4th Observation Report:
Learning to measure in sewing as a fun design learning using approach PMRI in class III A SD N 117 Palembang

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A. Introduction

Mathematics nowdays has a very important role in our daily lives. Starting from the simplest everyday life for example measuring of length of table, book, whiteboard until to life more complex and modern such as information and computer technology. Concepts in mathematics when it has been mastered well and right by the students at the primary level will be able to assist in developing of critical thinking ability of students in overcoming the problems that arise in everyday life and in the future. Therefore it is very important to give the good and right concept about mathematics education from primary school.

One of the mathematical scopes is the ability to measure. The concept of measurement is very important in daily lives. Measure has been carried out by those of ancient people by using fingers, hands and feet as a measuring instrument which is informal. Van den Heuvel-Panhuizen (2004) said that why measurement an important subject matter area in mathematics education is. First of all, measurement comprises an aspect of practical skill that is important in daily life. In the textbooks of 3rd grade of elementary school, "Buku Cerdas Matematika" (In Indonesia) (Nur Fajariyah, 2004) presents the content of the matters relating to everyday life, i.e. selecting the measuring instrument in accordance with its function as ruler, metelin, roll meter, and so on.

One of the mathematics learning developed in the 21st century is realistic mathematics education. Realistic mathematics education in Indonesia refers to the idea of Hans Freudenthal (1991), mathematics as human activity. According to Freudenthal (Van den Panhuizen-Mercure, 1998), mathematics must be close to children and be relevant to everyday life situations, to become a man of value.

Therefore, we (Fanni Fatoni, Achmad Wachidul Kohar and Wisnu Siwi) together with teacher in III grade of SD Negeri 117 Palembang have a collaboration to design learning using PMRI approach on material measurements by asking students to measure his own body on the activities of sewing. The details of how the teacher and we designed learning, implemented the plan and then do an analysis of the results of the implementations is described in the learning design.

B. Purpose of Observation

The purpose of this learning design and observation are to:

1. Describe the learning activity using PMRI approach through the activity of measurement of length several bodies in sewing.
2. Give experience for observer team to design and hold learning using PMRI approach on material measurement of length.

C. Learning Design

The activity of this learning is done at class III A SD N 117 Palembang. The material taught in this learning is the measurement with focus from observer team to introduce the measurement tools of length and do measurements using standard gauge. The steps of these activities are preliminary design (curriculum analysis, the determination of indicators and learning objectives), continued with teaching experiment and retrospective analysis (reflection of learning) which will be described as follows.

1. Preliminary Design

The activity which is done by us in this learning is to do the curriculum analysis which aims in order to make the design learning according to the mathematics curriculum that apply at third grade of elementary school as a subject in its learning. Those analyze consist of determination of material, the purpose of learning, and an indicator of learning.

Based on the discussions that we had been doing with teacher (Mrs. Fatmawati), the material of the measurement of the length is joined with the measurement material of time and weight. On 6th November 2012, she gave

suggestions for the preparation of lesson plan (RPP) at I-III grade compiled by using thematic RPP and slip about character education for students. She gave the example of the thematic and character format of RPP in SD N 117 Palembang that has been used so we could use it in the preparation of RPP in the learning process.

In addition, she gave advice in order to RPP enclosed with sheet evaluation and assessment criteria so we can give the maximum value in process of students evaluation during the learning process. She also showed the examples of reports created by another team of researchers who conducted observations in SD N 117 including RPP, sheet valuation and assessment criteria. She recommended that at the end of group worksheet, the student is directed to determine the conclusion of their learning activities. This conclusion is also related to the purpose of the learning activities of students.

Then we compiled the standard competence and basic competence in RPP that is divided into 3 themes based on Mathematical subjects, Indonesia Language and social science. The standard and basic competence in the subjects of mathematics is to use the measurement of the time, length and weight in problem solving and get to know the relationships between units of time, a unit of length, and a unit of weight. Furthermore, formulated regarding the learning objectives and learning indicators. The focus of this study material is students can select the required measuring instrument corresponding to the situation with regard to the measurements by providing the right reasons and determine the right measurement tool in the life in a problem-solving measuring shirt in sewing.

Before the process of learning, we designed the contents of learning activities that would be carried out. We involve five characteristics of PMRI. There are to use of context, interactivity, *contribution student's, intertwining of learning strands and use of model* (Treffers in Van den Panhuizen-Mercure, 1998). We chose the context that the function is to take benefitted of reality as a source of mathematics applications to introduce length measurement tools in everyday life as a starting point (use of context) like metelin, ruler, roll meter, strature meters (tool of measuring height). Through the activities of the

knowledge, we expect of students that can have direct experience in knowing and even use directly the length gauge.

In related to the expected process of matematization is student can build a mathematical model which is the bridge for students from informal to formal situations (the use of model) during study. In addition, we plan to use the students contribution where students are given the opportunity to develop informal strategies in problems-solving that can direct them on contribution of solving procedures with the teacher's guidance expected students can find out about the several gauge lengths in everyday life according to its use and can use it properly (the student contribution).

Students contribution in problem solving will evoke interaction between students with students, students with teachers as well as students with our learning device design through discussions between groups that appear explanation, agreement and the question among students (Interactivity). the fifth characteristic that we apply in the learning design with the purpose that the structure and concepts mathematical can be interconnected in the process of learning more meaningful (Intertwining).

After composing the study involving 5 characteristics of PMRI then we compile an iceberg the length gauge material here.

Figure 1. *Ice berg* of length measurement

After drawing up the learning design and discuss of RPP to be created, we wrote down the design into RPP and LKK (group worksheet) who then consulted with Mrs. Fatmawati. We exposed these learning details that have been made. In general she agreed the scenario learning.

2. Teaching Experiment

Learning activities held on Wednesday, November 21, 2012. On this occasion, one of the members of the research team serves as a teacher, namely Fanni Fatoni assisted by Ahmad Wachidul Kohar, Wisnu Siwi in conditioned students during group activities and Mrs Fatmawati as an observer in the classroom.

Learning activities began at 1.10 pm after students finished marched and prayed. The teacher started the learning activities with reminding the previous material that is the relationship between the unit of weight to students. Many students that provides excellent response from the teacher's questions, they are enthusiastic once in answering the teacher's questions. Furthermore, entering the material to be taught is the measurement of length, teachers started from a simple thing with inviting students to measure the length of pencil and other types of length measuring instrument that they have ever known before. Almost all of the students have no trouble in delivering the reasons of pencil which is longer and how do I know that the pencil is longer than the other by measuring using a ruler.

Figure 2. Students enthusiastically give opinions in measuring pencil.

The next activity was continued by referring students to mention a variety of suitable length measuring tool used to measure the length of a pencil, fabric, and body height like ruler, roll meter and its functions. However, they did not know the name of height tool. This activity is application of the use of context. Despite the fact they have been using the tool to measure it before.

On apperception activities, teacher also gave students a problem related with the length measurement of main activities of learning in which steps in sewing from body measuring and fabric measuring. Students mentioned sewing steps well that they ever known although they did not mention systematically but with the guidance of teacher, they finally can mention from body measuring, fabric measuring, fabric cutting and cloth sewing.

On main activities, the learning process was continued with the formation of group to work on LKK of length measurement that consist of ten groups where each group consists of 4 students heterogeneous. Teacher distributed LKK and explained the steps that doing it that was divided into two activities. Two of those activities are activity 1 is to determine the appropriate gauge of a given situation; activity 2 is the practice of body measuring from the booker cloth required for sewing. In practice measuring length, a unit that teachers used in this learning process is cm often used in Indonesia.

a. The First Activity (The Activity to find of measurement tool precisely)

The first activity started to run after teacher was providing explanation to students and enquiring back whether they understand intent of the first activity. After students understood the task in this activity, students did next question that is in LKK. In under construction of first activity, teacher gave time to students to complete LKK in 10 minutes in the hope of students can finish it on time. In following picture bellow is the activity of student in discussion

Figure 3. The implementation of student discussion in groups

When teacher went around looking at the answers to each group, students can determine the type of the length measurement tool acording to his functions such as measuring instrument which is suitable for used of a builder in measuring the length of the wood is a roll meter. However some groups are

still not able to convey the reasons in a timely and properly in accordance with teacher's expectations why a measuring instrument has a specific function. In this process, it still forms part of the use of context. For example why measuring instrument used in construction works is roll meters, instead of the ruler/metelin/strature meters. Why measuring instrument used in measuring the fabric is metelin, instead of the ruler/roll m/strature meter. Here are a variety of answers students for the first activity.

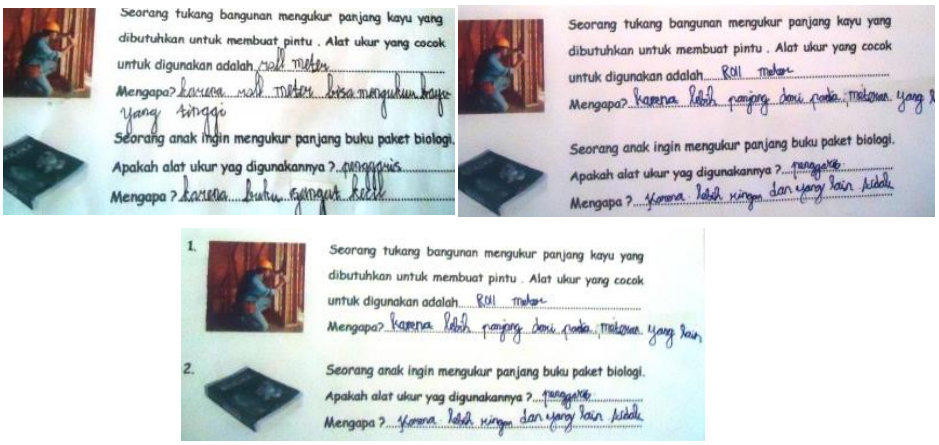

Figure 4. the variation of answer in the first activity.

There was an interesting thing in the first activity at the time of learning process took place, we saw one group doing suit in determining who became the secretary, who as chairman of the group. In addition, we observed there was one of the students named Talita Aurelia in the group suddenly passive did not want to come work with other friends.

We observed before that this student were active at apperception activities before the group and even went in front of class to measure the length of the pencil using a ruler. The teacher tried to ask her why she still did not want to come work with her friends?. But she didn't want to answer questions from the teacher and remaining silent. seen from this incident, the teacher tried an attempt by adding one of the students who are very active and brave in other groups to join her group named Salsabila A. Finally, this effort succeed where Talita started back a little eager and willing to cooperate in the group.

b. The Second Activity (The Activity of Body Measurement)

After the discussion of the first activity was completed, teacher explained the second activity that the practice of body measuring of booker cloth required for the purposes of tailoring that was part of iceberg as the model of in this learning in which students were asked to be a tailor to measure directly the various size of student body. The teacher explained the question in LKK about a tailor getting gown orders school from elementary school students. it was necessary to measure the student body members. Because forgetting to put the usual metelin was used to measure the booker of them clothes, so she/he used a rope.

Teacher explained to the students about the task of each student in a group where the first student acts as a tailor who is in charge of measuring the body section of the booker, the second student acts as the cloth booker which were measured over the body (the body section of the abdominal circumference, arm length, the distance between the shoulders, waist circumference, the distance between waist-eye), the third student as ruler bearers in charge of checking how long the rope is used to measure the booker while the fourth students as noted the size of the booker body that has been measured.

The teacher gave examples first before doing the second activity by requesting one of the groups to come in front of the class. In giving this example, many students from each group who wishes to come in front of the class. In this occasion, the teacher tried to ask Talita's group (students who were passive, less excited about the beginning of the activity group) to present in front of class in order to see if Talita was still passive/active again. Finally, she was active and back her motivation.

Figure 5. Talita's group go in front of class

The teacher gave time to each group to carry out the second activity as much as 20 minutes. When we got around observing the performance of each group, we looked at some strategies that emerged at that time when students did activities measuring as follows

i. Students measured the body directly using the ruler without rope where was not according to the teacher's instructions. This is true when they measure the straight body parts that look like arms and legs

Figure 6. The measurement using of ruler

ii. This second strategy is the implementation of the iceberg as the model for which was directed to measure using a tool that was not such a raw rope. It became the most strategy performed by students. The students used a rope first to measure the body, assuming one of the ends of the rope as a starting point of measurement. They did when measuring all parts of the body that was measured as the arm length, the pants length, a circular body parts such as abdominal and waist circumference. They began the step of work by holding one of the ends of the rope and put into the body section to be measured, then loop the rope around the belly/waist to stop at the point at which they began to put the rope.

Figure 7. The measurement with the rope first on the straight body section through one of the ends of the rope

Figure 8. The measurement on the circular body section through one of the ends of the rope

The next step was to draw the rope on the table with a fixed point at which they stopped holding the measure, then to measure the length of the rope from the start point to the end point by using the ruler. Because waist circumference length of the students more than 30 cm, which is the length of the length of average they used. They put the add ruler on the side of the first ruler to measure the waist circumference. Activities performed by students in the activity of measuring the length of rope with ruler was the application of iceberg as form of formal mathematics.

Figuere 9. Strategy to measure of rope with ruler

iii. Students did not measure through one of the ends of the rope but through the middle section/take an arbitrary starting point measurement that is not from one of the ends of the rope especially on parts of circular the body.

Figure 10. Measuring on circular body through an arbitrary point

This strategy was also widely presented students when measuring the circular body. These measurements on the body were started with holding both ends of the rope, then looped to the waist/belly and mark the two

points of measurement obtained. Furthermore, the ropes are stretched out on the table and measured the length between the two points. Interesting things found was there were some groups who did this strategy made a mistake in choosing a starting point of measurement. After the rope looped to belly/waist, they just marked one point from rope. In fact, they were supposed to mark the two points in the rope as they did not begin to measure from one point of the ends of the rope. Furthermore, they can make the process of measuring by using of ruler. The steps of student in length measuring of the rope using ruler was similar to Figure 10 above.

iv. Students measured directly the right size shirt on a task in LKK by placing and using ruler directly. So that students did not measure student's body first in advance using either rope or ruler.

Figure 11. Measuring the task directly

After students completed the second activity for approximately 20 minutes, the students were discussing in groups and activities continued with presentations from representatives of several groups to show their work to the class. Teachers guide this activity by asking the group representative to read out the results in each activity in turn. Teachers were also asking for responses from other groups if there was an answer that was different from the group's presentation. For the second activity, the students answer from all groups could be seen in the picture below.

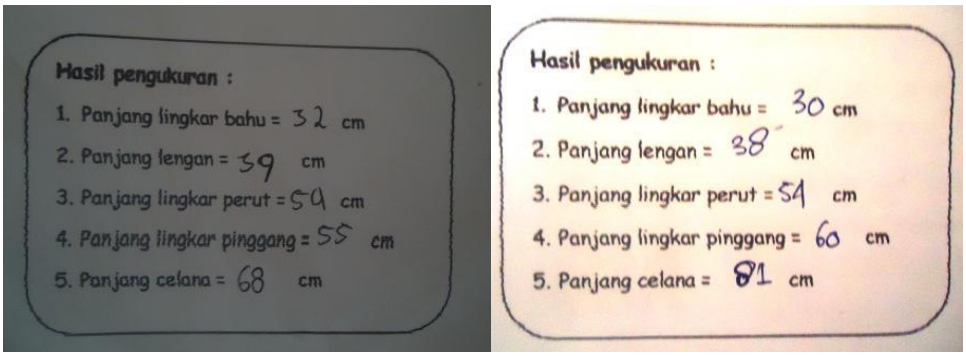

Figure 12. The answer variation on the second activity.

From those pictures above, there was given that the answer of each group was different but almost of the answer from students consist of the same answer. It was because of the same of their body size.

From the pictures above it was known that answers each group varies but most of the student's answers were on the same size range. This was because of the student body is almost the same so probably got the same measurement results was larger.

3. Retrospective Analysis

Through the retrospective analysis, we analyse the learning process that has been implemented and also compare between instructional design which has been made of the fact that occur when learning based on discussion with Mrs. Fatmawati, team and observations through video and photographs study documentation activities.

In general, the study which was carried out in accordance with RPP are formed, and the learning can took place with sufficient time was 70 minutes. Mrs. Fatmawati gave suggestions in the learning process, so that the teacher emphasized with more emphatic that pupils should not be too crowded. However as we watched the video at the time of the learning process took place mainly at the time of the discussions and presentations, students tended to talk because they wanted to scramble forward. In addition, when representatives of the group delivered their answers and opinions in front of the class, the other students in other groups have already claimed one of the answer groups that advanced. So we assumed that the students here were still associated with the process of learning activities.

When we observed the students answers in the first activity in image

captions above, the answer of students was divided into two answers which are not appropriate answers and answers are already appropriately in accordance with our expectations. However, when we asked students to come in front of class with the group with answers that were not appropriate, students were able to give a more complete answer which means that students' ability in expressing the answers through writing was still weak but with the guidance and discussion with other groups, they can reveal correctly through their opinions. This can be seen through an example conversation results in a presentation of students.

Teacher : What is the suitable of tool measurement for the question No 1?

Student : Roll meter

Teacher : Why?

Student : Because roll meter is tool measurement (This answer is not less precise)

We gave an opportunity for the other groups and they gave an answer that:

Student of another group: because of roll metres long and made of iron.

Student of another group: because of roll-meter can measure the longer object than the others.

from the two additional answer above, students became better know which was more true that roll meters used to measure the questions of No 1 because it was made of iron, making it easier to use and is longer than any other measurement tool.

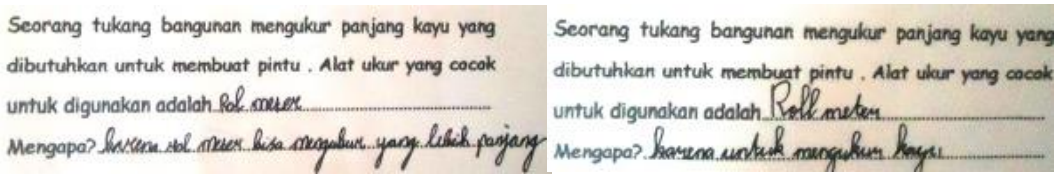

Figure 13. The precise and not precise answer in the first activity.

While based on observations on the second activity (length measure activity) through four strategies carried out by students, especially at the fourth strategy in which one group of measuring directly the size of the cloth on LKK. We asked the students why do such a thing. From their answers, we got that it turns out students in the group less listening to instructions well and true. But after receiving a briefing from the teacher, the group eventually can measure with the correct step to use the second strategy.

Most of mistake of each group was when students measured the rope using a ruler. In the beginning, the students just put directly the two perforated side by side without looking at the scale of ruler. However, after the teacher asked the students to check back their way to measure by observing a scale of measurement in ruler, such as the scale of centimeters should be sorted with a scale of centimeters instead of inches scale. 30 of scale cm at the first ruler should be put with a scale of 0 cm in the second ruler as in the picture below.

Figure 14. The Mistake of measurement when stick on ruler.

In addition, students were less scrupulous to give a mark on the rope when measuring by using an arbitrary point not through one of the ends of the rope. But students through the guidance from teacher can find the process of measurements on a rope properly.

In General, the students of SD N 117 Palembang can do the activities of fun new learning through activities to measure the body on sewing. The above activities were in accordance with PMRI approach involving the use of context such as the use of metelin, roll meters, ruler, strature meters (height measuring). Involving the use of models is to measure the rope then using a ruler which is a form of matematization from informal to formal situation.

Student's contribution lies when students find out their selves how the steps and strategies to measure length using a ruler on the rope and interactivity that is demonstrated by the establishment of communication between students in groups and communication between students and teachers at the time of the presentation. In the meantime, the intertwine between the material (intertwining) using PMRI approach more meaningful that refer to steps of measuring using a ruler where students are less conscientious using a 0 scale so to provide meaningful experiences that measure with a ruler always starts from 0 scale.

D. Conclusion

Based on the design and the learning process that has been implemented in class 3 A of SD N 117 Palembang, we conclude the following things.

1. Students can measure the rope by using the ruler through PMRI approach in order to give a new learning experience for students and the research team.
2. The need for thoroughness for students in the process of measuring and listening to the teacher's instructions properly.

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