

Science for Early Childhood Education: Practicality of Science Teaching Materials Oriented Science Literation for Early Childhood

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Abstract-This research was conducted to describe the practicality of science-oriented science literacy teaching materials for early childhood that have been developed. The results of this study can contribute to the provision of science teaching materials across the landscape of scientific literacy for early childhood which can be used by PAUD teachers can also be used as an additional reference for PAUD teacher prospective students in science learning courses for early childhood. This science teaching material was developed with the Four-D (4-D) development model. The implementation stages consist of define, design, develop, and disseminate. The instrument used is a practicality test sheet filled in by PAUD teachers and PAUD teacher candidates as potential users of this teaching material. The results showed that PAUD teachers and PAUD teacher candidates said that science literacy-oriented science materials were very practical (83%) in their ease of use and practical (80%) in the benefits obtained, namely the benefits of presenting and supporting early childhood scientific literacy.

Keywords-*practice, teaching materials, science, scientific literacy, early childhood*

I. INTRODUCTION

Life in the 21st century requires people to master the development of knowledge, technology, and have various life skills. The current generation needs to be prepared to have skills both soft skills and hard skills starting from early childhood education, elementary school students, to college. According to Omar, Turiman, Daud, and Kasman (2012) [1] that the skills needed in the 21st century there are four main domains, namely literacy, inventive thinking, effective communication, and high productivity.

Compared to other countries in the world, the literacy rates of children and adults in Indonesia are very low. The ability to read, count and science knowledge of Indonesian children is below Singapore, Vietnam, Malaysia and Thailand based on the results of the PISA (The Program or International Student Assessment) test released by the Organization for Economic Co-Operation and Development (OECD) in 2016. Survey Results of The World's Most Literate Nations in its publication March 9, 2016, from 61 countries, revealed Nordic countries (Finland, Iceland, Denmark, Sweden and Norway) were ranked highest. While Indonesia is ranked 60th (one level above Botswana), below Thailand (ranked 59), Malaysia (ranked 53), and Singapore (ranked 36). Low literacy is a fundamental problem that has a very broad impact on the progress of the nation. Abdini

(2017) states that low literacy contributes significantly to poverty, unemployment and inequality.

One important literacy to be developed since early childhood is scientific literacy. Literacy of science in Indonesia began to be introduced in 1993 by UNESCO (Astuti, 2016) [2]. Science literacy began to be accommodated in the 2006 curriculum (KTSP) and was more clearly seen in the 2013 curriculum through inquiry activities and scientific approaches.

Applying science literacy must begin as early as possible (Bybee, 2008) [3]. Childhood is the most important period in the process of developing all aspects of development, such as cognitive, language, physical, motoric, religious and moral values, so that it is called the golden age. Berk [4] early childhood is someone who is growing rapidly in their development and growth.

Science is very close in the lives of children. Children discover, observe, and learn from the objects of science that are in their surroundings. Science literacy is very potential to begin fostered and developed in early childhood. Science literacy for early childhood is that children are sensitive or aware of the surrounding environment, so that children can observe and solve problems in their environment.

Early childhood education should be able to become a forum for the development of early childhood literacy through science activities or learning that are integrated in themes according to the PAUD curriculum. Science learning that is integrated in themes according to the PAUD curriculum will be achieved well in the presence of appropriate teaching materials. Therefore, researchers develop science-oriented science literacy materials for early childhood that are expected to be practical in their use. Teaching materials that are practical in their use and provide benefits in their use will improve the quality of the learning done.

II. METHOD

The research that will be conducted is development research. Research and development (R & D) is a research method used to produce certain products and test the effectiveness of these products [5].

Development research is a systematic study of the design, development and evaluation of programs, processes and products that must meet the criteria of validity, practicality

and effectiveness. Sukmadinata states that development research is a research strategy or method that is powerful enough to improve practice. In this study the products developed are science-oriented science literacy teaching materials for early childhood. The model for developing teaching materials is a set of procedures that will be carried out sequentially to develop teaching materials. The type of development in this study will use the Four-D (4-D) model suggested. This model consists of 4 stages of development, namely Define, Design, Develop and Disseminate.

This model was chosen because it aims to produce products in the form of science-oriented science literacy materials for early childhood that are practically used by students and teachers. In the development stage a limited field trial was carried out to find out the practicality of using science-oriented science teaching materials for early childhood in classroom learning. Practicality in question is a practical, easy, and cheap standard for teaching materials to be used. [6] The instrument used to determine the practicality and teaching materials of science-oriented science literacy for early childhood is the response sheet of PAUD students and teachers.

III. RESULT AND DISCUSS

This development research was carried out with a Four-D (4-D) model. This model consists of 4 stages of development, namely Define, Design, Develop and Disseminate. This model was chosen because it aims to produce products in the form of science-oriented science literacy materials for early childhood. In accordance with the stages in the 4-D Model, the following are the results of the research that has been carried out.

The define phase is done to determine and define the requirements in teaching materials and collect information relating to the products to be developed. This stage has been carried out by interviewing PG PAUD students and PAUD / TK teachers in the UNIMED environment. In addition to interviews, researchers also made direct observations during the lectures on Science Learning for Early Childhood, made anecdotal notes, and discussed with a team of lecturers who shared the subject for the third semester of the UNIMED FIP PG PAUD study program. At this stage the initial analysis is carried out, analysis of students, task analysis, concept analysis, and analysis of learning objectives.

After getting the results from the defining stage, then proceed to the design stage. The design phase aims to design science-oriented science teaching materials that can be used in themed learning in early childhood education (PAUD). Teaching materials begin with instructions for readers of teaching materials that provide an overview of the contents of the book, then proceed with the identification of science content in the themes that exist in ECD learning according to the 2013 curriculum.

This teaching material consists of two parts, namely the theoretical part and the practice section. The theoretical section contains a discussion of the nature of science, scientific literacy, and the relationship of science, scientific literacy, and early childhood education. This section is intended to provide reinforcement to users of teaching materials, namely students and teachers. The second part contains science practice activities that can be done by

students and teachers as well as early childhood in integrated science learning themes in the PAUD curriculum.

The practicality of teaching materials is carried out by filling out questionnaires by teachers and students. This stage is done to test the use of teaching materials in the learning process.

The results of the analysis of the practical questionnaire value of teaching materials by students is 82.75% with a very practical category. For more details, see Table 1 below.

TABEL II. THE RESULTS OF THE PRACTICAL QUESTIONNAIRE OF TEACHING MATERIALS BY STUDENTS

No	Criteria	Percentage (%)	Category
1.	easy of use	84	very practical
2.	benefit obtained	81,5	very practical
average		82,75	very practical

The results of the analysis of the practical questionnaire value of teaching materials by teachers is 81% with a very practical category. For more details, see Table 2 below.

TABEL II. THE RESULTS OF THE PRACTICAL QUESTIONNAIRE OF TEACHING MATERIALS BY TEACHERS

No	Criteria	Percentage (%)	Category
1.	easy of use	82	very practical
2.	benefit obtained	80	practical
average		81	very practical

The practicality of teaching science-oriented science literacy materials for early childhood in general can be seen in Table 3 below.

TABEL III. THE RESULTS OF THE AVERAGE PRACTICAL QUESTIONNAIRE OF SCIENCE TEACHING MATERIALS HAVE TRAVERSED SCIENCE LITERACY FOR EARLY CHILDHOOD

No	Criteria	Percentage (%)	Category
1.	average of easy of use	83	very practical
2.	average of benefit obtained	80.75	practical
average of practicality		81.9	very practical

From the results of the questionnaire analysis of the practicality of science-oriented science literacy teaching materials for early childhood, it can be said that this teaching material is categorized as very practical with a practicality percentage of 81.9%. This means that the science teaching material developed has met the practicality requirements, namely ease of use and benefits obtained, namely the benefits of presenting and supporting early childhood scientific literacy.

The average percentage of teaching materials from the aspect of ease of use is 83% which means it is very practical. The indicators that determine the practicality of teaching materials in terms of ease of use are teaching materials using simple and easy to understand languages, making it easier for users (PAUD students and teachers) to understand the

concept of science for early childhood, and to facilitate users (PAUD students / teachers) to carry out activities / activities fun science.

The average percentage of teaching materials from the aspects of benefits obtained is 80.75% which means practical. Teaching materials are stated to be practical because they present interesting, clear and in accordance with the material, presentation of science activities supports fun science learning, supports the ability of child observation, asks questions, and makes conclusions.

Science-oriented teaching materials for scientific literacy for early childhood still maintain the principles in the development of teaching materials for PAUD teaching, such as the principles of relevance, flexibility, continuity, efficiency, effectiveness, and child-centeredness with comprehensive ongoing assessment.

Students and teachers responded that this science-oriented science-learning teaching material made it easier for them to carry out child-centered science activities, and help children learn to observe and learn from the objects of science that exist in the surrounding environment. These teaching materials help them build a child's mindset and critical attitude because children are involved directly in science practice activities related to their daily lives. Students and teachers also responded that this science teaching material is in accordance with the 2013 PAUD curriculum. Science practice activities in teaching materials are easy to do with easy tools and materials to find. While students responded that this teaching material provided inspiration for them to better recognize the world of children and develop science activities that could be practiced by them as prospective teachers.

IV. CONCLUSION

Science teaching materials across the scientific literacy for early childhood that have been developed have a practical value of 81.9% in a very practical category. The ease of use aspect is considered very practical with a percentage of 83%, while the benefit aspects obtained are assessed as practical with a percentage of 80.75%. The practicality of this teaching material is important so that the objectives of the learning can be achieved by not troubling the users

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