

Suggestion

Based on the study that has been done, there are suggestions as follows:

1. In this study, the readability test was not carried out, so there were some students misunderstand the staternents in the LKS. Therefore for other researchers, it should consider making the readability test to make students more understand.

2. Observers of the implementation of learning in the class should be done by two observers. The aim is to obtained more accurate practicality data.

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