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**EMPOWERMENT OF TEACHING MATERIAL DEVELOPMENT CAPABILITY FOR
PRIMARY SCHOOL TEACHER CANDIDATES THROUGH PROJECT WORK
APPROACH IN THE COURSE OF SCIENCE LEARNING DEVELOPMENT**

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18

Abstract

This study aims to determine the implementation of Project Work Approach in empowering the ability of the development of student teaching materials in the course of science learning development. This research uses descriptive qualitative approach. Research data obtained through documentation, interview, observation and questionnaire which then analyzed by using deductive mindset. The subjects of the study were 5th grade 5A students of Primary School Teacher Education Study Program of Universitas PGRI Madiun. Data validation or data validity refers to data triangulation methods including source triangulation, methods and researchers. Data analysis techniques in this research refers to Miles and Huberman interactive models include: 1) data collection, 2) data reduction, 3) data presentation, 4) drawing conclusions. The results of this research print students prospective teachers according to the competency standards of graduates who have been mandated in permendikbud by providing provision of mahasiswa in developing teaching materials. Providing real learning experience for mahasiswa in practicing mini research with reference to RnD approach which leads to the students to produce the products in accordance with the standard of teaching materials product development procedure. Project Work Approach leads students to systematic and standardized work procedures to create or complete a product so as to increase student participation in lectures.

Keywords: *Project Work Approach, Teaching Material Development, Development of Science Learning*

INTRODUCTION

The quality of an education and learning program is influenced by various factors, such as teacher quality, student quality, facilities, curriculum and learning media quantity and quality. Improving the quality of teachers relating to the development of teacher professional competence and improving the quality of learning. Therefore, it needs a positive capacity, skill and attitude / value in carrying out the work that is his duty. In PP No. 32 of 2013 Article 20 and 43, states that teachers are expected to develop learning materials, which is then confirmed through Permendiknas number 41 of 2007 on Process Standards, which among others regulate the learning process planning which requires for educators in educational units to develop RPP. One of the elements in RPP is learning resources. Thus, teachers are expected to develop the source of learning and one of the teaching materials. According to the Directorate General of Education and Information of the Ministry of National Education (2006) stated that the important problem that often faced by teachers in learning activities is choosing or determining learning materials or appropriate teaching materials in order to help students achieve competence. However, the focus of the problem of developing content and learning materials and how to learn students is not a simple process. This fact is caused by the curriculum or syllabus guidelines, the teaching material is only outlined in the form of "subject matter". Furthermore, the task of the teacher to then describe the subject matter so that it becomes a complete teaching material.



ICONBEC-3

The lack of maximization⁴⁷ teacher competence in developing teaching materials of course many factors that influence. Based on the results of preliminary analysis and observation of teacher activity, the main problem is the lack of understanding in the way of developing teaching products, the development of teaching materials become foreign things for teachers because it is too focused on teaching activities and routine non-academic activities in schools so that it is inclined for teachers to rule out self-development through the preparation of teaching materials. Lack of teacher activity in following workshop activities that lead to self-development through teaching material compilation.

Teaching materials as one of the important components in the learning process needs to be designed in accordance with the needs and characteristics of students. In the school environment, there are various models of teaching materials. And every model of teaching material is made on the basis of certain considerations; easy to learn students, in accordance with the ability of students, or practical and efficient in terms of procurement costs.

Another consideration is to develop teaching materials because each school has different characteristics, so that teachers are required to make the medium of teaching materials and can choose the teaching materials in accordance with the needs and abilities of students. Similarly, the distribution of government package books that are not evenly distributed to every school and untapped human resources in the region and in schools especially teachers, and need to be utilized to develop teaching materials. If the ability of teachers in developing teaching materials can be realized, then the professional ability of teachers will increase and the need for teaching materials can be fulfilled.

Teaching materials are required by every teacher and student to achieve learning objectives in each subject area or subject, therefore teaching materials should be adapted to the development of science and technology and can meet the needs of students.

In order to produce prospective teachers who have capability in accordance with the competency standards of graduates that have been mandated in permendikbud, required the development of learning for each competence in a systematic, scientific, integrated, (Scientific). Student prospective teachers are expected to have special preparations related to competence in developing learning products. The application of learning by familiarizing the students not only on the basis of theory but to transform learning into project activities and required to produce teaching products through the eyes kulaih taken.

Learning in the course of Science Learning Development is a learning tool for prospective teachers in learning how to develop products and learning tools. Students are not only focused on developing products but also directed to develop products that match the core competencies as well as basic competencies and also refer to the nature of science. The products produced include learning tools, media teaching materials and props, but yag become the main product in this course is the development of teaching materials.

The development of teaching materials becomes the main focus of the course of Science Learning Development. Teaching materials become important supplements in the running of teaching and learning activities and supported by lack of science materials in the field that leads to the essence of science by balancing hands on and minds on students. Walking learning process that is appropriate purpose of course require variation of learning that is in the form of model and approach. In the lecture activities the application of Project Work Approach was chosen to be the main approach in coloring the lectures. Project Work Approach uses a learning system that directs students to systematic and standardized work procedures to create or complete a product (goods or services), through a real production / job process. Project Work Approach is often used for productive learning programs. Students conduct exploration, assessment, interpretation, synthesis, and information to produce various forms of learning outcomes. Learning Project Work Approach is a learning method that uses problems as a first step in collecting and integrating new knowledge based on experience in real activity. Students in developing teaching materials are



ICONBEC-3

directed to form mini research with reference to RnD approach so as to teach also to mahasiswa to produce product that is in accordance with standard procedure of product development.

Implementation of Project Work Approach is expected to be a means for students in the practice of developing teaching materials, so that the objectives of the lectures of the development of science learning is achieved with the production of teaching materials products in accordance with the basic competencies of students and lead to the essence of science. The use of Project Work Approach is expected to empower the ability of prospective teachers in developing teaching materials Science.

METHODOLOGY

This research includes the type of qualitative research. Qualitative research method is a research method that uses research procedures based on the results of descriptive data. This research is proposed to analyze and express the students' work in developing teaching materials product in science learning development in elementary school.

This research was conducted at PGRI Madiun University in Madiun City, East Java. The time of the research was conducted in November 2017 until February 2018. The subjects of this research were 5th semester students of Elementary School Teacher Education (PGSD) of PGRI University of Madiun.

Research Procedure

The steps of qualitative research activities are as follows; 1) Phase description or orientation stage. At this stage, researchers describe the product produced during the lecture. The results obtained then analyzed the suitability of the product with the material, the language used, and the design of the teaching materials product; 2) Reduction phase. At this stage, researchers reduce the resulting product and then selected products that meet the criteria that have been determined; 3) Selection phase. At this stage, the researcher describes the results of the product that has been suitable to be described in more detail then perform in-depth analysis of the product of the teaching materials produced. The results of the description and analysis will be obtained into a finding in the form of conclusions and reference materials for further research.

Data Collection Technique

Techniques used to collect data on research are used for the selection of appropriate methods and in accordance with the type of data source. Data collection techniques is an effort to observe the variables studied. Instrument data collection used is 1) Documentation is done by collecting data and files needed then review documents obtained related to the object of research. The function of the documentation in this study is to obtain the results of the teaching materials development process; 2) Observations in this study, observation is the most important method of data collection. Researchers make observations on the planning of teaching materials to be developed and activities that take place in the classroom, namely the making and teaching materials produced; 3) Interview in this research, interview conducted by researcher to student. The purpose of the interview is to find out what problems students encounter when planning, implementing and producing science teaching materials; 4) Questionnaire used in this study is open with a brief description filled by students. Questionnaires are used to determine the state of the student when developing teaching materials in writing.

Data analysis technique

Data analysis in qualitative research is done at the time of data collection and after completion of data collection in certain period. Data analysis technique is done by data collection, data reduction, data presentation and conclusion. 1) Data collection on the first model analysis conducted data collection of interviews, observation results, and various documents based on the categorization in accordance with the problem of research which then developed data pengajaman through search data; 2) Data reduction is a form of analysis that sharpens, classifies, directs, discards unnecessary data and organizes data in such a way that the final conclusion can be drawn and verified (Miles and Huberman, 2007: 16); 3) Data Presentation Data presentation is a set of



ICONBEC-3

information organization that enables research conclusions to be conducted; 4) Conclusions were also verified during the study. Conclusions are drawn since the researchers compiled records, polapola, statements, configurations, cause and effect directions, and propositions.

RESULT AND DISCUSSION

The Implementation of the Project Work Approach on the Development of Science Learning enables students to use projects / activities as media. students conduct exploration, assessment, interpretation, synthesis, and information to produce various forms of learning outcomes. Project work learning is a learning method that uses problems as a first step in collecting and integrating new knowledge based on experience in real activity.

Project-based learning can be done through group formation and implemented within a semester, producing a product of instructional materials (modules) as well as instructional media, whose results are then displayed or presented. According to Fortus (2005), that learning Project Work Approach is a learning process that gives a strong emphasis on problem solving as a collaborative effort, which is done in the learning process within a certain period. Furthermore, according to Alamaki (2004), the collaborative project should also be innovative, unique, and focused on solving problems related to the learner's life or the needs of the community or local industry.

Project-based learning is an innovative learning approach, which emphasizes contextual learning through complex activities (Bern and Ericson, 2000). The focus of learning lies in the concepts and core principles of a study discipline, involving learners in problem-solving investigations and the activities of other meaningful tasks, allowing learners to work autonomously constructing their own knowledge, and reaching the peak of producing real products (Thomas, 2000). Thus this project-based learning has tremendous potential to make the learning experience more interesting and meaningful.

According to Thomas, in (Wena, 2010) mentioned that the model of project work learning is a learning model that provides opportunities for teachers to manage learning in the classroom by involving project work. Project work contains complex tasks based on very challenging questions and problems, and requires students to design, solve problems, make decisions, conduct investigative activities, and provide opportunities for students to work independently.

Implementation of Project Work Approach on the Development of Science Learning includes activities and learning steps by applying Project Work Approach according to Moursund, Bielefeldt, & Underwood (2003) in Basori (2013) can be seen in table 1.1.

Table 1.1 Project Work Approach Learning steps

What teachers and teachers should say and do:	Things to be done and implemented Learners
Learning objectives to be achieved.	Choose one of the title / name of the product or service and prepare the proposal according to the selected title
Learning strategy with project work approach.	Conducting the learning process in accordance with the production process that has been planned. Activities are conducted in accordance with the guidelines set out in the proposal under the guidance and supervision of teachers. The learning process emphasizes achievement of standards of competence as evidenced by the evidence of learning (learningevidence) and organized in the form of a portfolio.
Alternative title / name of product or service that can be chosen learners.	Organize proof of learning as a portfolio.



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The scope of the competency standard that learners will learn for each title / product name (goods / services).	Carry out culmination activities (in the form of: presentation / test / presentation / display).
Compile and set guidelines for the assessment of competencies according to the title of the project work.	Compile reports according to the learning experience gained
Facilitate guidance to learners by utilizing the guidance sheet.	

Moursund, Bielefeldt, & Underwood (2003) studied a number of articles on project work as quoted by Basori (2008) The advantages of Learning Project work are (1) Increasing motivation, so students are more diligent to learn without knowing the time limit, , increased attendance and reduced delays; (2) improving problem-solving skills, thereby developing students' high-level skills and knowledge and in problem solving to make students more active and creative; (3) enhance collaboration; (4) improving the skills of managing the source accomplish a complex task.

The development of teaching materials needs to be done systematically based on interrelated steps to produce useful teaching materials. Teachers often ignore this systematic instructional development procedure because assuming, if it is well made in accordance with the material to be taught, the teaching materials can be used effectively in the learning process. Though there are some steps that must be done before the teacher reached the conclusion that the materials have been well developed teaching, as well as teaching materials used are good. There are at least five major steps in good teaching material development procedures, as follows: analysis, design development and evaluation of revisions (Sungkono 2013).

1. Analysis

At this stage it is tried to identify who the training participants are, with their initial behavior and characteristics. Initial behavior with respect to the mastery and ability of field science or the eyes of the level that already owned by the participants. How far the participants have mastered the eyes of that level? Meanwhile, the initial characteristics provide information about the characteristics of the participants.

If the information about the participants is known, then the implikasi on the design of teaching materials can be determined, and teaching materials can be developed soon. A good introduction to the initial behavior and initial characteristics of the participants is necessary to determine the needs of the participants and then design the teaching materials that are beneficial to the participants.

2. Design

The design stage includes several things that must be done or observed, according to Prastowo (2012): a) Formulation of learning objectives based on analysis, Based on the analysis that has been done, will be obtained a map or diagram about the competencies to be achieved participants both general competence and special competence. General competence and special competence, if redefined with applicable rules, will be general learning objectives and specific learning objectives. The applicable rules, among others, by complementing the components of learning objectives of Audience, Behavior, Condition, Degree; b) Selection of the eye topics If the learning objectives have been established and the analysis has been done, then the participants already have a picture of the competencies that must be achieved by the participants through the learning process. Thus the teacher can also immediately set the topic subject and its contents. What are the topics, issues of the right issues to be presented in teaching materials, so that participants can learn and achieve the competencies that have been set? What are theories, principles or procedures that need to be discussed in teaching



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materials? The main reference for the selection of eye topics is the syllabus and instructional analysis that teachers have. Furthermore, teachers can also use various books and learning resources as well as doing library searching, ie reviewing books on the eye level including encyclopedia or magazines in the library; c) Selection of media and sources, media selection and learning resources should be done after teachers have instructional analysis and know the learning objectives. Teachers are expected not to choose the media only because the media is available to teachers, in addition to the penetration is expected also indirectly persuaded by the availability of various advanced media that has grown rapidly today such as computers. Keep in mind, the media chosen is for use by participants in the learning process. So choose the media needed to deliver the eye level topics, which facilitate the participants to learn, as well as the interesting and liked the participants. The key words are: Media that can membelajarkan participants. It is the media to consider to choose; d) Selection of learning strategies, the selection of learning strategies is the stage when designing learning activities. In designing the presentation sequence should relate to the determination of the theme / issue / concept / theory / principle / main procedure that should be presented in the eye level topics. This is not too difficult if you already have a concept map of what you want to learn. If you already know how the material is presented, in general can be said how to struktuk teaching materials. Various presentation sequences can be selected based on sequence of events or chronologically, based on location, based on cause and effect.

3. Development

Preparation and careful design is needed to develop the teaching materials well. Some suggestions that may help to start teaching materials: a) Write what can be written, maybe in the form of a workbook, part of a book or practice guide; b) Do not feel that teaching materials should be written in order; c) Write or develop teaching materials for known participants; d) Remember that the materials developed should be able to provide learning experiences to the participants; e) Media variety, learning resources, activities and feedback are important components in obtaining interesting, useful and effective teaching materials for participants; f) Various examples, learning aids, illustrations and packaging of teaching materials also play a role in creating teaching materials; g) Writing styles for textual, narrative, explanatory, descriptive, argumentative and command sections are essential so that participants understand the teacher's intent.

4. Evaluation and Revision

Evaluation is a process to obtain various reactions from various parties to the developed teaching materials. This reaction should be viewed as an input to improve the teaching materials and make the teaching materials more qualified. Evaluation is needed to see the effectiveness of developed teaching materials. Whether the teaching materials are developed can be used for learning-understandable, readable and can membelajarkan participants. In addition, evaluation is needed to improve the teaching materials so that it becomes a good teaching material.

In general there are four ways to evaluate teaching materials, namely: a) review by the material expert (more emphasis on scientific validity and accuracy of coverage); b) One-to-one testing (One of the participants reviewed the teaching materials, then asked to comment on legibility, language, illustrations, references and difficulty); c) Small group trials (One small group examines teaching materials, then asked to comment on readability, language, illustrations, references and difficulty); d) Field trials (To obtain information on whether the teaching materials can achieve the goal?) Are the teaching materials considered adequate and so on.

CONCLUSION

The results of this research print students prospective teachers according to the competency standards of graduates who have been mandated in permendikbud by providing



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provision of mahasiswa in developing teaching materials. Providing real learning experience for mahasiswa in practicing mini research with reference to RnD approach which leads to the students to produce the products in accordance with the standard of teaching materials product development procedure. Project Work Approach leads students to systematic and standardized work procedures to create or complete a product so as to increase student participation in lectures.

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