

# THE ROLE OF THE CONTEXT OF THE FASHION PATTERN IN THE LEARNING OPERATION OF REAL NUMBERS

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## Abstract

This study aims to determine the role of the context of the fashion pattern in the learning operations of real numbers. In this lesson, learners are expected to be able to solve the problem of operation of real numbers in context. The method used in this research is the method of design research with the subjects of research students class X in SMK Negeri 2 Prabumulih, South Sumatera. This research develops learning result of real number operation by showing activity, procedure and strategies used by learners to solve the problem of operation of real number. The Indonesian realistic mathematics education approach is used in this study because it is in accordance with the context used. The results of this study show that the activity of making clothing patterns can improve the understanding of learners in understanding the operation of real numbers.

## INTRODUCTION

The education system in Indonesia is always changing from year to year with the aim of improving the education system in Indonesia to become a better child and producing learners who can compete with children other world. The learning of mathematics also undergoes changes no longer as rigid as in antiquity. Learning today is made as attractive as possible to be more easily understood by learners and able to cultivate the interest of learners in learning mathematics. Through (NCTM, 2000: 7) the purpose of mathematics consists of five points namely 1). Mathematical communication. 2) mathematical reasoning. 3) Mathematical problem solving 4) mathematical connection and 5) mathematical representation. It is expected that Vocational High School students learn math to apply it in their respective skills program according to the skills they want to achieve.

Number operation is one of the materials taught in Vocational High School (SMK). Numerical research studies have been performed by several previous researchers such as: reduction of integers (Muslim, 2012), decimal number learning (Pramudiani et al, 2011), positive and negative number operations (Rosmah and Khalid, 2008).

Some previous researchers have linked the learning of number operations with everyday life such as: number operations using picture display plays (Rully, 2012), number operations using land transport (Kairuddin & Darmawijoyo, 2011). So on this occasion researchers want to try to associate the operation of the numbers with the pattern of clothing that learners learn in high school vocational.

In the learning process the teachers sometimes still do not take advantage of the existing context in the environment. Whereas In (Zulkardi and Ilma, 2006) the use of context can be the beginning for learning mathematics. Zulkardi (2005) states that

learning mathematics will be more meaningful and interesting if teachers present contextual and realistic problems, issues that are close to the everyday life of learners. Like the current National Curriculum which is a refinement of the 2013 curriculum and the previous curriculum hopes that children can learn from the surrounding environment that is so close to everyday life. Some researchers have attempted to use several contexts such as Khairudin (2011) using the context of land transformation, Prahmana (2012) using the context of the traditional game of pat pat, Yanti (2016) utilizing the lottery coupon for mathematics learning and Eryandi Yayan (2016) using kemplang as a learning context . So many things that we can use to attract learners and make learners easier in understanding the concept of mathematics.

One of the majors in the vocational school is the fashion department. Before learners make their fashion patterns first perform a mathematical calculation that uses the properties of real number operations such as addition, subtraction, multiplication and division. Number operation is a subject that must be mastered by learners in Vocational High School. So that learners do not make mistakes in making patterns. However, learners still often make mistakes in operating the number operations such as research conducted by (Rully 2012).

According to Astuti (2010: 21) making clothing patterns is a skill to master the technique or making fashion patterns. Differences in the pattern of construction with other patterns are in several aspects such as body size taken, drawing techniques and so on Shoumi (2015). Preparation of own clothing patterns in teaching there SMK students majoring in fashion. Making a fashion pattern is the most important thing to do because if there is a mistake in the calculation then we will not get the results as we expect. If this happens in the industrial world it will incur losses. Creating clothing patterns will be more fun if we already know and understand the concept of real numbers. So that can reduce the errors of learners in taking the size as written by Shoumi Nurul (2015).

Based on the observations made by teacher researchers in SMK Negeri 2 Prabumulih still using the old method in teaching so as to make the learners' interest in learning math lessons decreased. Teacher's lack of understanding in designing learning materials is also a problem. Some attempts were made to improve the mathematical learning of numerical operations by using the Indonesian realistic mathematical approach (PMRI). The realistic mathematics approach of Indonesia (PMRI) refers to the Freundthal concept in Realistic Mathematics Educations (RME) The two fundamental views in Freundthal are 1) mathematics as human activity (in Zulkardi, 2010). The original idea of Indonesian realistic mathematics is to give learners the opportunity to rediscover ideas and mathematical concepts after gaining experience solving problems with the help of adults.

Based on preliminary observation and teacher information at SMK Negeri 2 Prabumulih, in teaching and learning process still not using context, so make learners feel bored and resulted in lower learner value. To avoid this, the researcher tries to design the learning mathematics with the title "Design Learning Real Numbers Operation using the context of clothing patterns for class X in SMK Negeri 2 Prabumulih".

## **METHOD**

This research uses research design method that will design the material of real number operation with PMRI approach using activity to make fashion pattern for class X in SMK. The process in this research design is cyclic process (repeating). The cyclic process is from experimental thinking to experimental learning in the form of diagrams with illustrations of experimental ideas from Gravemeijer and Cobb (in Akker, 2006).

The basis of this research is a cycle process designed in the form of alleged learning, test and revise the alleged learning in the classroom to produce the learning path. The allegations are analyzed and then redesigned and revised and then re-implemented (Gravemeijer and Cobb, 2001). The subjects of this study consist of: pilot experiment stage is a learner amounted to 6 people divided into 3 capabilities that is high, medium and low and the stage of teaching experiment class X Fashion Clothing SMK Negeri 2 Prabumulih amounted to 21 people. Part of design research is the development of theory between learning process and support learning. Stages of this research, namely:

**Preliminary Design** At this stage. The researcher makes HLT which contains learners activity, learning objectives and the informal thinking of the informal learners to formal. which is derived from foam pattern books and books that deal with the operation of real numbers.

**Teaching Experiment** At this stage. The HLT that has been made is piloted in stages. First, the pilot experiment stage at this stage of the researcher as teacher and model teacher observes the learning process. In the classroom teaching experiments performed on large groups conducted by model teachers. The revision of HLT into Learning Trajectory (LT) is carried out at this stage so that the mindset and strategies of learners are very visible by using the pattern of clothing on the material of the real number operation.

**Retrospective Analysis** In the retrospective analysis stage. The researchers reflect on the learning that has been done in the teaching experiment stage. At this stage the HLT has been designed compared to the actual learning process of the learner and from that the researcher can answer the formulation of the research problem.

## **RESULTS AND DISCUSSION**

### **Results**

The ongoing learning process consists of several activities. Before and after the activity is done the initial test and the final test in order to know the ability to understand the concept of learners. The activities undertaken are as follows:

Activity 1 “measure body size”



Figure 1. Measure Body Size

In this activity the learners sit down with their respective group mates and start measuring the size of their group of friends after they take the size of their group's friends then they measure the size of the body from the other group members then they present their measurement results in front of the class by comparing the measurement result which they do with the measurements of other group mates that are done on the same person. Ukurang they take is the size commonly used to make a shirt. Such as neck circumference, body circumference, face length, face and other facial. Learning objectives: Learners are able to distinguish the types of clothing and dress patterns, able to measure the size of the body and learners are able to explain the location of weaknesses in the measurement process.

#### Activity 2 "Drawing Pattern of Dress according to scale"



Figure 2. Drawing Pattern of Dress according to scale

In this activity learners are invited to view a slide that contains about the actual size and scale size. So learners can make inferences from the pictures they have seen earlier. After that the learners are asked to sit in groups and recall the measurements they have done before and then change the actual body size to scale size. Further learners perform real number operations to draw the archetype. Learning Objectives: Learners are able to change the actual size to size according to the scale and learners are able to draw the pattern of clothing according to scale. Activity results: at the time of measurement

obtained the size of the body circumference of 80 cm after changing the size of the scale with a ratio of 1: 4 to

### Activity 3 "make fashion patterns"



Figure 3. Make Fashion Patterns

Students in groups are asked to recall one size of group of friends, then learners are asked to create a pattern of clothing with the actual size, which in the process of making the pattern of clothing there are real number operations that must be completed first. Furthermore, one group presenting results of their answers in front of the class. Learning Objectives: Learners are able to pass the operation of real numbers and learners are able to create fashion patterns. Results Activity: before making the pattern of clothing learners first perform the operation of real numbers. One of its operations is  $A - a = \frac{1}{6} \text{ circumference neck} + 2$ . A-a is a calculation of profit looking for the length of the neck. After the measurement is known the circumference of the neck is 40 cm so  $A - a = \frac{1}{6}(36) + 2 = 8 \text{ cm}$ .

Activity 4 "solve real-world operations problems". In activity 4 students still do activities in groups. Learners are asked to solve the problems associated with the operation of real numbers and then present their answers to the front of the class. Learning Objectives: Learners are able to perform real-number operations into wider issues. Activity results: students in groups solve some of the problems that exist on the activity sheet. Learners answer some troubleshooting questions which are applications of real number operations. Then the participants are presented the results of their group work in front of the class.

### Discussion

Discussion From the results of design research that has been done, obtained learning path operation of real numbers using clothing patterns PMRI approach done in class X SMK. Based on research Tasman (2011) and Prahmana (2012), that learning mathematics by using PMRI approach can lead learners in recognizing the concept of learning mathematics. In addition, obtained strategic thinking of learners in completing the material operation of real numbers. The strategy is the impact of the HLT implementation that has been designed and piloted at the pilot experiment stage and then revised so that it can be applied to teaching experiments that produce LT. The learning

that is carried out using cloth clothing as the starting point to start the material of the real number operation. The context of dress patterns is used because according to Jan De Lange (1987), there are four types of contexts, one of which is: educational and work context Then learners present the results of the answers to the front of the class. Here learners together discuss the results of their answers with the teacher as a facilitator. includes situations of problems where learners may face them at school, including artificial problems that will be encountered in work situations (in Kairuddin & Darmawijoyo, 2011). Activities that exist at the time of making clothing patterns make the mindset of learners more widespread in reaching the material. To support the learning process, the PMRI approach plays a very big role in the learning process that takes place more active and efficient.

Student activity is more visible in accordance with PMRI characteristics. The characteristics of PMRI that appear in the learning process is in line with the thinking activity. The five characteristics of realistic mathematics learning by Gravemeijer (1994) are as follows:

- 1) Using contextual problems. Explain about the process by which learners start measuring body size then draw the next pattern make fashion pattern. This stage where mebuat thoughts from the informal stage to the formal stage. Learners are also invited to see the objects with actual size and then change it to scale form.
- 2) Using the model or bridge as a vertical instrument Attention is directed to the development of models, schemes and symbols of formally transferring formulas or formal mathematics. Learners develop the body sizes that have been obtained into a fashion pattern in the form of images using a scale.
- 3) Using the contribution of learners Great contributions to teaching and learning should be derived from the contribution of learners themselves that lead them informally toward the formal. Learners perform real number operations that exist in the activities of making clothing patterns.
- 4) Interactivity. In the learning need to carry out the interaction, both between learners with learners and between learners and teachers who play a role as a facilitator. Students conduct measurement of group of friends, learners discuss their answers and present their answers is the interaction between learners. Interaction with teachers in the form of questions that come from students to teachers and vice versa.
- 5) Integrated with other learning topics. PMRI puts intertwinement between mathematical concepts as important things that must be considered in learning, because basically the concepts of mathematics are not partial, many mathematical concepts that have relevance. The linkage between the material of dressing with mathematical material in the form of oprasi real number.

## CONCLUSION

The use of fashion patterns in mathematics learning can be used as a starting point. Because the pattern of clothing is related to the daily activities of students of SMK so that it can help learners in determining the concept of operation of real numbers. The size of the clothing patterns that can represent the generalized mind image of the learner's pattern in determining the fashion strategy so that it has the power to use.

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