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Design of Student Worksheet Based Pendidikan Matematika Realistik Indonesia (PMRI) to Improve Creative Thinking

Candra Havilludin,[1] Master of Mathematics Education, University of Ahmad Dahlan, Indonesia
Suparman, Master of Mathematics Education, University of Ahmad Dahlan, Indonesia

Abstract: *Creative thinking is one of the skills that students must possess because this ability determines the success of students in achieving high learning achievement because students can better understand the lesson as a whole. However, the ability of the creative thinking of students in vocational schools in Gunungkidul Regency is still weak. This is demonstrated by the many students still have trouble resolving the question or problem which is not routine. The learning materials used by students and teachers is still limited, not using appropriate materials. The purpose of this research is to design of student worksheet based Pendidikan Matematika Realistik Indonesia (PMRI) to improve creative thinking of students. This research is preliminary research with a formative evaluation research methods. However, due to limitations of time, cost and energy, this study is limited to the stage of preliminary studies. This research was conducted in class X in SMK Muhammadiyah Tepus. The results showed that the student's worksheet-based realistic mathematics education Indonesia to improve the ability of the creative thinking of the students was as follows; Student worksheet components consist of 1) title, 2) identity, 3) basic competencies, learning objectives), 4 and 5) the content of the student worksheet. The contents of a worksheet-based approach students PMRI: 1) presentation of the problem real or contectual, 2) understand the problem, 3) designing a mathematical model, 4) complete mathematical model, 5) discuss the answers and 6) concluded. An indicator of the ability of the creative thinking of students contained at this stage to understand the problem, designing a mathematical model, and complete mathematical model. Based on this initial research results, then it needs to be done further research to determine the feasibility and practicality of the design of learning materials in the form of worksheets students.*

Keywords: student worksheets, the design of PMRI, creative thinking

INTRODUCTION

Permendiknas No. 22 in 2016 to load that the learning process in educational units organized in interactive, inspiring, fun, challenging, motivating learners to participate actively, as well as provide sufficient space for the initiative, creativity, and independence in accordance with their talents, interests, and physical and psychological development of learners. According to Supardi (2012), students have to think creatively in learning that is held in the school. With creative thinking so students are expected to achieve a high learning achievement because more can understand the overall lesson. Next Fardah (2012) added that creative thinking skills is important for everyone, not only at the time of learning in school, but also when facing the world of work. The opinions of some of the creative thinking of students needs to be improved.

A number of studies showed that an approach Pendidikan Matematika Realistik Indonesia (PMRI) can enhance the ability of the creative thinking of students (Windayana, 2007; Tarida, 2015; Saefudin, 2012). Research results Windayana (2007) shows that realistic mathematics approach was able to increase the variety of essential abilities on themselves to prepare students in the student life now and in the future especially capable improve creative thinking ability of the students. Next Saefudin (2012) also said that with the principles contained in the approach of PMRI then will develop creative thinking ability of students in solving math problems.

However, based on the interview against the master class X in SMK Muhammadiyah Tepus, acquired that ability to think creative students is still low. This is evident in students having difficulties in resolving problems which is not routinely given teacher. Then the teacher has not

1 Havilludin, Candra, Master of Mathematics Education, University of Ahmad Dahlan, Indonesia. email: candrahaviel@gmail.com

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been using the student worksheet. Student worksheet used by the teacher are still conventional, ranging from summary material, examples of the problem, and solution. In addition, based on a search field in SMK Muhammadiyah Tepus was still hard to find materials by using PMRI approach, even in the library is still very minimal found materials of mathematics.

Based on the above issues, researchers interested in developing student worksheet based PMRI to improve creative thinking of students. Hopefully, this student worksheets can help the process of learning by teachers and help students improve their creative thinking ability. Formulation of the problem in this research is how to design the student worksheet based PMRI to improve creative thinking of students.

RESEARCH METHODS

Research Subject

Research done on the odd semester academic year 2017/2018. The place of research in SMK Muhammadiyah Tepus. The subject of research in the form of curriculum, material, students, and literature.

Research Methods

This research was limited only to the stage of preliminary studies to determine the initial design based PMRI is categorized to improve the ability of the creative thinking of students. More clearly the early stages can be seen on Figure 1 (Prahmana,2017).

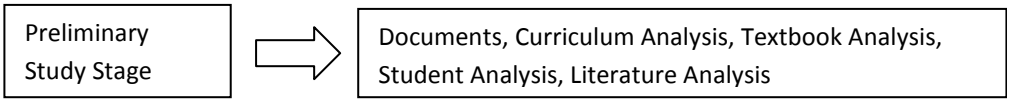

Figure 1. Research Phase

Data Collection Techniques

Based on the picture above then the data collection techniques used are as follows:

Document, The document is the document a curriculum 2013 revision 2017 SMK Muhammadiyah Tepus.

Curriculum Analysis, Record and analyze curriculum.

Book Analysis, Analyzing the Math text book used by teachers and students class X in SMK Muhammadiyah Tepus.

The analysis of the students, Observe, record, and analyze the characteristics of students of class X in SMK Muhammadiyah Tepus.

Analysis of the literature, Analyze, and record solutions that may be related to learning for the enhancement of the ability of the creative thinking of students.

RESULTS AND DISCUSSION

Based on the collected data, the researchers retrieved the following things;

Document

SMK Muhammadiyah Tepus curriculum 2013 revision 2017 to class X in the academic year 2017/2018.

Analysis of the curriculum

In the curriculum 2013 revision 2017, there are many approaches to learning one of these approaches in PMRI. Based on the decision letter of the Directorate General for primary and secondary education 330 year 2017 that one of the basic competencies that must be mastered by students is to analyze arithmetic sequences and series and resolve contextual problems related to arithmetic sequences and series.

Analysis of Textbook

In the textbook of mathematics curriculum 2013 revision 2017, yet many found problems contectual about arithmetic sequences and series. While in the mail attachment from the Directorate Director General of elementary and secondary education there are 330 year 2017 one basic competencies that must be mastered students can analyze arithmetic sequences and series and resolve contextual problems related to arithmetic sequences and series (KD 3.5 and 4.5)

Analysis of the Students

Based on the results of the observations of the researchers later in the analysis, the results obtained that the character of the students of SMK Muhammadiyah Tepus about responsibility and discipline of students in learning is still quite low. This one is shown by the large number of students who do not bring textbooks to school with a lot of reasons. Next in the process of learning many encountered obstacles. One of these students was difficult conditioned to work together because most students depend on answers from friends who considered clever, many students who don't want to participate actively in learning due to lazy to read or analyze problem. One of the biggest difficulties is the students solve the problem real or konstekstual. Students the trouble of his mathematical models to design and complete. Therefore, in the learning process of students requiring learning materials that can make them able to play an active role in learning (Wardani, 2017). One form of learning materials which are suitable for the character of student SMK Muhammadiyah Tepus is a Student Worksheet based PMRI. This is because it is categorized as simple structure, thus making it easier for students to learn and with the approach of PMRI expected difficulties students can be resolved.

Analysis of the literature

Ramdani (2012) revealed that learning materials are a very important part of the learning process as a whole. A student worksheet based on constructivism will guide students to build their understanding of the material being taught (Ramellan, 2012). Then some studies state that the development of PMRI based learning materials needed to enhance the ability of the creative thinking of students in learning mathematics in the classroom (Winarni & Rohati, 2012; Hidayanto & Irawan, 2013; Tarida, Ibrahim & Anggreini, 2015). Thus it can be concluded that the required learning materials based PMRI to improve the ability of the creative thinking of students. Mathematical teaching material in the form of student worksheets are designed in accordance with the stage of PMRI and the indicator of the ability to think creatively. Design Worksheets Students can be more clearly seen in the figure 2:

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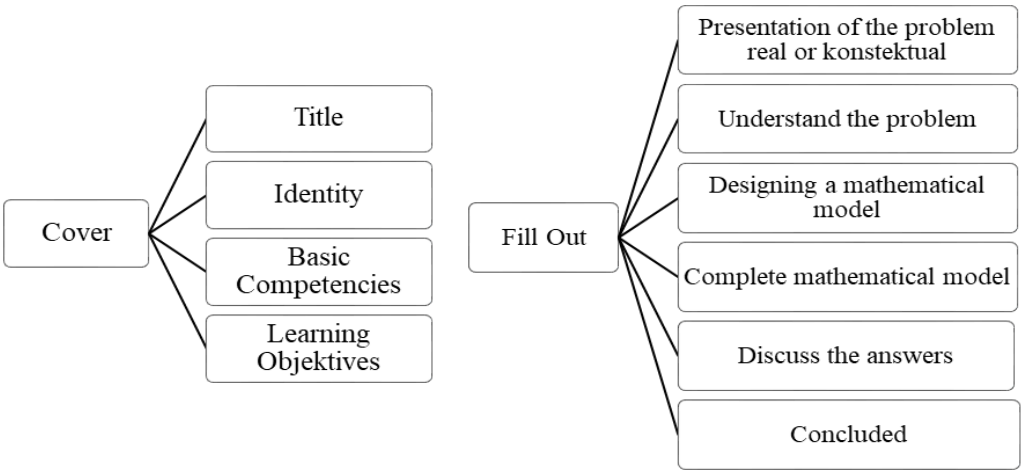

Figure 2. Desain of Students Worksheet

Based on the above flowchart drawing can be obtained that any steps on the content of the student worksheet using step approach realistic mathematics education Indonesia. At this stage of understanding the problems, students are directed to generate many ideas so capable of proposing the various problem-solving contectual correctly. Next the students can give an idea in designing a mathematical model of the problem. Mathematical models have been designed, and then solved it correctly and with clear details. The third process is to train students ' ability in creative thinking. So hopefully use this student worksheet may provide a learning experience of students to improve the ability of the creative thinking of students.

CONCLUSION

From the results of the research, it can be concluded that the design of learning materials for mathematics in the form of worksheets students based PMRI to improve the ability of the creative thinking of the students was as follows; Student worksheet components consist of 1) title, 2) identity, 3) basic competencies, learning objectives, 4), and 5) the contents of the student worksheet. Student worksheet contains in the stage of PMRI: 1) presentation of the problem real or contectual, 2) understand the problem, 3) designing a mathematical model, 4) complete mathematical model, 5) discuss the answers and 6) concluded. An indicator of the ability of the creative thinking of students contained at this stage to understand the problem, designing a mathematical model, and complete mathematical model. Design of student worksheet based PMRI to improve creative thinking of these students need to do further research to determine the feasibility and practicality of the student worksheet.

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ABOUT THE AUTHORS

Candra Havilludin: Student in the Master of Mathematics Education, Departement of Mathematics Education, University of Ahmad Dahlan, Yogyakarta, Indonesia.

Suparman: Associate Professor, Departement of Mathematics Education, University of Ahmad Dahlan, Yogyakarta, Indonesia.

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