

The Mathematics Learning in Frontier Schools

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Abstract – This present research is aimed at understanding the implementation of Mathematics Learning in frontier schools. The subject was one of the mathematics teachers in State Senior High School 2 Pidie Jaya Aceh taking part in the Undergraduate Educating Program for frontier, outermost, and disadvantage regions. A qualitative approach with the type descriptive research was adopted. The data analysis employed was the analysis of documents and transcripts of interviews. The results of the research showed that mathematics learning was still not maximal. The teacher did not make Learning Implementation Plans, did not make innovations in mathematics learning, and merely employed lecturing method. Moreover, the teacher did not pay attention to the students' understanding of the materials presented, as a result many students did not understand mathematical basic materials such as materials of positive and negative number basic operations. It is also caused by the inadequate background of the teacher of mathematics in this school.

Keywords – Learning, Mathematics, Learning Sources.

I. INTRODUCTION

Learning is a combination of components that affect each other in attaining learning objective [8]. Learning activities are essential in the whole educational processes involving two active actors, teachers and students [3]. The learning process itself is a system. As a system, the whole elements forming the system possesses with interdependence characteristics directed to attain an aim [22].

Success in learning may be seen from two aspects namely product and process. The two aspects are important. The success in learning that is merely be viewed from one aspect is not perfect [22]. Moreover, the success in a learning system may be known from the success in the attainment of the learning objective. A better and quality mathematics learning organization is a must [14; 12].

A learning process naturally is a communication process, where a teacher plays a role as the message conveyor to students as the message acceptor. The message conveyed by the teacher is in the form of contents/learning materials packaged into good verbal (words and writing) or non-verbal communication symbols. An important which often happens is a less clear message conveyance, so that the message is not well or wrongly responded [17].

A learning process will run well if it is supported by a teacher with high competence and performance, since she or he is the spearhead and frontier implementer of education at school and the curriculum implementer [15]. Attainment of a process standard to improve the learning process quality may start from analyzing each component

that may form and influence the learning process itself. The components of the learning system itself are students, objectives, condition, learning sources, and learning results. There are so many components influencing the learning process, but the component that has been considered to have a great influence is teacher [21]. Therefore, a teacher has a direct responsibility to improve the quality of education through the improvement of the quality of learn the learning process and learning results [24].

One of the components affecting learning results is learning sources. The learning sources themselves are all sources in the form of either data, persons and certain things that may be used by students in their learning process either separately or in combination with other things that facilitate the students in obtain certain competence [4; 5]. Learning sources may also mean as any power that may be made use of for the sake of teaching-learning process, directly or indirectly, in par or in whole [26; 19; 8].

A learning gap in Indonesia still cannot be denied, especially in certain areas of which the quality of education is still low. One of the causes is the learning approach adopted. This statement is reinforced by [11] mentioning the learning approach to mathematics in Indonesia is traditional or mechanistic in nature emphasizing on doing exercise, procedures or uses of formulas. As a result students are not used to solving many problems or applying mathematics in their surrounding environment. The learning approach adopted indirectly results in the students' learning achievement. On the basis of [16] research, the motivation to learn and the average achievement in mathematics among students in State Junior High School 16 Banda Aceh were low. This shows that there are some hindrances in learning mathematics in State Junior High School 16 Banda Aceh.

According to [17] research, among some Junior High Schools in Banda Aceh, some facts were found: 1) the teachers' competence in developing learning materials were still low; 2) their knowledge on their roles and responsibilities at school was still low; and 3) there is no appropriateness between the teachers' background knowledge and the subjects they teach. It is this fact that causes the learning implementation is not maximal, resulting in students' less mastery of learning materials. It is also reinforced by [13] research in State Elementary School in Pidie Aceh showing that 28 students were still under the Minimal Mastery Criteria, and the number of students reaching the criteria was just two as shown by the results of the test on the material of mixed count operation. The result of observations also showed that there are still less active students in learning activities and there were also students who did not understand materials presented

by the teachers. It shows that students' learning achievement was still low, so some improvements in mathematics learning at this school should be made.

The condition of the mathematical learning may be solved by improving the competence of the mathematics teachers. There are many ways to improve their competence for examples by asking teachers to join in activities of Better Education through Reformed Management and Universal Teacher Upgrading program such as Teacher Education Consensus Points (TECP) and Workshop in Approach to Indonesia Realistic Mathematics (AIRM). According to [20] as a whole the performance of the respondent teachers joining in the BERMUTU program was categorized as good. Teachers shared their experiences and discussed and made learning preparation collectively. Moreover, according to [6] workshop held by AIRM may also improve the competence of mathematics teachers in doing their learning process using the AIRM approach. The changes in the learning process between before and after joining in the workshop was very significant.

Besides the activities above, Reciprocal Teachings, Mathematical Learning Model namely Interactive CD-Aided Creative Problem Solving approaches were also applied. Based on [16] research, there was some improvement of the learning achievement in mathematics among the students taught using Reciprocal Teaching approach. Moreover, students were also more active so that mathematics learning was more interesting. On the basis of [18] research, it is shown that students' activities in the Interactive CD-Aided CPS model gave a better effect on their ability in problem solving and their achievement. Students joining in this learning process had fulfilled their learning mastery and had better ability in problem solving compared with those who were joining in conventional learning activities. Therefore, the problem of this present research is presented in the form of following question: How is the professionalism and competence of mathematics teachers in State Senior High School 2 Bandar Pidie Jaya Aceh?

II. RESEARCH METHOD

Qualitative approach with the type of descriptive in nature was employed in this present research. Informants were mathematics teachers in State Senior High School 2 Bandar Pidie Jaya Aceh who were joining in the Undergraduate Educating Program for frontier, outermost, and disadvantage regions. Instruments made use of were transcripts of interviews, documents and observations during the mathematical learning activities.

The steps in the data analysis were as follows: organizing and describing data systematically, choosing and sorting out important data, and making conclusions. The data analysis was made by analyzing the transcripts of interviews and photos obtained. A detailed analysis was made to understand the implementation of the Mathematics learning in State Senior High School 2 Pidie Jaya Aceh.

III. RESEARCH RESULT

On the basis of the document data, it is shown that the number of teachers in State Senior High School 2 Bandar Pidie Jaya Aceh was 34 persons. The number of the mathematics teachers was merely three persons, including those joining in the Undergraduate Educating Program for frontier, outermost, and disadvantage regions program, while two teachers were volunteer teachers. No permanent teacher was found at this school. Viewed from the ration between the number of students and that of teachers, it was good, the school facilities were also good. But, among the teachers, their competence was still very minimum. From the results of observations, the teachers may be able to make use of the available facilities such as books and LCD. It is confirmed through the interview with the informant:

The facility in this school has been adequate, but teachers in this school cannot make use of the facility. The number of the mathematics teachers is 3, including me. Here, the number of teachers are many, but their competence is minimum ... the two teachers are volunteer teachers, different from honorary teachers. Honorary teachers must be paid, but volunteer teachers are not certain to be paid.

In the mathematics learning process in this school, Aceh language was used, it is not because that the teachers and the students in this school were not able to use *Bahasa Indonesia* but it is the habit factor in using the local language anywhere and anytime. So, when teachers spoke *Bahasa Indonesia* during the teaching-learning process, the students in this school would be late in understand the material. It can be seen from the results of the following interview:

Either the teachers or the students are able to use Bahasa Indonesia, but it is caused by the habit to use the local language anywhere, in the meetings, at school. All use Aceh language. So if we use Bahasa Indonesia they would be late to understand the materials.

Based on the document data, the curriculum applied in this school was School-based Curriculum, but the implementation of the learning process in this schools was inadequate and had not fulfilled the School-based Curriculum criteria. Mathematics teachers taught freely, they did not make any innovations or did not develop any creativity in their learning activities. The learning method adopted was just lecturing, and the students took notes the materials presented by the teachers. Whereas the role of teachers in the School-based Curriculum is the facilitator in the learning activities. This causes students in this school to be used to accepting materials given by the teacher. It is seen from the following interview:

Thanks God, I am a mathematics teacher in this school. It has been in line with my major, but the learning innovation in this school is still lacking, the learning method adopted is merely lecturing ... here students merely take notes, they are very hard to be asked to do the exercises.

Moreover, mathematics teachers in this school did also not pay attention to their learning quality. Teachers merely

gave an emphasis on finishing materials in the books without any attention whether their students understood them or not. It certainly influences students' knowledge on next materials. If students did not understand previous materials presented by the teachers, they must be difficult in understanding the following concepts. Therefore, mathematics teachers joining in the Undergraduate Educating Program for frontier, outermost, and disadvantage regions program should teach the materials of basic mathematics to make the students understand them. It can be seen from the results of the interview below:

Here, for the teachers, the learning materials finish, without paying attention whether their students have understood them or not. Last year in a year i just taught 3 chapters. I just taught them to do basic operation.... Principally I try to make my students understand first: Because if they are presented difficult integral materials, they still have difficulty.

One of the causes why the quality of the mathematics learning has been maximal is inadequate human resources. It can be said that the teachers in this school possess an inadequate background in teacher education. Due to inadequate education facility, high quality teachers are rarely found in this area. It is seen from the following interview:

The quality of higher education (campus) is also apprehensive, it is located in a shop house, so the scholars produced are also inadequate.

On the basis of the document data, it seems that teachers did not make any Lesson Units (LU), as a basis in doing learning activities, so that it can be said that the learning activities were merely done. The Lesson Units were copied from other teachers and served as formalities when supervisors asked them. It can be known from the following interview:

Don't ask LUs, here all teachers merely copy paste. I did not make LPs but Learning Plan and LUs made as formality when the Supervisor asks for.

Teachers in this school did not master learning materials deeply. It is because mathematics teachers in this school are the graduation of a college that is inadequate. Based on the observation made by an informant, the two teachers were graduated from a college with a low quality. It is seen from the location of the college which is in a Shop House. Based on the results of observations, the impact on the learning implementation is that the learning materials were not well conveyed. This then caused students not to understand the materials presented. For example, it can be seen from the material on the positive and negative integers operation. The third-year students of Senior High School had not mastered the material. Whereas the material had been taught since they were at the elementary school level. This condition is certainly apprehensive. It can be seen from the results of interview with an informant below:

Here, the students' mastery of basic mathematics is very bad. I was shocked when i came to this place finding that the third-year students of Senior High School had not understood the material on positive and negative integers

operation. So last year i merely taught 3 chapters. Students did test items according to their ability, hoping that the government knows that the school here is different from those in Java.

From the descriptions above it can be said that the mathematics learning in the place of the research is very apprehensive due to teachers' inadequate conditions.

IV. DISCUSSION

The results of this present research show that the mathematics learning method employed is monotonous without any innovations. It is in line with statement by [11] that the mathematics learning approach employed in Indonesia is still traditional or mechanistic emphasizing on exercises, procedures and the use of formulas.

Viewed from its facility, this schools has had adequate facility, but the teachers cannot make use of the existing facility. They should always make innovations in their mathematics learning activities to improve the students' achievement in mathematics. To reach effective learning process, a proper approach, model or learning process is needed [25]. The curriculum adopted by this School is School-based Curriculum. In this curriculum teachers serve as facilitators, a teacher-centered learning process is not allowed. It is in line with the research result by [9] that the teacher's knowledge on a learning model is still dissatisfactory.

The mathematics learning quality in this school also needs to be improved. The teachers in this school merely gave a priority on finishing materials in the books without paying attention whether the students understand the materials or not. It is in line with the finding in the research by [17] that teachers have limited ability in the development of subject matters. If teachers just give a priority on finishing the materials in the books without paying attention whether they understand them or not, it certainly influences students' understanding on concepts in the next materials. This results in students' low understanding of the materials.

According to [21], teachers should act as demonstrators where they should be able to show how to make each learning material presented be easily understood by each student. Concepts of basic materials should be planted into the students' mind so that they will be able to learn the next concepts. No wonder that there are many third years students in this school who still have not understood basic concepts of positive and negative integers operation. The background of the mathematics teachers in this school is also apprehensive because the facilities in their college which did not support their learning process.

On the basis of the research made by [23], it is shown that the teachers in the field of mathematics study in SMA when they were presented questionnaires in the form of multiple choices dealing with mathematical problems show lower scores compared with students' scores. Either the teachers' or students' scores in five schools tried out were lower than average scores in the city, namely the scores of all students all over Banda Aceh city in the 2011 National Examination. This indicates the teachers' weak

understandings of the materials in the schools, so that this results in the mathematics learning is not maximal.

Dealing with lesson plan, on the basis of the results of interviews with mathematics teachers in State Senior High School 2 Bandar Pidie Jaya Aceh, the teachers there did not make any Lesson Plans in the implementation of their learning process. Teachers should make lesson plans that will be applied to result in a more focused teaching-learning process. According to [22] a lesson plan is not only made for the sake for administrative complements, but is organized as an integral part from a professional job, functioning as a guide in learning implementation. Before doing a learning process, a teacher should possess an ability to make a lesson plan [1]. The lesson plan made is expected to be able to support activities and efforts done efficiently and effectively to reach a learning objective [2]. Teachers are expected to be able to design a learning activity that may improve students' ability in accepting materials and catching meanings from the school tasks if they are able to related new information and their previous knowledge and experiences [10].

V. CONCLUSION

On the basis of the descriptions above, it can be concluded that the mathematics learning in State Senior High School 2 Bandar Pidie Jaya Aceh is still less maximal. It can be seen from less learning innovations made. The learning methods employed by the mathematics teachers in this school tend to be lecturing method. Moreover, the teachers in this school have an inadequate background of teacher education.

Teachers did not make lesson plans in their learning process, but those joining in the Undergraduate Educating Program for frontier, outermost, and disadvantage region program merely made lesson plan, instead of Lesson Unit. Teachers merely make Lesson Units as formality to show to the supervisors when they are asked. The materials presented are not deep. Teachers merely present materials according the orders in the books in order to be able to give all materials to the students without paying attention whether they understand them or not. It is that results in students' understanding of materials is very low. Therefore, it is no wonder that the third year students of State Senior High School still have not understood basic materials such as negative and positive integers operation.

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