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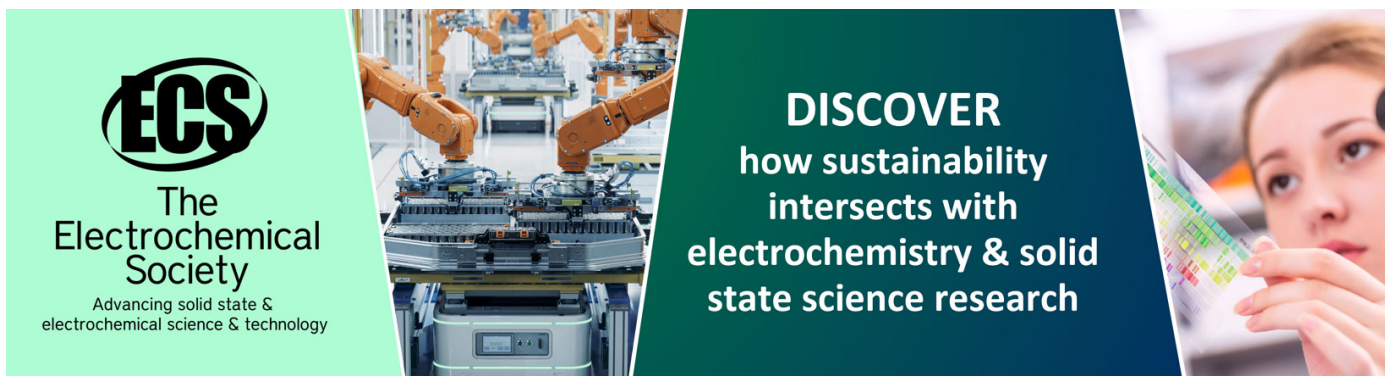
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Preliminary research development of professional competency-based mathematics learning devices in the culinary expertise program

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Abstract - This study discusses the preliminary research stage in developing professional learning based mathematics learning tools in culinary skills programs for vocational high school students. At the preliminary research stage interviews were conducted with mathematics teachers and students of class X vocational high school. Based on the results of interviews with mathematics teachers, the learning tools used are still general without regard to the professional competence of students, therefore it is necessary to improve the learning of mathematics by taking into account the professional competence of pesetas students especially in culinary skills programs. The problems in the learning tools that were developed were related to the profession of students in the culinary skills program, including the hotel, restaurant, hospital, service and flight chefs.

1. Introduction

Vocational high school (SMK) is one of the secondary education levels with specialization preparing graduates to be ready to work. This vocational high school will prepare someone to be better able to work in a work group or occupational fields that are in accordance with their respective skill competencies. The competence of this expertise is obtained at the vocational education level that is in accordance with the expertise program. This is in line with Law No. 20 of 2013 Article 15 (in the Ministry of Education and Culture) [1] which explains that "vocational education is secondary education that prepares students especially to work in certain fields".

Vocational high school (SMK) is a secondary school as an institution that prints human resources (HR) that are ready to enter the world of work. Through vocational education, there will be human resources who are ready to enter the workforce and HR who have skills in their fields of expertise. By having skills in the field of expertise someone will be professional in their field, as well as competitive in the world of work both at home and abroad.

At the level of vocational education students can choose a program of expertise in accordance with the interests of students and the number of job opportunities after they graduate from vocational high school. Vocational high schools (SMK) have many areas of expertise, this is stated in Permendikbud number 70 of 2013 [2] Vocational Schools are grouped into several areas of expertise, namely: (1) Technology and Engineering, (2) Energy and Mining, (3) health and Social Work, (4) Agribusiness and



Technology, (5) Maritime, (6) Business and Management, (7) Tourism, (8) Art and Creative Industry, (9) Information and Communication Technology.

The field of tourism expertise has several expertise programs, namely (1) Hospitality and Tourism Services, (2) Culinary, (3) Governance, (4) Dressing. Each skill program also has their own expertise competencies. In hospitality expertise programs and tourism services, the competencies are (1) travel business, (2) hospitality, and (3) marine and economic tourism. Culinary expertise program with culinary skills competencies. Beauty care program with expertise competencies (1) skin and hair beauty, (2) spa and beauty therapy. Fashion design program with expertise (1) fashion, and (2) fashion design.

Culinary development in Indonesia will not die. Developments in the tourism sector also contributed to increasing enthusiasm in the culinary field. Graduation graduates can have a career in the culinary industry that is built alone or in the tourism industry. Graduation graduates can pursue careers as chefs or chefs, bakers, baristas or bartenders in various hotels, restaurants and cafes.

In addition, culinary graduates also have the opportunity to develop their own culinary business.

One of the efforts to create qualified and competent human resources in their field is to equip students with their expertise programs and other supporting subjects. This is stated in the KI / KD SMK which contains several points, namely (A) National Content (B) Regional Content (C1) Expertise Field (C2) Expertise Program (C3) expertise competency. While mathematics is in the National Content. Mathematics at the vocational education level is in the national content, meaning that mathematics has an important role in education in vocational schools.

Based on KI / KD SMK, mathematics subjects are one of the subjects taught in SMK. Kline [3] argues that mathematics is to help humans understand and master social, economic and natural problems.

The purpose of learning mathematics in Vocational High Schools is stated in Permendikbud Number 58 of 2014 [4] covering concept understanding, problem solving, reasoning ability, communication ability of ideas, having respect for mathematics, having attitudes and behaviors that are in accordance with the values in mathematics and learning, conduct motoric activities that use mathematical knowledge, as well as using simple teaching aids as well as technology results to perform mathematical activities.

Based on mathematics learning goals students are not only skilled in working on math problems, but can use mathematics to solve problems encountered in everyday life. This means that problem solving is one of the abilities that must be developed and must be owned by students. So problem solving ability is a general goal of school mathematics learning.

Every student must have mathematical problem solving skills. This problem solving ability must also be possessed by vocational students with culinary skills programs. As has been explained that students with culinary skills programs will plunge into the world of work related to purchasing, selling, dosing and other calculations involving mathematical problems. To solve this problem students are required to have problem solving skills. The importance of problem solving ability was also stated by Bell [5], namely that problem solving strategies which are generally studied in mathematics in certain matters can be transferred and applied in other problem solving situations.

For this reason a mathematics teacher who acts as a facilitator is expected to be able to create interesting learning conditions for students and help students to understand the material delivered easily. This is inseparable from the learning plan designed by the teacher to be attractive and adapted to the competence of his expertise.

One of the tools that should be owned by the teacher is the Learning Implementation Plan (RPP) and Student Worksheet (LKPD). RPP is an important component in the curriculum that is designed in such a way. The learning implementation plan is a guide to the steps that will be carried out by the teacher in the learning activities arranged in the Trianto activity scenario [6]. RPP is used as a guideline by teachers when teaching in class during the learning process. The RPP that has been designed aims to make the learning process carried out systematically, effectively and fun. The lesson plan used by the teacher should be designed by the teacher concerned, because the teacher who knows the characteristics of the teacher and the lesson plan is also used as a guideline in teaching.

Student Worksheet (LKPD) is one of the learning tools that can support the learning process. This is stated in the Ministry of National Education [7] "Student Worksheet (sheet worksheet) is a sheet containing tasks that must be done by students. LKPD used by teachers as well as RPP must be designed by the teacher concerned and used in the learning process.

RPP and LKPD designed by the teacher and used in the learning process must be synchronous or interconnected. Besides that, other things that should be of concern in making RPP and LKPD are adjusted to their respective competence. This is so that students are interested in learning mathematics. In addition, the LKPD that is made should be able to help students understand the material and guide students in solving problems in a structured and systematic manner so as to improve the ability of students' mathematical problem solving abilities.

The SMK curriculum contains more practice than theory. Thus students of SMK prefer practice rather than theory. This should also be a concern for teachers in the learning process in order to create a pleasant learning atmosphere. A pleasant atmosphere will make students like math. One of the efforts to create a pleasant learning atmosphere is by designing learning devices. The learning tools are in the form of Learning Implementation Plans (RPP) and Student Worksheets (LKPD) which are designed in accordance with their expertise competencies. RPP and LKPD that are designed in accordance with their field of expertise will make students interesting in the learning process because they are related to the students' expertise programs.

But the reality in the field is not as expected. Based on observations made at SMK 6 Padang and SMK 9 Padang, information was obtained that students were not too interested in learning mathematics. At the time of mathematics learning students are busy with other matters outside mathematics and students do not focus on the material provided by the teacher. Other conditions that are very disruptive to the learning process are the number of students who go in and out of the classroom for various reasons that disrupt the effectiveness of the learning process.

Other information obtained is that students have difficulties in learning mathematics and lack of understanding of students about the material delivered by the teacher. Low student learning motivation also affects students who experience difficulties in learning mathematics. One of the difficulties encountered by the teacher is the lack of students' mathematical problem solving abilities. Students have not been able to find mathematical problem solving ideas. Students have not been able to express mathematical problems into mathematical modeling.

Lack of students' mathematical problem solving abilities is influenced by several factors, including the learning tools developed by the teacher not in accordance with the professional competencies and expertise competencies of each student. The tools made by the teacher have not provided an opportunity for students to learn according to their professional competencies and diverse skill competencies.

Based on the results of interviews with teachers of SMKN 6 Padang and SMKN 9 Padang, the learning tools made by teachers are still general. The device has not been developed in accordance with the skill competencies chosen by students. This is in accordance with the research of Armiati et al in 2008, the causes of mathematics subjects in Vocational Schools are less desirable, namely the learning devices and teaching materials used by teachers are general in nature, namely the same as the learning devices and teaching materials used in high school. This of course does not pay attention to the professional competence of vocational students in each of their skill competencies. In addition, the material used is equated in all the skill programs of students in vocational schools.

Another thing presented by the teacher during observation is that the teacher has not familiarized students with mathematical problem solving problems. This also results in the low ability of students to solve mathematical problem solving.

Other information obtained from students based on interviews conducted, students consider mathematics difficult and not important to learn. Students assume that if they have mastered their respective fields of expertise then it is considered sufficient for the provision of plunge into the world of work. The lack of motivation of students towards mathematics which results in students not being interested in mathematics and considering mathematics is difficult to learn.

Based on the problems found in the 6 Padang Vocational High School and Padang 9 Vocational High School, if no improvement is made it will adversely affect learning outcomes and the quality of education in Vocational Schools. This will be a concern for educators that must be completed in order to achieve the goals of mathematics learning.

Based on the above problems, there is a need for improvements to the learning devices used by teachers in vocational schools. The learning tools are RPP and LKPD. RPP and LKPD developed to overcome the above problems are RPP and LKPD based on Professional Competency.

The focus of research that researchers do is on the culinary expertise program. The reason for choosing this culinary expertise program is the large number of students who choose a lot of culinary skills and job opportunities. Another thing that is the reason researchers choose this expertise program is because along with the development of culinary business in Indonesia that requires graduates of a competent culinary expertise program in their field. The culinary business in Indonesia will require competent human resources in the culinary field who have a great opportunity to join in the existing culinary business and build their own business.

The culinary expertise program aims to prepare skilled and qualified cheff graduates and meet the competency standards required by the world of work. However, to meet these objectives found problems in the learning process. Especially in mathematics learning, the teacher has not used a tool based on the professional competencies of students. The tools used by teachers in mathematics learning have not been able to help students to have a creative attitude, critical, confident in solving problems found in everyday life. Problems like this that result in low learning outcomes of students and ultimately lead to SMK graduates not having expertise competencies that are appropriate to the world of work.

Professional competency-based learning devices are learning tools designed by teachers, especially for vocational students, where vocational schools consist of several areas of expertise and expertise. So that the learning tools that are made must be in accordance with the needs of their competency skills. Making this professional competency-based learning departure should be able to improve mathematical problem solving skills in each of the vocational students' skill competencies. The tools to be developed are expected not only to see the students' mathematical abilities, but also to improve the ability of students in the field of professional competence that students have.

In this study will be developed mathematics learning tools that are directed to produce products in the form of RPP and LKPD based on professional competencies that have been relevant to the 2013 curriculum on odd grade X grade material on culinary skills programs.

2. Research Methods

The research conducted in this research is development research. Borg and Gall [8] stated that development research is a research method used to develop or validate products used in education and learning. The research model used in this study is the Plomp development model. Plomp [9] provides a development model consisting of three phases, namely the initial investigation phase (preliminary research), the development or prototype phase (development or prototyping phase), and the assessment phase (assessment phase).

In the initial investigation phase (preliminary research) there are several activities carried out namely collecting data, analyzing and identifying problems that occur in learning as a basis for determining alternative solutions and product specifications needed, studying the scope of material needed to achieve indicators of achievement of competencies. Analysis of this phase consists of needs analysis, curriculum analysis, concept analysis, student analysis.

3. Results And Discussion

At the Preliminary stage is needed to get information about the problems found in Vocational Schools. At the preliminary stage this is done with several activities in it, as follows:

3.1. Needs Analysis

In the needs analysis, the activities carried out collect information in the form of problems that exist in the process of learning mathematics. This activity is carried out by observing and interviewing several teachers who teach in vocational schools and requesting data in the form of learning devices used so far. The observation activities were conducted to several vocational mathematics teachers in the city of Padang in April 2018.

From the observations and interviews that have been carried out, there is an illustration that the learning tools used by teachers are still general without regard to the professional competence of students. In the learning process, the lesson plan made by the teacher is not based on professional competence and not all steps in the lesson plan are carried out by the teacher when teaching and making the LKPD which is used to contain only questions even there are teachers who provide LKPD from printed books from the library. This results in students not yet accustomed to solving problem solving problems that are appropriate to one of the learning objectives.

3.2. Curriculum Analysis

The activities carried out in this curriculum analysis are reviewing the 2013 curriculum for mathematics subjects in vocational schools in the culinary skills program. The activity is conducting a review of content standard analysis and basic competencies in the mathematics subjects contained in the 2013 curriculum in vocational schools in the culinary skills program. Next describes basic competencies into indicators of achievement of competencies and learning objectives.

3.3. Concept analysis

At this stage, activities are identified to identify concepts, detail, and systematically compile the materials that students will learn. Concept analysis aims to determine the content and material of mathematics lessons needed in the learning device. In addition, this concept analysis seeks to find a relationship between productive material in vocational schools with culinary expertise and mathematics which is the content of the learning tools that will be developed.

3.4. Analysis of students and teachers

In this analysis, a review of the characteristics of students, students' abilities in learning mathematics and professional competence of students is carried out. The main characteristics of vocational school students prefer practice rather than theory and less like mathematics and low mathematics learning motivation. Problem solving ability of students in vocational schools is still low because students have not been familiarized with math problem solving problems.

In addition, an analysis was carried out on the teacher, namely the procedures for teachers to design mathematics learning tools for vocational students, learning models and learning strategies used by teachers and LKPD used by the teacher itself.

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