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Learning Number Based Theory on Edmodo Using the Context PMRI of the Palembang PGRI Building and Apam Cake

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ABSTRACT
Learning Number Theory using context is a way that can be done to help use mathematical skills in everyday life. In addition, learning using context will make it easier for students to put mathematics into context so that it will help students use problem-solving skills in lecture learning, be able to answer questions, and can challenge students' mathematical thinking patterns. The purpose of this research is to see to what extent the learning path uses the context of the PGRI Building and Apam Cake. This research method is a design research type validation study. The subjects in this study were the 2nd semester students of PGSD, PGRI Palembang University. In this study, it produces qualitative learning to see the level of success using the Apam Cake Context and PMRI Building and is able to produce Edmodo-Assisted Learning Modules on the material or subject of Number theory.

Keywords: *Context, Number theory, Design research, Edmodo.*

1. INTRODUCTION

In determining a progress in a nation, it is seen how the development of the nation's education itself is in the future. Communities in developed countries can give birth to advances in various fields, namely science, technology, and civilization itself in their countries. This reveals that the existence of education is very important. According to Sudarwan [1] education is a process of improving a person to a higher peak through the potential knowledge, attitudes and skills he has. The purpose of education provides a

description of the values that are good, noble, appropriate, and very important for life. Therefore the purpose of education has two functions that provide direction to someone for educational activities and provide something that someone wants to achieve in educational activities [2]

Mathematics is an educational science that plays an important role in science and technology and everyday life, therefore learning mathematics must be understood both by students and prospective students themselves who want to become teachers. According to Ulya, Isnarto, Rochmad, and Wardono [3] mathematics is a science that has a very important role in the development of science and technology. More and more mathematics develops to make an integrated structure of systems and relationships and ways of thinking that can understand the world around them. However, it must be realized that in fact most students do not like mathematics. Because many students have difficulty learning. This also makes it a challenge in teaching at PGSD where many students do not understand mathematics, either basic concepts or Students must be given sufficient understanding of how important it is to know a number, so one of the courses they are pursuing at the Teacher Training and Education Faculty, especially PGSD is number theory. In addition, because elementary school children have a lot of mathematical material related to each class, therefore teachers should master the science of mathematics from the basics which is the basis of the unity of numbers and number theory is one of the obligations of students in completing their study of mathematical persks of students in higher education. It is also hoped that someday it can be used as the basis for the experience of applying numbers and numbers that can be done or done in the field in their daily lives or look for other objects to be able to do something research later.

Number theory provides students with great provisions to be able to think and do activities carefully, precisely, correctly, using general and clear systematics. In addition, the presented presentation of numbers is not only abstract, but also in the real field that can be found in everyday life and is also a major factor in basic subjects in mathematics at PGSD. So learning this theory can be very necessary for a calculation process toward advanced courses.

According to Pitadjeng [4] it gives the impression that mathematics is not difficult to do, among others, by providing contextual problems, the difficulty level of the problem is according to or less than the student's ability level, and increasing the difficulty of the problem gradually. Furthermore, according to Pitadjeng [4] so that students can learn mathematics in a pleasant atmosphere, the lecturer can strive for pleasant situations and conditions, pleasant strategies, and fun mathematics material. One learning approach that emphasizes the use of contextual problems as a starting point for learning is PMRI. According to Marpaung [5] based on the results of research and experience using PMRI, it seems that learning mathematics, which is usually scary and disliked, is no longer scary, even though it has not reached the level of being liked. According to Saefudin [6] with the principles and characteristics of PMRI, it is possible for students to carry out creative activities in solving math problems, especially open math problems. PMRI principles are mathematics material transmitted as a human activity, giving students the opportunity to reinvention through practice (doing it). Based on the problems presented, students build models from (model of) situations to mathematical models (model for) to solve until they get formal mathematical knowledge [7]. Meanwhile, PMRI characteristics emphasize more on student centers so that it will reduce the domination of lecturers. The PMRI approach leads students to learn mathematical concepts based on the reality or environment around them. The structure of the presentation of mathematics material begins with horizontal mathematical "informal mathematics", then goes to vertical mathematics (abstract material), so that learning is meaningful.

Panen [8] explains that in meaningful teaching theory suggests that the meaning of presentation and the importance of regulating learning progress (advance organizer) where teaching materials must be designed properly to be attractive to students. To overcome this problem, the researcher wants to provide alternative solutions to problems, namely by developing independent learning resources in the form of modules that will direct students not to experience difficulties in learning number theory, as well as making learning that is liked by them so that they are more creative and take advantage of the internet / wifi on campus to learning process. The learning module is one of the independent learning resources for students which is used to facilitate the distribution of learning messages to be conveyed to students and to enable students to study independently.

According to Purwanto, et al. [9] the purpose of compiling the module is so that students can master the competencies taught in learning activities as well as possible. The module that the researcher will develop is in the form of an electronic module (e-Module). Researchers want to develop e-Modules, one of which is because students are currently able to use electronic devices that can read electronic modules (e-modules) such as laptops and cellphones based on Windows, Android, and OS, thus enabling students to study anywhere. With the teaching material in the form of e-Module which is integrated directly with the learning needs of students, especially derivative materials that will directly train the KBKM. Several studies on the development of e-Modules by Nurmawati et al. [10] that e-module media using the Guided Note Taking model in mathematics II are valid and can be used in the learning process, and learning using e-module media using the Guided Note Taking model is more better compared to conventional learning.

This study found the learning outcomes that students did during their PMRI-based learning with Edmodo in this number theory course calculated descriptively or described the results during learning to students.

1.1. Literature Review

1.1.1. Indonesian Realistic Mathematics Education (PMRI)

1.1.1.1. PMRI Learning Concept

PMRI is the Indonesian version of Realistic Mathematics Education (RME) developed by the Freudental Institute in the Netherlands [11]. According to Zulkardi [12] RME is an approach in teaching and learning mathematics. RME theory is in line with the trend of developing mathematics curriculum materials in other countries, such as Portugal, England, Spain, Brazil, Denmark, Japan, and Malaysia [13].

Learning mathematics with the PMRI approach starts from the context or "real" situation that students have experienced which is a bridge to connect students from the real stage to formal mathematics. This is in line with the RME philosophy developed based on Hans Freudenthal's ideas or views, namely: (1) mathematics must be connected to reality; and (2) mathematics as human activity [12].

The first view is that mathematics must be close to students and relevant to students' daily life situations. The life situation of students is not only limited to what is real in the eyes of students but also everything that students can imagine, is reached by their imagination.

Therefore, mathematics must be connected to reality, stay close to children's experience and be relevant to society in order to be a human [14].

2. METHOD

This study uses a design research method which is a form of qualitative approach. Design research is a systematic study of designing, developing and evaluating educational interventions (such as programs, strategies and learning materials, products and systems) as solutions for solving complex problems in educational practice [15]. According to Gravemeijer [7], there are four kinds of levels in RME learning, namely situational, model of, for model, and formal which can be seen in Figure 1.

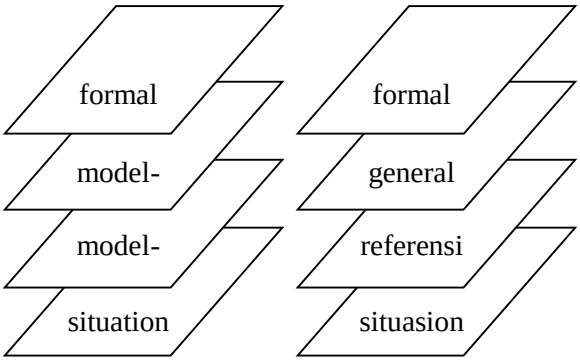

Figure 1. Levels in RME learning

3. RESULTS AND DISCUSSION

The results of making e-learning Edmodo in number theory class are as shown in the picture below on the front cover of the profile of the teacher who uses edmodo blended learning in number theory courses.

Figure 2. Edmodo

The class under study is a second semester student class A as shown below.

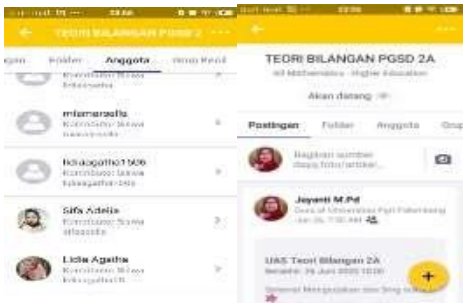

Figure 3. Edmodo class

The video tutorial on learning speech theory face-to-face e-learning as illustrated below

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Figure 4. Video

While the discussion of the results of student worksheets that are validated by experts is tested on students in the learning process in the review of LKM that have been made as in the picture below :

Figure 5. Cover of LKM

Look the front cover of LAS teaching materials for PGRI Palembang students because the learning is through Edmodo elearning, so the child does the questions and answers by downloading the teaching materials using the Edmodo application. Here at the initial stage of introducing the form of PMRI, which is learning Mathematics with the context of daily life which is found in everyday life, such as the context of the PGRI building which consists of floors followed by semester students on odd or even periods. Here is an introduction to the odd number pattern.

Figure 6. The context of the PGRI building

After the introduction of the semester building and also in the introduction of definitions in answering questions that can pay attention to the shape of the pattern and sequence of chapters that are often given assignments by the lecturer to summarize or work on assignments in the book by chapter.

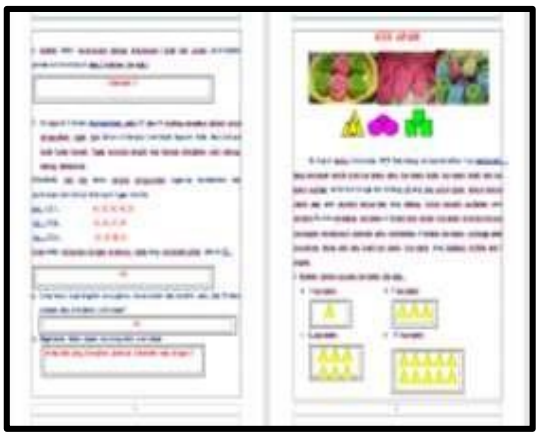

Figure 7. Apam cake

Then here also introduces learning in the context of Apam Cake. The traditional cakes of Palembang region which are often found in local snacks. Here the form starts from the abstract and then analyzes and rediscover the pattern by drawing or pasting objects that are similar to apam cakes.

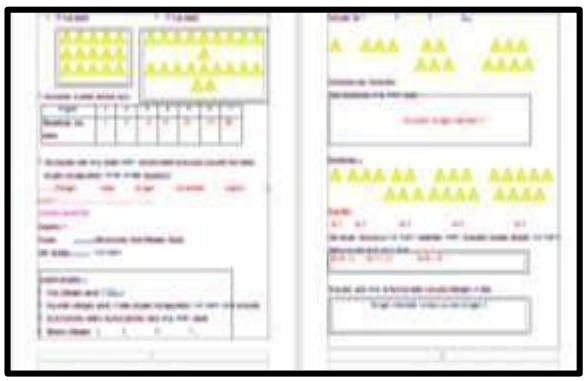

Figure 8. Drawing Apam cake

The implementation of the four levels is as follows.

1. Situational level

Situational level is the basic level of emergent modeling that emerges where domain-specific, situation-based knowledge and situational strategies are used in solving the context presented. Apam Cake context, at this level the students carry out the first activity of drawing directly the object of the motif into a whole part. Furthermore, the second activity of the students was drawing the shapes of the Apam or also copying the pictures of the teaching materials

2. Referential level

The use of models and strategies at this level refers to situations that describe the problem. At the referential level in this study, students describe a given situation or problem through images such as the area model, the bar model and in determining the next sequence number in a set of Apam cake objects.

3. General level

This level focuses on strategies that are already mathematical from the referential level which later develops into a formal model. The final activity designed in this study is the provision of problems related to the depiction of the object being observed so that it requires students to complete using strategies such as addition which will become a pattern of completion which will lead to formal conclusions about determining the number pattern.

4. Formal level

At this level students work with conventional procedures and notations without the need for context. In learning to make the final form of a number pattern. This formal level is the peak achieved by students through a series of designed learning activities

In Risdiyanti's [19] research, which is given numbering or steps in learning trajectory learning, which is in line with providing a game or game in learning Risdyanti [20] has similarities with my design which provides context by giving different steps so far from sticking or also draw and provide a motivation according to the willingness of students in learning number theory.

Fausiah (2020) provides a good PMRI learning environment that needs to be improved which is in line with Putri [17] to develop professionalism that needs to be done, where PMRI can be collaborated with other learning Putri [18]. Meanwhile, elementary school children must be given learning that is in accordance with the emotional nature of Susanto's children [21], which must be demanded by the teacher to have Slamet's competence (2013). with child psychology. Develop self-competence with various knowledge.

4. CONCLUSION

This study obtained the results of learning based on PMRI assisted by edmodo during learning when the learning conditions of children found informal and formal forms according to the PMRI category. PMRi in the teaching materials here begins with the context of the Teacher Building where children can determine a pattern that exists in learning. The next context, where is the apam cake children make pictures and form number patterns according to the directions in the LKM learning

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