Development of Gayo Culture Based Learning Device with Realistic Approach

Zuhra Ruhmi*1, Cut Morina Zubainur2, Yusrizal3

*1 Master of Mathematics, Faculty Education, University of Syiah Kuala, Banda Aceh, Indonesia, 23111
*2 Master of Mathematics, Faculty Education, University of Syiah Kuala, Banda Aceh, Indonesia, 23111
*3 Master of Education Management, Faculty Postgraduate, University of Syiah Kuala, Banda Aceh, Indonesia, 23111
*Corresponding author email: zuhraruhrm9@gmail.com

ABSTRACT
Mathematical learning tools that integrate culture are needed to bring the learning of daily life together so that it can improve students' problem solving skills in learning as well as in life. This is a hope to be achieved in the implementation of education in the province of Aceh. But the learning device is not available yet. So it takes effort to help teachers develop the learning device. Gayo is one of the sub ethnic in Aceh Province. This study aims to determine the process and results of the development of learning devices based on Gayo culture with a valid, practical and effective realistic approach. The development model used in this research is the development of Plomp which consists of three stages: initial assessment, design / prototype, and assessment. The subjects of this research are VII grade students of SMP IT Azzahra as small test also big test to judge valid, practical and effective. The results of this study obtained the tools of learning mathematics based on Gayo culture has met the valid, practical and effective criteria.


ARTICLE HISTORY
Received: 29 January 2019
Revised: 14 February 2019
Accepted: 1 March 2019

KEYWORDS
Realistic Approach
Gayo Culture
Student Problem Solving Ability

1. INTRODUCTION.
Mathematics is one of the subjects taught at every level of education. Mathematics is also the queen and servant of science, so mathematics is seen as a structured and unified science, the science of relationship patterns and the science of how to think to understand the world around. The importance of mathematics, the National Council of Teachers of Mathematics (NCTM) states that mathematical topics are considered important for different reasons, such as their use of developing other mathematical ideas, in connecting various fields of mathematics, or in deepening the appreciation of mathematics students as discipline and as human creations useful in representasi and solve problems in or outside mathematics (NCTM, 2000).

Problem solving will encourage students to approach authentic issues based on daily life in a systematic way and cultivate a sense of curiosity about the material to be learned so that students are attracted and challenged to solve a given problem (acobsen, at al, 2009). The use of cultural contexts based on daily life is one way to improve student problem solving skills. This is in line with the standard process which says that one of the principles in the learning of the 2013 curriculum is learning that prioritizes the culture and empowerment of learners as lifelong learners and recognition of differences in the cultural background of learners Sanjaya, W. (2010).

Mathematics learning integrated with culture is a wish to be achieved in the implementation of education in Aceh Province. However, only a few schools in Aceh are designing integrated learning with culture. This is due to the limited availability of learning devices. In addition, teachers are also not trained to develop cultural-based tools so that efforts need to help teachers. Where teachers use only common learning tools without integrating with cultural values. This happens because many teachers have not mastered how to create lesson plans using local cultural values. Thus, the development of learning tools of mathematics with local cultural wisdom approach is expected to assist teachers in enriching learning tools that will be used Abubakar, A. (2013).

Gayo culture is one culture that has the potential to be integrated in learning tools. Gayo is one of the sub-ethnic groups in Aceh province. The majority Gayo community inhabits three districts, namely Central Aceh, Bener Meriah, Gayo Lues, and parts of East Aceh and Aceh Tenggara. Gayo community has its own culture that is different from the people of Aceh in general, whether in the form of art, culture, language and value system in social society (Bowen, 1993).

Gayo culture that has a close relationship with mathematics, among others: the use of poetry on Gayo songs can primarily be used to define open sentences and statements, this is the basic material of the subject of linear equations of one variable. A typical cuisine or cuisine can also be used as a visual aid or student learning resource that is also related to linear equations. The role of the Gayo-based mathematics learning device in addition to strengthening the mathematics learning materials also participated to socialize one dance Gayo is almost extinct Sining dance. Sining Dance was recently revitalized by the Cultural Value Preservation Center (BPNB) of Aceh in collaboration with the Ministry of Education and Culture (Yoga, 2016).
It takes effort to implement a culture-based learning one of them with a realistic approach. Realistic mathematics by Zainure (Tanjug, 2017) refers to Freudenthal's opinion that mathematics must be related to reality and mathematics is human activity. This means that math must be close to the child and relevant to real-life everyday. This Realistic Mathematics approach has advantages, the lessons become fun for students and make the students have the ability to solve the problems encountered in everyday life.

Realistic approaches to characteristics using real-world contexts, use of student models, production and construction, interactivity and engagement will involve students directly discovering their own math concepts taught. So hopefully this can improve problem solving skills by students and make students more motivated and like learning mathematics. Math learning with a realistic approach that uses matters relating to culture can help teachers activate students. Culture can be used to associate ideas and concepts of mathematics with the real life that students know. Through the culture of students it is important to find an answer to the given problem (Bonotto, 2008).

A realistic, cultural-based approach is expected to give students imaginable situations or select relationships with the real world close to their daily lives so as to enable students and train students to improve problem-solving skills, create fun classes, and encourage teachers to improve learning outcomes (Zubainur, 2008).

Based on the above explanation, it can be said that the learning of mathematics with culture is one of the teacher's efforts to implement meaningful learning and help students in solving problems. This paper is the result of research on Development of Gayo Based Mathematics Learning Device with Realistic Approach to Improve Student Problem Solving Ability.

2. RESEARCH METHOD

The research method used is the development of Plomp model which consists of three phases, namely: initial investigation, design or prototype making, and assessment. In the early investigative phase, identification and study of mathematics curriculum, student condition, and analysis of learning materials were conducted. This is done to obtain information about the availability of Gayo-based learning tools with a realistic mathematical approach. In the design phase / prototype design activities are done learning device and research instrument that is in the form of validation sheet of each learning device designed. At this stage also validation of learning devices that have been designed to the validator. After the learning device is declared valid, then proceed with the third phase of assessment. In this phase, a limited trial of the learning device has been produced. Trials are conducted to see the practicality and effectiveness of instructional devices (Plomp, 2013).

3. RESULT AND DISCUSSION

Gayo-based learning tool with realistic approach to improve student problem solving can be seen from valid practical and effective. This development refers to Plomp which consists of the following phases:

3.1 Initial Investigation

In this phase, information is collected through the interview stage using the instrument in the form of curriculum analysis sheet, concept analysis sheet, literature analysis sheet, existing tool analysis, situation analysis and condition of school and needs analysis, from the collection of information, it is found that: on curriculum analysis, the utilization of the daily environment in the form of culture is needed to support the problem solving ability of students, then do the concept analysis obtained that the learning process on the material equation and linear inequality one variable will be more meaningful if done with realistic mathematical approach. The result of literature analysis shows that in the matter of equation and linear inequality, one variable of teacher has not studied the characteristics of the existing culture, but also the instructional tool used by the teacher in the form of RPP is only oriented to academic value while the use of LKS in learning activities is rarely done, whereas the use of LKS can function actively students in learning activities and make it easier for students to understand the material (Prastowo, 2011). In the analysis of users/needs obtained that learning on this material required problems close to the daily life of students, one of the Gayo based learning culture. Based on the analysis, it is found that there is no learning tool available with realistic approach based on Gayo culture. Though the application of such learning strategy is very important to be used to help students solve the problem solving in mathematics and to know the culture and the values contained in it.

3.2 Phase design/Prototype Creation

From the results of initial investigation, it is necessary to design learning tools tailored to the characteristics of culture-based learning as well as principles on the realistic approach. Implementation of Learning (RPP) is designed in accordance with realistic approach and Gayo culture. Student Worksheet (LKS) is designed with attention to the objectives to be achieved in learning. While the test of learning result is designed to measure student's learning mastery in material of Equation and Linear Inequality One Variable. In this phase also performed the validity of the device specified based on the validation of 5 validators. In RPP obtained results four of the five validators said the device already meets the validity of the contents and constructs so that the RPP is said to be valid with a little revision. In the LKS, an assessment of the feasibility of the content is assessed based on the suitability of the topic on the LKS with the indicator, the conformity of the learning objectives in the LKS with the objectives of the learning, the suitability of the teaching materials needs, the suitability of the students' needs and the suitability of the language has been fulfilled, resulting in valid LKS results with little revision.

3.3 Assessment Phase

After learning tool in the form of RPP, LKS and test of learning result which is designed declared valid, then the next step is assessment phase to test the practicality, effectiveness of learning device with result of observation to the implementation of learning.

Practicality of Learning Devices

The practicality indicator in this study is that if it meets at least four out of five experts give consideration that the developed device can be applied in the classroom, the teacher states can apply the device developed in the class, and the level of implementation of the developed device, including in very high category. In the results of this study, the five validators have recommended that learning tools be used with little revision. This recommendation can be seen at the end of the validation sheet of each validator. In addition, teachers have also recommended that learning tools developed can be used with little revision.
The third indicator is the level of device implementation can be seen in the results of the observation analysis of the implementation of learning which shows that the average obtained from the five learning meetings reached 4.2. This means that the level of learning is very high. Based on these three indicators, it can be concluded that the learning tool with realistic approach of Gayo culture is practical.

The Effectiveness of Learning Tools

At this point will discuss the effectiveness indicators with the following results: the average activity on student LKS is at least 91%, the average activity on the task of students is at least 90%, the level of conformity of student activity is observed with the expected student activity of at least 80% , there is a tendency to increase formative test score/more than 50% of students give positive response to realistic mathematics based approach of Gayo culture, and teacher give positive response to realistic based culture based approach Gayo. Based on analysis result obtained average more than 80% students have been able to use and complete the LKS of development results well.

The second indicator seen in the student activity as a whole, the average student activity of the five meetings is 91%. This means that students’ activities on learning tools with Gayo-supported realistic approach developed are already running well. This is in line with the explanation of Taufik (2014) about learning by using the media to make student activities lead to positive things related to listening/paying attention to teacher explanations, reading / understanding learning materials, working on LKS, actively discuss / ask questions to friends / teachers, work and draw conclusions.

The third indicator is the suitability of student activity at each meeting. There are nine (9) activities that are expected to be implemented in the learning process. Based on the overall observed student activity it can be concluded that the level of suitability of observed activity with student activity is expected to reach more than 80%.

The fourth indicator is the tendency to increase formative score. This test is done at the end of each lesson, to see students' understanding of the material they have learned at each meeting. The result of the analysis showed that at the first meeting the average score of 79 students, at the second meeting the average score obtained by students reached 84. While at the third meeting, the average obtained reached 84, at the fourth meeting the average score reached 87 and the fifth meeting reached 91. There was an increase in the normative score at each meeting. It is also supported by the value of student learning result test, there are 23 students complete and 3 students do not reach the value of mastery. This shows that as many as 88.4% of students have reached completeness, it can be concluded that students’ understanding of the application material Equation and Linear Inequality One Variable is good. This is consistent with the explanations of Nofitasari, Mastur, and Mashuri (2015) that Gayo-style learning is effective against students' problem-solving abilities. This means that cultural learning presents material by linking the existing culture with the material to be learned, this makes students more motivated and easier to understand the materials learned because culture is often encountered in everyday life. Here's the response of students related to culture-based learning.

Figure 1. Students' comments on learning activities

From the picture obtained that the student's response to positive learning because the learning of culture-based mathematics makes students more easily understand the material being taught. This is because culture is part of the students' daily life which is the initial conception that has been possessed from the local socio-cultural environment. Teachers' responses to learning achieve an average of 4.4 from a perfectly average score of 5. That is, teachers also give a positive response to the implementation of the developed device.

Based on the result of the research, it can be seen that the learning device developed has fulfilled the predetermined indicators. Therefore, it can be concluded that the learning tool with realistic approach of Gayo-assisted culture has been effective.

4. CONCLUSION

Culture-based learning tool is one solution to facilitate students in learning mathematics. The existence of interconnection between mathematics with culture that comes from the experience of students makes learning mathematics students meaningful and fun. Therefore, the development of Gayo-based mathematics learning device is expected to improve students problem solving abilities.

REFERENCES

Cooperative Setting on Cone and Rectangular Prism Subject Material to Student of SMPN 1 Segeri. Prosiding Seminar Nasional. 1(1), 194.