

DEVELOPMENT OF CLOPEDIMATIC LEARNING MEDIA WITH REALISTIC MATHEMATICS APPROACH BASED ON MADURA'S LOCAL WISDOM

Septi Dariyatul Aini^{1*}, Agus Subaidi², Chairul Fajar Tafriyanto³

^{1,2,3} Universitas Madura, Pamekasan, Indonesia

*Corresponding author

E-mail: septi_math@unira.ac.id^{1*)}
agus_math@unira.ac.id²⁾
chairul_math@unira.ac.id³⁾

Received 30 December 2022; Received in revised form 30 January 2023; Accepted 16 February 2023

Abstract

The low student learning outcomes in measurement material can be caused by the tendency of teachers to only transfer their knowledge into students' minds so that students are passive, not critical. One learning approach that pays attention to this situation is a realistic mathematical approach based on Madurese local wisdom. Students face contextual problems, namely problems related to measurement, so that they are accustomed to solving problems in everyday life. To support this realistic mathematics approach, clopeditics-based learning media will be designed as a substitute for the textbooks used by students. Clopedimatics is a form of print media which is based on the concept of compiling an encyclopedia and is designed to help students understand measurement material and is placed in non-standard units of measurement used by the Madurese. The purpose of this study was to produce learning media and determine the validity, practicality, and effectiveness of developing Klopeditimatics learning media with a realistic mathematical approach based on Madurese local wisdom in prohibiting material measurement. This type of research is development research that uses a 4-D model but has been modified to 3-D namely definition, design, and development. The conclusion of this study is that the development of clopedimatic learning media with a realistic mathematical approach based on Madurese local wisdom on measurement material at SDN Barkot 1 Pamekasan meets the valid, practical and effective criteria.

Keywords: clopedimatics; madura local wisdom; measurement

Abstrak

Rendahnya hasil belajar siswa pada materi pengukuran dapat disebabkan oleh kecenderungan guru hanya mentransfer ilmunya ke dalam pikiran siswa sehingga siswa bersikap pasif, tidak kritis. Salah satu pendekatan pembelajaran yang memperhatikan keadaan tersebut adalah pendekatan matematika realistik berbasis kearifan lokal Madura. Siswa dihadapkan pada masalah kontekstual, yaitu masalah yang berhubungan dengan pengukuran, agar mereka terbiasa memecahkan masalah dalam kehidupan sehari-hari. Untuk mendukung pendekatan matematika realistik ini, akan dirancang media pembelajaran berbasis klopeditimatika sebagai pengganti buku teks yang digunakan siswa. Klopeditimatika adalah salah satu bentuk media cetak yang disusun berdasarkan konsep menyusun Ensiklopedi dan dirancang untuk membantu siswa menguasai materi pengukuran dan dikaitkan dengan satuan besaran tidak baku yang digunakan oleh masyarakat Madura. Tujuan penelitian ini untuk menghasilkan media pembelajaran dan menentukan kevalidan, kepraktisan, dan keefektifan pengembangan media pembelajaran Klopeditimatika dengan pendekatan matematika realistik berbasis kearifan lokal Madura dalam mengajarkan materi pengukuran. Jenis penelitian ini adalah penelitian pengembangan yang menggunakan model 4-D namun telah dimodifikasi menjadi 3-D yaitu pendefinisian, perancangan, dan pengembangan. Kesimpulan dari penelitian ini adalah pengembangan media pembelajaran klopeditimatika dengan pendekatan matematika realistik berbasis kearifan lokal Madura pada materi pengukuran di SDN Barkot 1 Pamekasan memenuhi kriteria valid, praktis, dan efektif.

Kata Kunci: kearifan lokal madura, klopeditimatika, pengukuran.



This is an open access article under the [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/)

DOI: <https://doi.org/10.24127/ajpm.v12i1.6926>

INTRODUCTION

The use of mathematics outside of school must be related to the environment, for example building a house, weighing production results, determining matching geometric patterns, selling and buying goods and so on. The application of mathematics like this is often different from the mathematics learned at school. In everyday life, Madurese people measure the weight of rice using kolak (a wing soap container), whereas when they buy rice at the shop they use the unit weight "genthang", and to calculate the number of household items, such as plates, cups, spoons and the like usually use the quantity unit "sajhina" or "salusin". Meanwhile, in schools, it is specifically measured by liters or cubic meters, weight is measured by kilograms, but there is no weight unit by "genthang". Calculating quantity units with dozens, gross, kodi, reams, but no quantity units with "sajhina". This will be very influential for elementary school students, especially those who are just learning about measurement. What they learn at school is very different and new. There is no synchrony between the material they learn at school and what they find in everyday life. In fact, the mathematics material they learn at school should be meaningful learning so that they can apply it in real life, especially to solve problems in everyday life.

A meaningful learning process must be adapted to the conditions of students in learning mathematics. The process of learning mathematics can become meaningful learning for students when mathematics material is related to local wisdom in the local area (Matsun et al., 2020). Local wisdom is knowledge, outlook on life, and life strategies that are embodied in local

community activities to answer the problem of meeting community needs (Ulfah Fajarini, 2014). To connect local wisdom with mathematics subject matter, mathematics learning media is needed. One of them is clopedimatic learning media.

Clopedimatics learning media is a print media that is compiled based on the concept of the preparation of the Encyclopedia of Mathematics (Masduki et al., 2016). Clopedimatics functions as an independent learning tool, by presenting material accompanied by interesting and supportive pictures so that students do not only imagine instructions from the teacher. Clopedimatics is systematically arranged which contains a set of learning experiences designed to assist students in understanding mathematical material, especially measurement materials that contain content of Madurese local wisdom. As an illustration of learning about measuring tools where the Madurese people are familiar with the terms measuring tools for length in the form of "depah", "kèlan", "sokoh" and weight measuring instruments in the form of dosing using the size of "ghântang" and "tobung".

Based on previous research, clopedimatics learning media is very suitable to be used in learning and is able to improve students' understanding and learning outcomes. Local wisdom-based learning media clopedimatics is very suitable to be used in learning and is able to improve students' understanding and learning outcomes (Matsun et al., 2020; Nurdiansyah, et al., 2021)

To optimize the use of clopedimatic learning media based on Madura local wisdom, the appropriate learning approach is realistic mathematic education (RME). RME is

DOI: <https://doi.org/10.24127/ajpm.v12i1.6926>

an approach to learning mathematics that starts with a real problem and then with a tiered mathematization process, is brought to a formal form with a pleasant learning atmosphere (Khotimah & As'ad, 2020). So that RME based on Madura local wisdom means a learning approach that utilizes the reality and environment of the Madurese community to facilitate the mathematics learning process so as to achieve the goal of better mathematics education.

This learning approach is effective because it is able to make mathematics meaningful by relating it to the real life of the Madurese. Students are presented with contextual problems related to measurements that are often used by the Madurese community, so that they are trained to get used to solving problems in everyday life. This can also increase student motivation because they are involved in learning and the material they learn is related to their lives. In a research shows that the activities and learning outcomes of students who use realistic mathematical models are better than those whose learning uses conventional models (Armiyanti, 2019). In another research also stated that teaching materials based on local wisdom were practically used in learning because these teaching materials did not make it difficult for students to use them (Misbah, 2020).

Based on the description above, the researcher is interested in conducting research so as to produce learning media that will increase motivation and learning outcomes, and is closely related to students' daily lives with the title "Development of Klopematic Learning Media with Realistic Mathematical Models Approaches Based on Madura Local

Wisdom in Units Measuring instrument. The purpose of this study was to produce and determine the validity, practicality, and effectiveness of clopedimatic learning media with a realistic mathematical approach based on Madurese local wisdom at SDN Barkot 1 Pamekasan on measurement material.

RESEARCH METHODS

The type of research used is educational research and development. the existence of researchers in the field is needed, so researchers use a qualitative approach. This is due to the existence of researchers in the field as the main instruments in collecting and planning, executors, action givers, data analyzers, results reporting and persons in charge of the entire research process and results.

Based on the scope of the study, the trial subjects in this study were limited to 28 grade III students at SDN Barkot 1 Pamekasan in odd semesters. The selection of the trial subject was done by randomly selecting class III as the place for the trial, students whose class was selected as the place for the clopedimatics trial to be the subject of the research trial.

The procedure for developing clopedimatic learning media with a realistic mathematical approach based on Madurese local wisdom uses a 4-D model (four D model) which consists of four stages but has been modified to 3-D (three stages). Based on the results of these modifications, the stages of developing clopedimatic learning media, namely: (1) the definition stage consists of: early-late analysis, student analysis, concept analysis, task analysis, and specification of learning objectives; (2) the design phase consists of: preparation of tests,

DOI: <https://doi.org/10.24127/ajpm.v12i1.6926>

preparation of media, selection of formats, and initial design; (3) the development stage consists of: expert assessment, and limited trial.

The research procedure consists of three stages, namely: (1) the preparation stage, namely developing clopedimatic learning media and research instruments, then analyzing the results of the validation of clopedimatic learning media and research instruments to revise the media and research instruments; (2) the implementation stage, namely carrying out learning using clopedimatic learning media, observing student activities and the teacher's ability to manage learning, providing learning outcomes tests and student response questionnaires; (3) the data analysis stage, namely analyzing the data obtained from the implementation stage.

The data collection techniques in this study are observation of student activities in learning and teacher activities in managing learning, tests, questionnaires. Whereas the instrument used in this study aims to measure the validity, practicality, and effectiveness of clopedimatic learning media with a realistic mathematical approach based on Madura local wisdom. Therefore, the instruments used are: (1) expert validation sheets, (2) student activity observation sheets, (3) teacher activity observation sheets, (4) learning outcomes tests, (5) student response questionnaire sheets to find out students' opinions on clopedimatic learning media with a realistic mathematical approach based on Madura local wisdom, as well as to determine students' interest in the learning that has been used.

Data analysis techniques were carried out to obtain clopedimatic learning media products that fulfill three

aspects, namely valid, practical and effective. The steps are as follows:

1. Analysis of learning device validation

This validity test was obtained from the validation results of the Clopedimatic Learning Media, lesson plan, test question by the validators. (Putri et al., 2014)

2. Analysis of the practicality of learning device

The product developed (clopedimatic learning media, lesson plan, test question) are said to be practical if the expert states that the product can be used in the field with little revision/no revision (Wicaksono et al., 2014).

3. Analysis of the effectiveness of learning devices

Effectiveness analysis is carried out using the results of observations of teacher activities and student activities in learning, test results, and the results of student response questionnaires. The teacher activities is said to be effective if the score interval of the average total meeting assessed is in the good or very good category (Septi & Irawati, 2018). The student activities are said to be effective if the time used for each category of observations at each meeting is within the ideal time criteria with a tolerance limit of 5%. The test result can be said to be effective if the number of all students who are able to complete or achieve a minimum score of 80, at least 75% of the number of students in the class (Kurniati, 2013). The percentage of classical completeness can be calculated by dividing the number of students who complete their learning outcomes by the total number of students (Aini & Irawati, 2019). And the student response questionnaires are said to be effective if 70% or more students respond in a positive category

DOI: <https://doi.org/10.24127/ajpm.v12i1.6926>

(happy and interested). The percentage of each response is calculated by adding up all the aspects that appear divided by the total number of students multiplied by 100% (Aini & Irawati, 2019).

RESULT AND DISCUSSION

The following is a presentation of research results consisting of the definition stage, the design stage, and the development stage.

1. Description of the Results of the Definition Stage

a. Early-late analysis

Based on the results of the researcher's interviews with several 3rd grade elementary school students, they stated that the measurement material was very difficult for them to understand. They also do not know about the various traditional units of measurement in Madura, although they often hear these units of measure both at home and in the community. This is in line with the results of the researchers' interviews with elementary mathematics teachers, none of these teachers linked the units of measure they teach in schools to the units of measure commonly found by students in Madura society. Most of these teachers realized the importance of inculcating the concepts of traditional units of measurement or non-standard units of measurement for the Madurese community as a form of appreciation for preserving Madura culture. This may also be the cause of student learning outcomes which are very far from expectations, because only 25% of students score above 80.

In addition to these factors, the low student learning outcomes in the measurement material can be caused by the tendency of teachers to only transfer their knowledge to the minds of students so that students are passive,

uncritical and will make students quickly bored and bored. This situation occurs because in the learning process, students are not given the opportunity to express ideas or reasons for their answers. One learning approach that pays attention to this situation when the learning process takes place is the realistic mathematics education (RME) based on Madura local wisdom. The reason why this approach is effective in the above problems is because this realistic mathematical approach based on Madurese local wisdom emphasizes bringing mathematics to a more meaningful teaching by relating it to the realistic daily life of the Madurese community.

To support this realistic mathematics approach, a Clopedimatics learning media is designed as a companion to the textbooks used by students. Clopedimatics is a form of print media that is compiled based on the concept of compiling an Encyclopedia which contains a set of planned learning experiences designed to help students understand the units of measurement that are studied in school and associated to non-standard units of measurement used by the Madurese community. Clopedimatics functions as an independent learning tool, by presenting material accompanied by interesting and supportive pictures so that students do not only imagine instructions from the teacher.

b. Student analysis

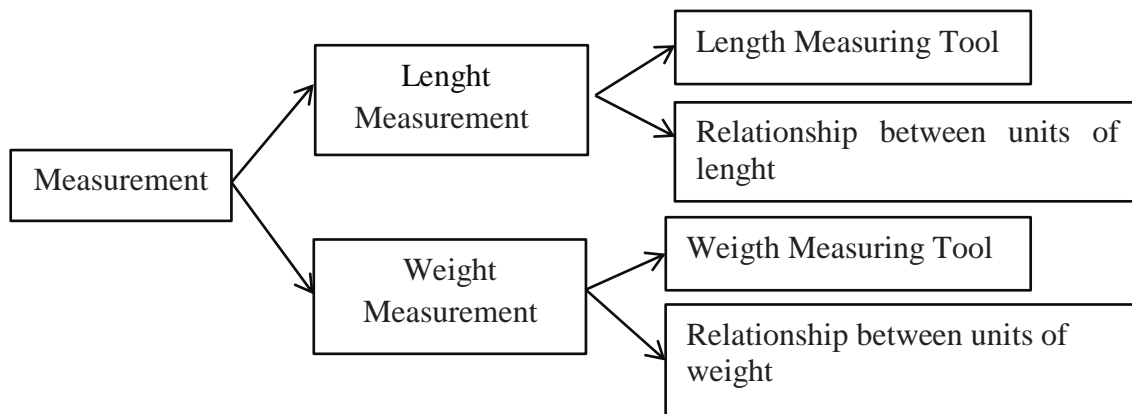
Meanwhile, based on the analysis of cognitive development, the average grade III students are in the age range of 9-10 years, namely in the concrete operational stage according to Piaget's theory. At this stage students length and weight was obtained in class II. In other words, students have been familiar with measuring length and weight. begin to

DOI: <https://doi.org/10.24127/ajpm.v12i1.6926>

be able to think logically about real events around them, the mind begins to be organized although it is still somewhat concrete, and begins to use inductive logic (reasoning information from specific to general).

c. Material Analysis

This analysis aims to classify, detail and systematically compile relevant concepts that will be taught based on the initial final analysis. Based on K-13 for grade III SD in the first semester, an analysis of angle measurement subjects is obtained as shown in picture 1:



Picture 1. Measurement material

d. Task Analysis

The tasks that will be carried out by students during the learning process include: 1) the tasks in the length measurement sub-topic are: identifying the length measuring instrument according to its function, identify the length and record the identification results, find the relationship between units of length, using units of measurement of length in solving everyday problems; 2) the tasks in the weight measurement sub-topic are: identify weight measuring equipment according to its function, identify the weight and record the results of the identification, finding the relationship between units of weight, using units of measurement for weight in everyday problem solving.

e. Specification of Learning Objectives

This analysis was carried out to formulate the results of task and concept

analysis as indicators of achievement of learning outcomes. The indicators are formulated as follows: 1) Students can identify measuring instruments according to their functions; 2) Students can identify the length and weight of objects and record the identification results; 3) Students can determine the relationship between units of length and weight; 4) Students can use units of measure in solving everyday problems.

2. Description of the Results of the Design Phase

The purpose of the design phase is to design learning tools, so that prototypes (examples of learning devices) are obtained, here in after referred to as draft I learning devices. In this study, the learning tools prepared include lesson plans, clopedimatics learning media, and test questions.

DOI: <https://doi.org/10.24127/ajpm.v12i1.6926>

The lesson plans are designed to be oriented towards a realistic mathematical approach which includes the identity of the lesson plans, basic competencies, learning objectives, learning approaches, and learning activities. The identity of the lesson plan consists of the name of the school, class, semester, material, and time. The basic competencies used are in accordance with the syllabus contained in K-13 for class III semester I.

Clopedimatics Learning Media on measurement material consists of two sub-materials, namely measuring length and measuring weight. Each sub-material in the clopedimatic learning media starts with a short story with the theme of Madura local wisdom and then continues with contextual problems based on Madura local wisdom which are done individually and then discussed in groups. After that, there is an 'Independent Exercise' as a student exercise.

The preparation of the test was obtained from the results of task analysis and material analysis formulated in the specification of

learning objectives. In this study, the researcher did not arrange a preliminary test, only compiled a final test that would be given to students and aimed to determine students' understanding of the material.


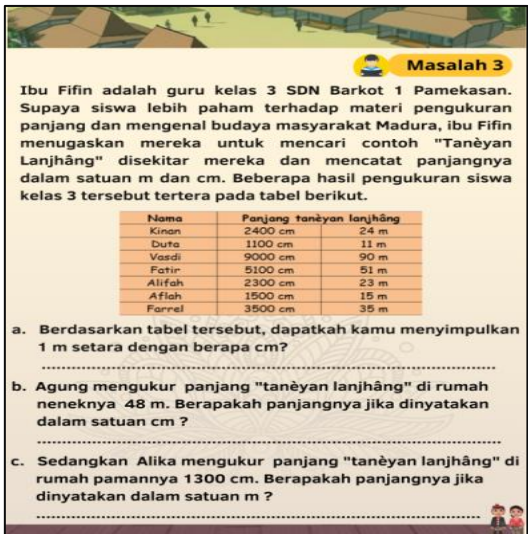
3. Description of Development Stage Results

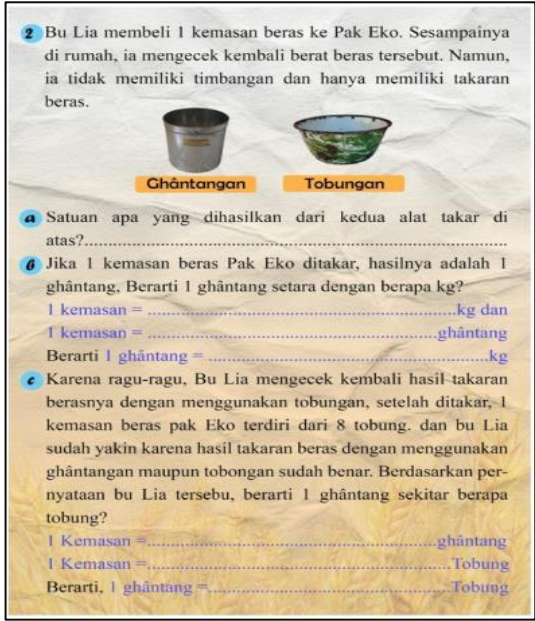





The development stage aims to produce a revised learning device design based on suggestions or comments from experts as well as data obtained from limited trials.

a. Learning Tool Validity

The results of the development of Clopedimatics Learning Media in this study are valid with an average total validity of 4.38. Even though the categories obtained by Clopedimatic Learning Media were valid, the first validator suggested that the Clopedimatic Learning Media developed should be revised slightly, especially on the questions used. Some of the revisions contained in Clopedimatic Learning Media are as shown in table 1.

Table 1. Revision of Clopedimatic Learning Media

Before Revision	After Revision
	

Before Revision	After Revision															
 <p>2 Bu Lia membeli 1 kemasan beras ke Pak Eko. Sesampainya di rumah, ia mengecek kembali berat beras tersebut. Namun, ia tidak memiliki timbangan dan hanya memiliki takaran beras.</p> <p style="text-align: center;">   </p> <p style="text-align: center;"> Ghântangan Tobongan </p> <p>a Satuan apa yang dihasilkan dari kedua alat takar di atas?.....</p> <p>b Jika 1 kemasan beras Pak Eko ditakar, hasilnya adalah 1 ghântang. Berarti 1 ghântang setara dengan berapa kg? 1 kemasan =kg dan 1 kemasan =ghântang Berarti 1 ghântang =kg</p> <p>c Karena ragu-ragu, Bu Lia mengecek kembali hasil takaran berasnya dengan menggunakan tobongan, setelah ditakar, 1 kemasan beras pak Eko terdiri dari 8 tobong. dan bu Lia sudah yakin karena hasil takaran beras dengan menggunakan ghântangan maupun tobongan sudah benar. Berdasarkan pernyataan bu Lia tersebut, berarti 1 ghântang sekitar berapa tobong? 1 Kemasan =ghântang 1 Kemasan =Tobong Berarti, 1 ghântang =Tobong</p>	 <p style="text-align: center;">Masalah 1</p> <p>Pak Eko seorang pedagang beras jagung di pasar tradisional. Dia menyediakan beras jagung yang sudah dikemas dan beras jagung yang belum dikemas. Beras jagung yang sudah dikemas beratnya 1 kg tiap kemasan. Sedangkan beras jagung yang belum dikemas disediakan bagi pembeli yang ingin membeli dengan takaran dalam bentuk "ghântangan" atau "tobongan". Menurut Pak Eko 1 ghântang beras jagung sekitar 3 kg dan 1 ghântang beras jagung sekitar 8 tobongan.</p> <p style="text-align: center;">   </p> <p style="text-align: center;"> ghântangan tobongan </p> <p>Berdasarkan pernyataan Pak Eko di atas, coba kamu lengkapi tabel berikut untuk nilai ghântang yang berbeda-beda sesuai keinginan kalian !</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">ghântangan</th> <th style="width: 33%;">kg</th> <th style="width: 33%;">tobongan</th> </tr> </thead> <tbody> <tr> <td>1 ghântang</td> <td>3 kg</td> <td>8 tobongan</td> </tr> <tr> <td>.....</td> <td>.....</td> <td>.....</td> </tr> <tr> <td>.....</td> <td>.....</td> <td>.....</td> </tr> <tr> <td>.....</td> <td>.....</td> <td>.....</td> </tr> </tbody> </table>	ghântangan	kg	tobongan	1 ghântang	3 kg	8 tobongan
ghântangan	kg	tobongan														
1 ghântang	3 kg	8 tobongan														
.....														
.....														
.....														

The results of the development of the Lesson Plan have an average total validity value of 4,48. This means that the lesson plan has been valid with the "Valid" category. Based on the validation results from the two validators, it can be concluded that the lesson plan can be used without revision.

And the last, the test questions in this study had an average total validity of 4,39. This shows that the test questions have been valid in the "valid" category. Although the categories obtained are valid, validator I provides suggestions so that the questions used are adapted to general questions and are no longer associated with Madura local.

b. Results of Practical Analysis of Learning Devices

The validation sheet also contains an assessment of the practicality of learning tools which aims to find out whether the learning tools developed can be implemented in the field. The result can be seen in Table 2.

Table 2. Results of learning device practically assesment

Learning Media	Valida-tor	Description
Clopedimatics Learning Media	1	little revisions
Lesson Plan	2	no revision
Test Questions	1	little revisions
	2	no revision

Based on Table 2, it can be concluded that the validator's overall assessment of the Clopedimatic Learning Media, Lesson Plan, and Test Questions states that it can be used with little or no revision so that the learning device can be said to be "practical".

c. Limited Trial

In the trial, data were obtained about teacher activities, student activities, student learning outcomes tests, and student responses. The results of observations of teacher activities during learning activities by observers are presented in Table 3.

DOI: <https://doi.org/10.24127/ajpm.v12i1.6926>

Table 3. Results of Teacher Activity Data Analysis

Lesson Plan	Average Teacher Activity Rating
Lesson Plan 1 at the 1st meeting	4,18
Lesson Plan 1 at the 2nd meeting	4,41
Lesson Plan 2	4,65
Total Average	4,41

Based on table 3, it can be concluded that the average total teacher activity is 4,41. This figure is in the "good" category so that it meets the

criteria to be said to be "effective". The results of observing student activities during learning activities by one observer are presented in Table 4.

Table 4. Results of student activity data analysis

No	Observation Category	Percentage of Student Activities (%)			Tolerance
		Lesson Plan 1 (1st meeting)	Lesson Plan 1 (2nd meeting)	Lesson Plan 2	
1	Listening/paying attention teacher/friend explanation	30,1	31,63	28,64	$22 \leq p \leq 32$
2	Read/understand the problem Contextual in clopedimatics learning media	14,8	10,71	7,42	$6 \leq p \leq 16$
3	Complete problem/find how to solve the problem	20,92	24,74	31,46	$22 \leq p \leq 32$
4	Comparing answers in group discussions or class discussions	13,01	14,03	17,9	$24 \leq p \leq 34$
5	Drawing conclusions about a concept or procedure	2,3	3,06	1,53	$1 \leq p \leq 11$
6	The behavior of students who not relevant to teaching and learning activities	18,37	15,82	13,3	$0 \leq p \leq 5$

Based on table 4 above, the category of observing student activities in lesson plan 1 the 1st meeting does not meet the "effective" criteria, namely at points 3, 4 and 6. Meanwhile in lesson plan the 2nd meeting, there are categories of observations that do not meet the criteria. "effective", namely at points 4 and 6. In Lesson plan 2, there are also categories of observations that do not meet the "effective" criteria, namely at points 4 and 6.

Data on student learning outcomes during the realistic mathematics education process based on Madura local wisdom was obtained through the learning outcomes test after the end of the learning process. The test results obtained by students are briefly presented in Table 5.

DOI: <https://doi.org/10.24127/ajpm.v12i1.6926>

Table 5. Results of Student Learning Outcomes Test Data

Description	Amount	Percentage
Completed students	5	21
Unfinished students	20	7

Based on table 5 above, it can be concluded that as many as 21 students "completed" individually, meaning that students have achieved the competencies that have been determined in the measurement material. Likewise, for classical completeness (class success), the percentage of students who

complete is 75% while the class is declared complete if there are at least 75% of students who "completed" individually so it can be said that overall students have achieved competence. which has been specified.

And the last, student responses to realistic mathematics education based on Madura local wisdom were obtained by using a student response questionnaire and given after the end of the learning process. The data obtained are presented in Table 6.

Table 6. Results of Student Response Questionnaire Data Analysis

Order of questions	Yes		No	
	Average	%	Average	%
1	27,2	97	0,8	3
2	27,6	98,4	0,4	1,6
3	27	96	1	4
4	27	96	1	4
5	27	96	1	4
Average percentage of student responses		96,68%	3,32%	

Based on Table 6, it can be concluded that as many as 96,68% of students are happy and interested in realistic mathematics learning based on Madura local wisdom. In other words, the data shows that more than 70% of students responded well to the learning tools, so that the student's response can be said to be "positive".

Based on the above results, it was found that the student's activities were not effective, the teacher's ability to manage learning was effective, the student's response to positive learning, classical learning completeness. Student activities were less effective because this research was carried out at the lower elementary level, namely class III, these students were very active, still liked to play and talk with friends next to them so that students were less focused on following the lesson and the

teacher's ability to manage these students was needed. Although the activities of students are not effective, because the other three aspects are effective, realistic mathematics learning based on Madura local wisdom is effective because it fulfills three aspects of the four aspects below, namely:

- 1) Effective student activities
 - 2) The ability of teachers to manage effective learning
 - 3) Student responses to positive learning
 - 4) Complete learning classically
- Provided that aspect (4) is met.

Overall, the development of clopedimatic learning media with a realistic mathematical approach based on Madurese local wisdom in the measurement material meets the valid, practical, and effective criteria. The results of this study are strengthened by

DOI: <https://doi.org/10.24127/ajpm.v12i1.6926>

previous research. The research entitled "Development of mathematics learning tools with a Realistic Mathematics approach based on local cultural wisdom of the Gayomaterial Tribe Geometry class VII" also produces valid, practical and effective learning tools (Yustianingrum, 2017). Similar results were obtained from the research entitled "Development of a Realistic Mathematical Education Module with Banten Cultural Value to Develop Students' Mathematical Literacy Ability" also produced valid, practical, and effective learning tools (Jamil et al., 2021). This statement is also accompanied by the results of a research entitled "Development of Encyclopedia Mathematics Media with a Realistic Mathematics Approach in Elementary Schools" which shows valid, practical and effective results. Student learning outcomes using mathematics with a realistic mathematical approach are better than students who receive conventional learning (Masduki et al., 2016).

This is because ethnomathematics-based learning can be an alternative solution in improving student learning in improving students' thinking or reasoning processes, arguing and communicating, as well as being a means to motivate, stimulate students, can overcome boredom and provide new nuances in learning mathematics for elementary level students (Fitriatien, 2016; S. Sirate, 2012). Student learning outcomes have also increased because through RME approach, it can effectively improve students' mathematical abilities can improve the ability of elementary students in understanding and solving mathematical problems (Fitriani & Maulana, 2016; Wahyudi et al., 2017; Mutaqin, et al., 2021).

CONCLUSION

The learning tools developed in this study consisted of lesson plans, test questions, clopedimatic learning media with a realistic mathematical approach based on Madurese local wisdom on measurement material. The development of clopedimatic learning media with a realistic mathematical approach based on Madura local wisdom on measurement material meets the valid, practical and effective criteria.

This research is only up to the development stage. To find out how effective and to find out if there is a difference the learning outcomes of students who take part in learning using clopedimatics learning media with a realistic mathematical approach based on Madurese local wisdom with learning media and other learning approaches, so this research can be continued to experimental research in subsequent studies.

REFERENCES

- Aini, S. D., & Irawati, S. (2019). Strategi Pembelajaran Quick on the Draw untuk Meningkatkan Aktivitas dan Hasil Belajar Mahasiswa Pada Materi Interpolasi. *NUMERICAL: Jurnal Matematika Dan Pendidikan Matematika*, 3, 19–30. <https://doi.org/10.25217/numerical.v3i1.421>
- Armiyanti. (2019). Penerapan Pembelajaran Matematika Realistik untuk Meningkatkan Hasil Belajar Siswa. *ANARGYA: Jurnal Ilmiah Pendidikan Matematika*, 2(2), 110–115. <https://doi.org/10.37411/pedagogika.v10i2.132>
- Fitriani, K., & Maulana, -. (2016). Meningkatkan Kemampuan Pemahaman Dan Pemecahan

DOI: <https://doi.org/10.24127/ajpm.v12i1.6926>

- Masalah Matematis Siswa Sd Kelas V Melalui Pendekatan Matematika Realistik. *Mimbar Sekolah Dasar*, 3(1), 40–52. <https://doi.org/10.17509/mimbar-sd.v3i1.2355>
- Fitriatien, S. R. (2016). Pembelajaran berbasis etnomatematika. *Conference Paper. December, December 2016*. https://www.researchgate.net/profile/Sri-Fitriatien/publication/317318097_Pembelajaran_Berbasis_Etnomatematika/links/5931a4b2a6fdcc89e7a37493/Pembelajaran-Berbasis-Etnomatematika.pdf
- Jamil, A. F., Cahyono, H., & Ayu, M. S. (2021). Pengembangan Handout Matematika Bercirikan Kearifan Lokal Untuk Meningkatkan Kemampuan Literasi Matematis. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, 10(1), 48. <https://doi.org/10.24127/ajpm.v10i1.3260>
- hotimah, S. H., & As'ad, M. (2020). HASIL BELAJAR MATEMATIKA SISWA SEKOLAH DASAR. *Jurnal Ilmiah Pendidikan Dan Pembelajaran*, 4(3), 491–498.
- Kurniati, D. (2013). Pengembangan Perangkat Pembelajaran Matematika Sekolah Menengah Pertama dengan Sistem Character Based Integrated Learning. *Jurnal Kreano*, 4(2), 159-173. <https://doi.org/10.15294/kreano.v4i2.3156>
- Masduki, L. R., Paridjo, P., & Kurniasih, E. (2016). Pengembangan Media Matematika Ensiklopedia Dengan Pendekatan Matematika Realistik Di Sekolah Dasar. *JIPMat*, 1(1). <https://doi.org/10.26877/jipmat.v1i1.1081>
- Matsun, M., Sari, I. N., & Boisandi, B. (2020). Pengembangan bahan ajar fisika pada materi pengukuran berbasis kearifan lokal Kalimantan Barat. *Jurnal Riset Dan Kajian Pendidikan Fisika*, 7(2), 59. <https://doi.org/10.12928/jrkpf.v7i2.17822>
- Misbah. (2020). *The Practicality of Physics Teaching Materials Based on the Wetland Environment*. 407(Sbicsse 2019), 185–187. <https://doi.org/10.2991/assehr.k.200219.058>
- Mutaqin, E. J., Salimi, M., Asyari, L., & Hamdani, N. A. (2020, October 8). *Realistic mathematics education approach on teaching geometry in primary schools: Collaborative action research* [Paper presentation]. Seminar on Advances in Mathematics, Science, and Engineering for Elementary Schools (SAMSES) 2020, Jawa Barat, Indonesia. <https://iopscience.iop.org/article/10.1088/1742-6596/1987/1/012031/pdf>
- Nurdiansyah, E., Faisal, E. El, & Sulkipani, S. (2021). Pengembangan Ensiklopedia Identitas Nasional Berbasis Kearifan Lokal. *Jurnal Civic Hukum*, 6(2), 112–123. <https://doi.org/10.22219/jch.v6i2.14612>
- Putri, N.W.S., Sariyasa, Ardana, I.M. 2014. Pengembangan Perangkat Pembelajaran Tandır Berbantuan Geogebra sebagai Upaya Meningkatkan Prestasi dan Aktivitas Belajar Geometri Siswa. *E-Journal Program Pascasarjana Universitas Pendidikan Ganesha*,

DOI: <https://doi.org/10.24127/ajpm.v12i1.6926>

- 3(1), 1-11.
<https://doi.org/10.23887/jppm.v3i1.1073>
- S. Sirate, F. (2012). Implementasi Etnomatematika Dalam Pembelajaran Matematika Pada Jenjang Pendidikan Sekolah Dasar. *Lentera Pendidikan : Jurnal Ilmu Tarbiyah Dan Keguruan*, 15(1), 41–54.
<https://doi.org/10.24252/lp.2012v15n1a4>
- Septi, & Irawati. (2018). Pengembangan Perangkat Pembelajaran Visual Thinking Disertai ktivitas uick on theDraw pada Mata Kuliah Metode Numerik. *Math Didaktiic: Jurnal Pendidikan Matematika*, 4(edisi dis natalis), 287–295.
- Ulfah Fajarini. (2014). Peranan kearifan lokal dalam pendidikan karakter. *SOSIO-DIDAKTIKA: Social Science Education Journal*, 1(2), 123–130.
<http://journal.uinjkt.ac.id/index.php/SOSIO-FITK/article/view/1225>
- Wahyudi, M., Joharman, M., & Ngatman, M. (2017). *The Development of Realistic Mathematics Education (RME) for Primary Schools' Prospective Teachers*. 158(Ictte), 814–826.
<https://doi.org/10.2991/iccte-17.2017.83>
- Wicaksono, D. P., Kusmayadi, T. A., & Usodo, B. (2014). Pengembangan Perangkat Pembelajaran Matematika Berbahasa Inggris Berdasarkan Teori Kecerdasan Majemuk (Multiple Intelligences) Pada Materi Balok Dan Kubus Untuk Kelas VIII SMP. *Jurnal Elektronik Pembelajaran Matematika*, 2(5), 534–549.
<http://jurnal.fkip.uns.ac.id>
- Yustianingrum, B. (2017). Pengembangan Perangkat Pembelajaran dengan Pendekatan Realistic Mathematics Materi Geometri pada MTs Berbasis Kearifan Budaya Lokal Suku Gayo. *Al-Khawarizmi: Jurnal Pendidikan Dan Pembelajaran Matematika*, 1(2), 123–133.