Development of Creative Digital Book Based on Socio Scientific Issues in Science Learning Concepts Course for Primary School Teacher Education Program Students

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Abstract. The development of creative digital book based on socio scientific issues in science learning concepts course for primary school teacher education program students aims to examine the feasibility, practicality and effectiveness of developing creative digital books for prospective elementary school teacher students. The subjects in this research were primary school teacher education program students who were selected using a cluster sampling technique. Development of a creative digital book based on socio scientific issues carried out using the four D (4-D) model, namely definition, designing, developing and disseminating. The data analysis technique that will be carried out is data validity analysis, analysis practicality data, data analysis of the effectiveness of implementing creative digital books. This research produces a socio-scientific-based creative digital book issues and the results obtained were satisfactory for the validity of the material and media and were effectively used in learning in science learning concept courses in primary schools.

Keywords: Creative Digital Book, Socio Scientific Issues, Science Learning.

1 Introduction

The learning environment is a unity of learning activities that include conditions that affect the behavior of subjects involved in the learning process. Educators as active driving subjects who focus on managing the learning environment, must be able to create a good learning environment and develop holistic learning outcomes that include literacy and numeracy competencies, as well as characters that need to perfect the abilities they have so that they can realize the expected educational goals [1]. The success of the teaching and learning process is highly dependent on the learning environment, the ability of educators to teach, how to interpret the lecture implementation plan, organize the structure of the teaching materials taught and the presentation system of the material. In his research [2] stated that the learning that has existed

so far in lectures emphasizes more on how to provide teaching materials without paying attention to the characteristics and individual differences of students and factors that may affect the student learning process [3]. Students are not given enough opportunities for independent learning, freedom and responsibility, and active participation in making their own decisions, even though studying in higher education is an adult learning process that aims to prepare students to become members of society who have academic and/or professional abilities who can apply, develop and create science, technology and art [4] in also emphasized that the focus of the education system includes three aspects, namely: (1) students, (2) the learning process, namely not what lecturers must do to teach the material but what students must do to learn it and (3) learning situation, namely the environment where the learning process occurs and includes all factors that affect students and lecturers, classes and interactions within them. Based on these three aspects, it is necessary to develop teaching materials to facilitate the learning process so that later students are able to learn independently, are confident in learning, and facilitate interaction between lecturers and students [5] . This is in line with a preliminary study in the form of observations conducted by researchers in the science learning process. In the implementation of learning, students learn based on the lecturer's delivery of the teaching materials presented and the learning resources they have without paying attention to the learning environment based on problems in the surrounding environment. Learning planning is very necessary to prepare for enjoyable lecture activities. From the observation, it can be seen that students have not been able to prepare themselves to attend lectures due to the limited teaching materials they have that are not yet relevant to the needs of students in developing skills and abilities related to science. What students need in science learning must be in accordance with the characteristics of science [6].

The context in science learning refers to situations in everyday life that are a place for the application of processes and understanding of scientific concepts. So students must be ready to be able to examine facts, phenomena, or events based on social issues related to science in society known as socio-scientific issues [7] . Socio-scientific issues involve the use of scientific topics or problems that require students to be involved in dialogue, discussion, and debate. Furthermore, according to [8] , the skills that students must have in the era of the industrial revolution 4.0 and the era of society 5.0 do not only focus on hard skills but also soft skills that are well honed, but having the ability to argue is important for students to have. Scientific argumentation skills can strengthen a claim by emphasizing the ability to express ideas and concepts about scientific phenomena in everyday life based on evidence and their suitability with existing theories. To be able to develop students' argumentation skills through critical and innovative thinking processes, it is necessary to present teaching materials in the form of the use of cradbooks (creative digital books). E-books as a learning innovation in the form of a digital version of a printed book containing text or images loaded into digital information [8] in [8]. Creative digital books as digital books that will be designed by presenting new ideas in a variety of ways. What strengthens this research is that to perfect previous research related to learning media, books are needed that are relevant to students' needs, as a development of learning in the basic concepts of physics and chemistry courses. Based on the explanation above, it is felt that.

2 Method

The research used in this activity is using development research where this research chooses the 4D model (four-D models) in its implementation. The stages developed according to the model consist of 4 stages including define, design, develop, and disseminate [9]. In each stage it is developed into an initial stage, namely preparing the things needed in the research, then how the process of compiling a research proposal, then the stage for designing the research, then the implementation of the research, and the processing process for data from the research results, as well as discussion of the results obtained from the research and reporting that will be carried out at the final stage. The design in this study refers to the pretest-posttest control design to see the improvement of scientific argumentation skills of PGSD students in science learning using a creative digital book (cradbook) based on socio-scientific issues. The procedures carried out in the research on the development of a creative digital book (creative digital book) based on socio-scientific issues in science learning for PGSD students are as follows: 1) Definition stage (define), this definition stage aims to determine the learning outcomes of science learning courses. This definition stage consists of a) Student analysis, namely to determine the needs of students in science learning that are adjusted to the characteristics of students, b) Concept analysis is carried out to determine the material that must be mastered by students in science learning. analyzing the learning outcomes of the course (CPMK) and study materials in the science learning course to determine the concept of a creative digital book (creative digital book) based on socio-scientific issues that will be compiled. Furthermore, collecting and identifying supporting sources for the process of developing a creative digital book (creative digital book) based on socio-scientific issues in science learning that has been adjusted to the semester learning plan (RPS) that has been made. 2) Design stage (design), this stage aims to design a creative digital book (creative digital book) based on socio-scientific issues in science learning. In the design stage, it consists of a) Formulating the instrument, namely formulating what instrument is appropriate to use in designing a creative digital book (creative digital book) based on socio-scientific issues in science learning by mapping the teaching materials according to the needs of PGSD students.b) Choosing a media concept, namely by formulating a prototype of a creative digital book (creative digital book) based on socio-scientific issues in science learning. c) Initial planning, namely compiling an initial draft of a creative digital book (creative digital book) based on socio-scientific issues in science learning as well as possible by considering the needs of students in science learning in Elementary Schools.

3. Result and Discussion

The research on the development of a creative digital book (cradbook) based on socio-scientific issues is a research that aims to improve scientific argumentation skills in PGSD students. This creative digital book (cradbook) is compiled through an approach that presents learning that connects science with problems in social issues or what is called socio-scientific issues. The background of this research is of course because of the needs of students in science learning that is adjusted to the problems and technological advances in science today. Before implementing the development of a socio-scientific issues-based creative digital book which includes the stages of lecturer needs analysis, student needs analysis, learning device analysis, and learning analysis. The stages in this define stage are as follows.a) Lecturer Needs Analysis, The initial

stage carried out before developing a socio-scientific issues-based creative digital book is to conduct an analysis of the lecturer's needs in science learning. In this case, to find out what is needed by lecturers to support the lecture process in science learning. The analysis was carried out through interviews with science lecturers in PGSD, namely Mr. Fahrur Rozi, S.Pd., M.Pd related to the process of science learning at PGSD and of course about implementation. The results of the interviews that have been obtained are used as guidelines in developing a socio-scientific issues-based creative digital book. The results of the interviews that have been conducted include; 1) Science Course Learning Achievements, 2) Semester Learning Design, 3) Availability of Science Learning Materials and Media.

Based on the three aspects in the interview results, it was found that the learning achievements in science courses are not in accordance with what is needed by students when they directly implement science learning in Elementary Schools. As is known, science learning in Elementary Schools is real or factual learning about the universe and its contents, so that the concept of science must be based on scientific methods, not only theoretical. When viewed from the analysis of the characteristics of the nature of science learning in Elementary Schools, how is it related to the right models, methods, and approaches used in science learning so that they must be adjusted to the achievements of science courses so that later when implemented in the field, students are able to provide learning that is in accordance with the achievement of competencies expected by students in Elementary Schools. Furthermore, the semester learning design that has been prepared has not been able to improve the competencies expected in science learning. In lectures, it is necessary to explore skills that can support the implementation of science learning. Furthermore, the availability of science teaching materials and media is also one of the factors that does not support student understanding in lectures. From the problems based on interviews with the lecturers, it can be seen that science learning is still considered to be less than the expected achievements.

b) Student Analysis, What of the student needs analysis is to determine students' needs in science learning. The researcher with a questionnaire given using by a google form with the link: https://forms.gle/yEgofCqpG3d4FBBn6 which was filled in by 25 students related to science learning in PGSD. The results of the analysis of student needs above show that indicator 1, namely the relationship between science material and science learning outcomes, obtained 66.7% strongly agree and 33% agree that learning in science learning courses in elementary schools must be adjusted to learning outcomes where science learning courses in elementary schools need to be designed according to the needs of students in elementary schools, science learning courses also need to instill material related to the practice of implementing learning in elementary schools directly and science learning courses in elementary schools need to present learning that connects science with problems in everyday life/social issues. Furthermore, indicator 2, namely related to science learning which must be theoretical and practical, obtained 79.2% strongly agree and 20.8% of students agree that science learning is not only theoretical but also practical so that science learning courses need to be designed using digital teaching materials that can facilitate students in the learning process, then science courses also need to provide output for learning in elementary schools and must be adjusted to the curriculum achievements in elementary schools. Indicator 3, namely science learning must be able to explore students' skills, 75% strongly agree and 25% agree that science learning must be able to develop students' thinking skills. Then in indicator 4, namely student understanding in learning, 83.3% strongly agree and 16.7% agree that in science learning, innovation is needed

so that science learning is more interesting. The overall results of the analysis conclude that students state that the science learning that is implemented still needs to be developed. c) Analysis of Learning Devices, Learning devices are the main spearhead in implementing learning, especially lectures. Based on the results of the interviews that have been conducted, it was obtained that the learning devices that have been used include printed books that are not in accordance with the learning achievements in the semester learning plan, in addition, lecturers have not maximized digital-based learning to attract students' attention in learning so that the skills expected in lectures are not optimal.d) Learning Analysis, Learning is a thinking process that must be able to be implemented in exploring the expected competencies. Observations related to learning show that the teaching and learning process tends to occur in one direction, where students are passive but sometimes accompanied by presentations by students, but in fact when students are invited to discuss, understanding of science concepts tends to be very lacking, so that lecturers need to be active to provide appropriate teaching materials so that students understand the material they have to learn.2. Design Stage (Design), This design stage aims to design a creative digital book (cradbook) based on socio-scientific issues. The stages first are as follows: a) Designing a Semester Learning Plan (RPS), The semester learning plan (RPS) developed refers to the 2023 Faculty of Education guidelines. b) Designing a creative digital book (cradbook) based on socio-scientific issues, The design results from the process of designing a creative digital book (cradbook) based on socio-scientific issues. 3. Development Stage, The Development Stage is the stage for producing a socio-scientific issues-based creative digital book product. The stages in this activity are to validate the product and validate the material based on suggestions and input from experts. The expert in validating the socio-scientific issues-based creative digital book product is Suyit Ratno, M.Pd., and the material expert is Septian Prawijaya, S.Pd., M.Pd. The results of the validation are described in the following stages.a. Product Validation, Validation is a stage in assessing the feasibility of a socio-scientific issues-based creative digital book product. Aspects that are valued in product validation include feasibility aspects that include indicators of the appearance of the socio-scientific issues-based creative digital book product, ease of use of the socio-scientific issues-based creative digital book product, attractiveness of the socio-scientific issues-based creative digital book product, and usefulness of the socio-scientific issues-based creative digital book product. Based on the results of the validation carried out related to the socio-scientific issues-based cradbook (creative digital book) product, several suggestions and inputs were obtained at the validation stage, including: 1. Appearance, The socio-scientific issues-based cradbook (creative digital book) product displayed in a flipbook that was previously designed using Canva has a good appearance, the font size can be read well, the appearance and layout are also quite attractive to read the contents of the product. However, there are some notes, namely regarding the background that covers the writing, so that the image is more likely to be visible and the contents of the book are less readable. 2. Ease, The socio-scientific issues-based cradbook (creative digital book) product designed using Canva and flipbook makes it easier to create and for readers who access it because it can be done online and offline, but there are several features that when used online take quite a long time to read the contents of the book. 3. Interest, The socio-scientific issues-based cradbook (creative digital book) product is compiled using interesting images and applications, so that it provides a sense of curiosity to read. However, there are some images that break when zoomed in because the image quality is small. 4. Usefulness, The product of the cradbook (creative digital book) based on socio-scientific issues has good benefits for those who access it, but it will be easy to distribute privately if you do not

use the lock system. The results obtained based on the validation carried out on the developed product are in accordance with and meet the criteria that have been given, the availability of products that have been adjusted to what has been formulated in the achievements in science learning in the course so that in the end it can improve the expected competencies of students. In addition, there are several things that really need to be developed related to the substance in the material that has been adjusted to the needs and developments of science, knowledge, and technology related to science that can be found by increasing the literature read, so that it can be said that the product produced, namely the teaching book product, namely creative digital book based on socio-scientific issues, is suitable for use in learning in science courses in Elementary Schools. b. Material Validation, Material validation is carried out to assess the feasibility of the material in the cradbook (creative digital book) based on socio-scientific issues. Aspects that are valued in material validation include aspects of feasibility which include indicators of material suitability with CPMK, material accuracy, material up-to-dateness, encouraging curiosity, presentation techniques, and conformity with language rules. Based on the results of the validation carried out related to the material in the socio-scientific issues-based cradbook (creative digital book), several suggestions and inputs were obtained at the validation stage, including: 1. Content Aspect, The content of the material contained in the socio-scientific issues-based cradbook (creative digital book) is able to present issues and problems in science learning according to the characteristics and needs in Elementary Schools, but for some materials it is necessary to review with more literature, so that the expected learning outcomes can be achieved and can improve student skills. 2. Presentation Feasibility Aspect, The material presented in the socio-scientific issues-based cradbook (creative digital book) designed using canva and flipbook is very interesting and easy to understand, but it is necessary to adjust it to science learning to explore better HOTS, because some materials are relatively simple but difficult to understand. The validation results of the material in the socio-scientific issues-based cradbook (creative digital book) have in order to provide criteria that are in accordance with existing assessments, the available products need to be adjusted to the learning achievements in the course so that they are able to improve the quality or competence expected from students. so that their implementation will be suitable for use in learning activities. in science learning courses in Elementary Schools.

4 Conclusion

Based on all the 4D stages that have been carried out, the results of the feasibility test on the material validation were 84%, so it can be said that the material presented in the book is suitable for use and dissemination in lectures, then based on the results of the product validation, the results obtained were 85.3% considered unsuitable, so it can be said that the product of the teaching book (creative digital book) based on social scientific issues is suitable for use in learning in science courses in Elementary Schools.

Acknowledgments

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