Device Learning Based on Realistic Mathematics Education for Students Tenth Grade of Vocational High School in Hospitality and Tourism Services Program Skill

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Abstract. This study aims to discuss a draft RME-based math learning tool for the students of tenth grade vocational high school of hospitality and tourism services program skill. This study is part of a research model development Plomp. This research only to the preliminary stage of research is the analysis of needs and learners. Data analysis in this study uses an interactive analysis model that consists of data collection, data reduction, data presentation, and drawing data conclusions. The instruments used in this study were interview and questionnaire guidelines. The analysis shows that devices made by teachers are universal to all membership programs and not pay attention to the character of each program skill.

1. Introduction

Vocational School is one of the formal education where the learners are prioritized and prepared to work in accordance with their respective expertise program. National Education System Law Article 15 Ministry of Education states that vocational education is secondary education that prepares students for entry into the work place [1]. In 2017 there were four areas of expertise are in accordance with the national development priorities, namely maritime, tourism, agriculture and the creative industries. According to the Education Minister's election of the four areas of expertise based on the direction of economic development of Indonesia is projected to absorb a large number of workers [2]. Specifically in the field of Tourism expertise in the Hospitality and Tourism Services program skill. Tourism diversity in West Sumatra holds great potential to be developed as a supporting service in tourism development.

Graduates of the hospitality and tourism services program skill has a great opportunity to enter the world of work, which is on the hotel manager, restaurant manager, event / banquet / wedding sales manager, food & beverage manager, room sales manager, and others. The entire job in the field of hospitality and tourism services requires learners to be nimble, multitasking, and patience. Hospitality and tourism industry focus to provide the best service to guests, so it is necessary hospitality to serve guests well and also extra patience to deal with a complaint or a request [3].

Mathematics is a common subject for study in schools, especially in vocational, as well as math is a subject that must to be learned, because in mathematics was not just train for the count, but trained to solve problems in everyday life. Susanto [4] says that: "mathematics is one of the disciplines that can improve the ability to think and argue, contribute in solving everyday problems and the world of work, as well as provide support in the development of science and technology", Therefore, mathematics needs to be mastered properly every individual, starting from elementary school through college.
The reality had shown, the results of observations and interviews conducted at vocational high school Padang and at meetings with teachers in Congress Subject Teacher Mathematics Vocational High School, indicating that the lack of interest of students in the study of mathematics. This is caused by the learning device used is not integrity with programs skill. Armiati and Armiati & Hestu [5,6] states that the cause of mathematics courses at the vocational less desirable learning tools and teaching materials used by teachers is still common or together with learning devices and materials used in high school. So that students are less interested in participating in the learning of mathematics and feel math is not too important to them. The same thing is also conveyed by Hestu [7] state that "the learning process in vocational high school still weak namely strategies and learning tools that teachers use are not in line with the activity of learning, so that students, especially in vocational assume that mathematics is difficult subjects, unattractive and less useful ". Learners prefer subjects productive than mathematics. So that it causes low mathematical ability of students, this is in line with research by Safitri and Arnawa [8]

One attempt to increase the interest of learners hospitality and tourism services program skill on a math lesson is to design a device that includes mathematics learning problems associated with learners' skills program. So that learners can see the benefits of studying math in preparation for their work come into the world. The design of learning tools with the Realistic Mathematics Education (RME) approach is the solution of the above problems, wherein the according to De Lange in [9] State that Characteristics of RME, among others: (1) the use of context; (2) use models, (3) students contribution, (4) interactivity, (5) intertwining. RME approach looking at mathematics as a human activity. Of the characteristics of RME students are taught to think actively in solving the problem, so that learners are trained to deal with problems in the workplace. Characteristics of RME is interactivity and students contribution in solving the problem, it can train the communication skills of learners to enter into the work place. The characteristics of the use models and intertwining RME, can train learners in solving the problem they encountered with the knowledge that learners know, trying to experience or prior knowledge. By applying the RME approach it is expected that the interest of students in learning mathematics will increase, thereby affecting the mathematical abilities of students. As research by Fauzan and Yerizon, Syafriafdi et al, Fauzi & Fauzi et al, [10-13] that RME is able to improve students' mathematical abilities.

Based on the problems above alleged that the RME approach can increase the interest of students in learning mathematics. To produce the design devices based math learning RME in accordance with the program skill of hospitality and tourism services, it is necessary to do a needs analysis and analysis of learners first. This analysis was conducted to find out information about the learning of mathematics in vocational courses especially in the hospitality and tourism services program skill and learning of mathematics as what learners are expected. So before learning devices are developed and then used, need to do a needs analysis and analysis of learners first.

2. Methods of Research
This study was part of research development at Plomp development model. Plomp development model consists of three stages, including preliminary analysis, prototype development phase and the assessment phase [14]. Plomp models have some advantages in assessing the practicality, where there are three stages, one to one, small group and field test so that the model Plomp better ensure product quality practical [15].

Needs analysis and analysis of learners who do belong to the preliminary analysis phase. This study includes qualitative research into descriptive. Data collection techniques by triangulation (combined), data analysis is inductive / qualitative and qualitative research results further emphasize the significance of the generalization. Descriptive aims to describe the systematic and accurate facts and characteristics about issues gained in the field. Sources of data obtained from interviews and observations. Methods of data collection in the form of a combination of the interview, and observations. Interview is done by teachers and learners in tenth grade of hospitality and tourism.
services program skill. Analysis of the data in this study using an interactive model that consists of data collection, data reduction,

3. Results and Discussions
This needs analysis was conducted to: (1) to collect information in the form of basic and common problems in mathematics, (2) Determine the level of need for math learning tools based on RME for students. This activity is done by observation and interview. Based on the analysis of needs, there were some of the findings obtained from interviews and observations of teachers and students vocational high school namely (1) lesson plant made by the teacher are used for all programming skills, (2) they were not using student worksheet, (3) the context math problems on LKPD be a matter of routine, (4) Some indicators of achievement of competencies in a given lesson plans and tests are still mostly at the cognitive level C2 and C3. Whereas in 2013 the expected curriculum learners have the ability to think critically or Higher Order Thinking Skills (HOTS), which is the ability to think critically, logically, reflective, metacognitive and creative thinking, (6) material provided only focus on what's in a book.

Based on a needs analysis conducted, the need for improvements of the learning device that has been used by teachers. The improvement in the material by using examples of hospitality membership programs and services of tourism, given the context of the problem, as well as other techniques used in the steps of learning activities. Thus, researchers need to design learning tools that use the context of the problem in accordance with the students' expertise program in introductory mathematical material.

The device is capable of learning designed to help learners understand mathematics through problem context learners membership program, make learners more interested in learning mathematics through mathematical benefits of the program expertise. Learning tools developed in this study is based learning RME devices in the form of Worksheet Students and Learning Implementation Plan. The data collected can be used as guidelines in the development stage or prototypes.

Analysis of the students was conducted to determine the characteristics of learners in terms of academic ability, environmental vocational learners on the program expertise hospitality and tourism services, the tendency of students in learning, teaching materials such as what they like learners.

Based on the analysis of students, the results are as follows:

1) Learners are difficult to understand given the mathematical context. This can be seen when the teacher gives math, the students looked confused, when it was given the previous example in working on it.

2) Learners do not look serious and focused in participating in the learning of mathematics. This is because the learners consider important not mathematics for students.

3) Learners are more interested in the subjects productive in program expertise hospitality and tourism services compared with the math. When compared to students' observations on productive subjects with mathematics, students are more inclined to be interested and motivated in productive learning in hospitality and tourism services program skill. But in mathematics, the students actually look less passion and considers important mathematical subjects than productive.

4) Learners prefer to learn by groups. Although learners are not too interested in the study of mathematics, but when teachers provide learning in groups, look learners discuss in resolving the problem context provided by the teacher.

Based on the results of interviews conducted with the students of tenth grade of vocational high school on the program expertise of hospitality and tourism services, the results are as follows: (1) Students assume the subjects of mathematics is very difficult and hard to understand, (2) Students are more interested in learning productive than the subjects of mathematics, (3) Since it hard with the subjects of mathematics, finally bored and tired of being in the classroom when teaching mathematics progress, (4) learners difficult to understand the context of a given problem.
Based on the analysis of learners, researchers found it necessary improvements to the learning techniques through learning device. Because learners are more interested in learning about the program which is a professional expertise to enter into the world of work, the researchers devised a mathematical associate learning with skills program learners through RME-based learning tools. Learning tools developed in the form of lesson plant and Worksheet Students which contains about learning mathematics using examples or context of the problem of learner skills program.

The results of this analysis will be used as guidelines for researchers in designing appropriate worksheet students so as to motivate learners to learn. The collected data were analysis descriptively and then information from learners are sorted and used as a guide in the development stage or prototypes.

A sample of the problems associated with hospitality and tourism services program skill:

In 2019, PT Wisata Gemilang Indonesia sold two types of "tour and travel" tickets namely economic and exclusive tickets. Each type of ticket has different facilities. On the first day PT Wisata Gemilang Indonesia managed to sell 2 economic tickets and 2 exclusive tickets, while on the second day economic tickets sold 3 pieces and 2 exclusive tickets.

Ticket sales from the first and second day were respectively Rp. 3,200,000 and Rp. 3,850,000.

4. Conclusion
RME-based math learning tool developed in this study only reached the stage of preliminary research. Plomp used models consist of three stages: preliminary research, prototyping phase, and assessment phase assist in the development of learning tools RME-based math learning. With the learning of mathematics-based RME devices is expected to increase learners to study mathematics because the device is designed in accordance with the programming skills of learners. Learners become more active in the learning process and being able to connect the subject matter with everyday life or other sciences. The results of this study can be a reference in carrying out research to develop devices that fit the need students of vocational high school, especially in hospitality and tourism services programs skill.
References

[1] Depdiknas 2008 Panduan Pengembangan Materi dan Standar Sarana dan Prasarana Sekolah Menengah Kejuruan (SMK) dan Madrasah AliyahKejuruan (MAK) (Jakarta: Depdiknas)

[2] Kominfo go id 2017 Revitalisasi SMK Untuk Produktivitas dan Daya Saing Bangsa (Access in: http://kominfo.go.id)

[3] https://glints.com/id/lowongan/peluang-kerja-bidang-perhotelan

[4] Susanto A 2014 Teori Belajar dan Pembelajaran (Jakarta: Prenada Media Group)

[5] Armiai 2008 Pengembangan Modal Matematika Berbasis Kompetensi Profesi Pada Sekolah Menengah Kejuruan Teknologi (Padang: Dirjen Depdiknas Penelitian Hibah Bersaing, FMIPA-UNP)

[6] Armiai and L T Hestu 2018 International Conference on Mathematics and Mathematics Education 2018 (ICM2E 2018) Advances in Social Science Education and Humanities Research (ASSEHR) Vol 285 (Bandung: Universitas Pendidikan Indonesia)

[7] Hestu T L 2018 Pengembangan Perangkat Pembelajaran Matematika Berbasis Kompetensi Profesi di SMK Bidang Keahlian Teknologi Informasi dan Komunikasi (Padang: UNP)

[8] Safitri Y & Arwana I M 2019 Mathematics learning device development based on constructivism approach to improve mathematical reasoning skill of class x student in vocational high school (smk) Int J Sci Technol 8 5 – 19

[9] Primary Schools (Enschede: The Netherlands Print Partners Ipskamp)

[10] Fauzan A dan Yerizon 2013 Proc. Semirata (Lampung: FMIPA UNILA)

[11] Syafriafdi N, Fauzan A Arnawa I M, Anwar S & Widada W 2019 The tool of mathematics learning based on realistic mathematics education approach in elementery school to improve math abilities UJER 7 7 - 21

[12] Fauzi A 2018 Math learning with realistic mathematics education approach (rme) based on open source – ended ti improve mathematic communication Journal of Primary Education

[13] Fauzi A dkk 2018 Math learning with realistic mathematics education approach (rme) based on open source-ended to improve mathematic communication Journal of Primary Education

[14] Plomp T & Nievenn M 2013 Educational Design Research-Part A. An Introduction Enschede Netherland Institute for Curriculum Development (SLO) PQ4R Strategy Accompanied by Refutation Text Reading

[15] Arnawa I M, Yerizon, Nita S & Putra R T 2019 Int J. Sci Tech Res. 8 287-92