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DEVELOPMENT OF COMICS TEACHING MATERIALS BASED ON PROBLEM BASED LEARNING TO IMPROVE THE SCIENTIFIC COMMUNICATION SKILLS OF GRADE IV STUDENTS

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Abstrak

Penelitian ini dilatar belakangi oleh kurangnya media pembelajaran yang sesuai dengan mata pelajaran IPA materi daur hidup hewan. Tujuan dari penelitian ini yaitu untuk mengetahui proses pengembangan bahan ajar komik berbasis PBL pada pelajaran IPA kelas IV materi daur hidup hewan dalam meningkatkan keterampilan komunikasi ilmiah siswa kelas IV di SD Negeri Wanatirta 02. Jenis penelitian ini adalah penelitian kuantitatif menggunakan pendekatan Research and Development (R&D) dengan desain One Group pretest-posttest design. Model pengembangan dimodifikasi dari model 4D. model 4 D terdiri dari 4 langkah yaitu : (1) Define, (2) Design, (3) Develop, (4) Desiminate. Teknik sampel yang digunakan yaitu sampling jenuh. Teknik pengumpulan data menggunakan angket, wawancara, dan tes. Analisis data menggunakan paired-sampel t- test. Hasil penelitian diperoleh (1) bahan ajar komik layak dan valid berdasarkan hasil validasi materi dan media sebesar 4 dan 5 dengan kategori baik dan sangat baik. (2) bahan ajar komik berbasis PBL efektif digunakan ditunjukan hasil uji t-test diperoleh nilai Sig. (2-tailed) < 0,05. Peneliti simpulkan bahwa pengembangan bahan ajar komik berbasis PBL valid dan layak untuk digunakan serta mampu meningkatkan keterampilan komunikasi ilmiah siswa kelas IV.

Kata Kunci: *Pengembangan, Bahan Ajar Komik, Problem Based Learning, IPA, Keterampilan Komunikasi Ilmiah Siswa*

Abstract

This research is based on the lack of learning media that are in line with the science subjects of animal life cycle material. The purpose from research this that is for know the development process comic teaching material PBL based on class IV science lesson material cycle life animal in improve skills communication scientific students fourth grade at SD Negeri Wanatirta 02 . This type of research is quantitative research using the Research and Development (R & D) approach with the design of the One Group pretest-posttest design . The development model is modified from the 4D model. 4 D model consists of 4 steps, namely: (1) Define , (2) Design , (3) Develop , (4) Desiminate . The sample technique used is saturated sampling. Data collection techniques using questionnaires, interviews, and tests. Data analysis using paired sample t - test . The results of the study were obtained (1) the comic teaching material is feasible and valid based on the results of material and media validation of 4 and 5 with good and very good categories. (2) PBL-based comic teaching materials effectively used are indicated by the results of the t-test obtained by the Sig. (2-tailed) <0.05. Researchers concluded that the development of teaching materials based PBL comic valid and l sieve to use and able to improve scientific communication skills of fourth grade students.

Keywords: Development, Instructional Materials Comics, Problem Based Learning, Science, Skills Communication Scientific Students

Introduction

Science learning in elementary schools has so far been centered on teachers. This is because knowledge is considered to be transferred completely from the teacher's mind to the student's mind. Teachers still tend to use the lecture method rather than providing students with the widest possible opportunity to discover the concepts they are learning. Meanwhile, students are passive objects where students only listen and memorize and listen to the knowledge transferred by the teacher (Mahendra, 2014: 2). At the elementary school level, students still think at the concrete/real thinking stage. Natural Sciences (IPA) is one of the subjects taught at the elementary school level and is one of the main subjects in the education curriculum in Indonesia (Susanto, 2013: 165). In the science subjects in elementary schools, it has an important role in everyday life.

The science learning process emphasizes providing direct experience in developing competencies and understanding the natural environment, with the aim of helping students to gain a deeper understanding of the natural environment, and can increase awareness to participate in maintaining, protecting, and preserving the natural environment. Science learning is said to be successful if all predetermined learning objectives can be achieved. In reality, the science learning process in elementary schools tends to be less than optimal, where teachers have not been able to apply ideas to design memorable and exciting learning so that they can achieve learning objectives. Students are only required to always memorize the material explained by the teacher, so students tend to be passive and there is almost no interaction between teachers and students. Another factor is the use of learning media which is still minimal and less interesting to students (Pradanti, 2017).

Scientific communication is the skill to communicate scientific knowledge, the results of one's findings and studies to various target groups for various purposes (Samatowa, 2010: 100). In elementary schools, communication skills can be developed in various ways, one effective way is to give them the opportunity to work in groups, have group discussions, and convey the results of their discussions in class (Nurhayati, 2013). However, in reality, student communication, especially in elementary schools, is still low. Based on initial observations of Nurhidayati's research (2018) entitled "Improving Students' Communication Skills in Science Lessons Through the Discovery Learning Model in Grade V of Elementary School", students' communication skills are low, with the following details of the observed indicators: 1) conveying ideas/concepts orally, only 9 students out of 20 students. 2) conveying ideas/concepts in writing, only 3 people out of 20 students, so researchers can conclude that students' communication

skills in science subjects are still low.

The researcher also conducted initial data collection through interviews with class teachers regarding student books for grade VI at SD Wanatirta 02 on March 29, 2019 that the contents of the student books, especially in science material, had several problems including the presentation of learning materials that were less interesting and there were no student worksheets aimed at improving students' communication skills. Based on these problems, the teaching materials used should be developed and adjusted to the characteristics of students by presenting interesting learning materials with appropriate illustrations. Related to the material describing the life cycle of animals based on initial data collection on March 29, 2019 that at SD Negeri Wanatirta 02 the learning outcomes and communication skills of grade IV students on the life cycle of animals were still relatively low as seen from the results of the Final Semester 1 Assessment (PAS 1) there were 12 children out of 36 children who had not achieved the Minimum Completion Criteria (KKM) score of 70. This problem occurs because the science learning process is not optimal, where teachers have not been able to apply ideas to design memorable and exciting learning so that they can achieve learning objectives. Students are only required to always memorize the material explained by the teacher, so that students tend to be passive and there is almost no interaction between the teacher and students.

The results of a preliminary study through interviews on March 29 and 30, 2019 conducted with class teachers and grade IV students found problems in science learning, namely (1) students do not understand the material in the student's book, (2) lack of student motivation in participating in learning activities, (3) students are less active in participating in learning activities, (4) students' communication skills are still very lacking, (5) students are still embarrassed to ask and answer questions, (6) there is no teaching material other than using student books, (7) the majority of students prefer to read comics compared to textbooks. Based on the problems above, it is necessary to develop interesting and effective teaching materials that can be used to teach animal life cycle material without reducing the function of the teaching materials.

The description of the problems above, so the researcher took the title "Development of Comic Teaching Materials based on Problem Based Learning (PBL) to Improve Scientific Communication Skills in Grade IV Elementary School Students". The material in the comic teaching material is the animal life cycle material in learning theme 3 in grade 4. The reason the researcher chose this sub-theme was because students still had difficulty understanding the material which resulted in the final assessment of semester 1 of grade 4 students still many have not completed the KKM. So the researcher developed animal life cycle material in the form of comic teaching materials according to the character of grade 4 students who prefer to read comics based on the results of interviews with grade IV students of SD Negeri Wanatirta 02. The goal is to attract students' attention to participate in learning activities and

students can more easily understand the material to be studied.

Methods

The type of research used is a quantitative research type using the Research and Development (R&D) method. While the approach to this research is a pre-experimental approach. This pre-experimental uses the One-Group Pretest-Posttest Design. The research design used in this study is the 4-D model research and development design.

The research took place at SD Negeri Wanatirta 02. The research was conducted in March-June 2019 and the field trial in August 2019. The sample of this study was 29 students of grade IV of SD Negeri Wanatirta 02.

The data obtained from the responses of media experts regarding media and material experts are in the form of quantitative data. The data analysis technique used to analyze the quantitative data from the validation results using quantitative descriptive analysis techniques. Quantitative data obtained through the validation questionnaire is converted into qualitative data using a 5-point scale.

In this study, the T test was conducted to compare the pretest and posttest of the science learning outcomes of grade IV.

The calculation of this T test uses the paired-samples t-test technique with the help of SPSS 16 for Windows. With the decision guidelines according to Santoso (2014: 265), that the decision-making guidelines in the paired sample t-test based on the significance value (Sig.) of the SPSS output results, are as follows:

1) If the Sig. (2-tailed) value is <0.05, then Ho is rejected and Ha is accepted.

2) Conversely, if the Sig. (2-tailed) value is >0.05, then Ho is accepted and Ha is rejected.

Result and Discussion

Based on the results of the analysis of the learning activity process, researchers are interested in developing PBL-based comic teaching materials. These comic teaching materials are developed based on the needs of elementary school students, namely compiled using the PBL model which allows the learning activity process to be more effective and not boring.

After the preparation of PBL-based comic teaching materials, the product is then validated by media experts and material experts. This validation stage aims to obtain complete data for product improvement or the perfection of the product made. In addition, validation tests are also carried out to determine whether the developed product is worthy of being tested on grade IV elementary school students. The following is an explanation of the validation test from the experts.

The media expert in this study is a lecturer at the University of Peradaban,

namely Rizki Noor Prasetyono, M.Pd who has expertise in the field of learning media, especially printed teaching materials. The validation questionnaire for PBL-based teaching materials media consists of two assessment aspects, namely the presentation aspect and the graphic aspect. The results of the validation questionnaire from media experts on PBL-based comic teaching materials obtained a total score of 110 with an average score of 5, which is very good with a percentage (%) of 100 in the very valid category. The results of the validation questionnaire assessment from media experts on PBL-based comic teaching materials show that the overall average score is 5. If the qualitative data is converted into a categorization table, the score 5 is in category A with very good criteria. Thus, PBL-based comic teaching materials can be said to be suitable for use without revision/improvement. The criticism and suggestions given by media experts before the revision were for the appearance of the page border design to not be too busy and the core of the comic story to be made on one page.

The material expert selected by the researcher to validate the material contained in this product is a lecturer who is an expert in Natural Science (IPA) who masters the material on the animal life cycle, namely Eka Trisnawati, M.Pd. The material validation questionnaire consists of content aspects, presentation aspects, and language aspects. The results of the validation questionnaire from media experts on PBL-based comic teaching materials obtained a total score of 56 with an average score of 4 in the good category with a percentage (%) of 80 in the valid category. The results of the assessment of PBL-based comic teaching materials by material experts show that the overall average score is 4. If the qualitative data is converted into a categorization table, the score 4 falls into the B category with good criteria. So that PBL-based comic teaching materials are suitable for use in the field without any revision/improvement. The criticism and suggestions given by material experts before the revision were for the appearance of the cover design and page border to be changed so that it is not too busy, in the section on the book explaining the PBL model to be included.

The product that has been validated by media experts and material experts is then revised. Revisions to the developed product are revised according to criticism and suggestions from media experts and material experts given at the validation stage. Revisions are made to correct errors or deficiencies in teaching materials when used. Based on the questionnaire sheet instrument for validation, media experts concluded that the media is suitable for use with revisions to the appearance of the page border design so that it is not too crowded and the core of the comic story to be made on one page. Meanwhile, validation from material experts concluded that it is suitable for use with revisions to the appearance of the cover design and page border to be replaced so that it is not too crowded, in the section about the book explaining the PBL model to be included.

The product that has been validated by media experts and material experts was then tested on a limited basis to 27 students. Of the 27 students, they were grouped into

5 groups. The limited trial was conducted on grade IV students of MI Nurul Amin Kedawung Wanatirta on June 20, 2019 at 10:00 WIB. The limited trial was conducted to determine whether students were able to use PBL-based comic teaching materials developed by researchers and students better understand the animal life cycle material in real terms. 100% of students are motivated to follow the learning process, 100% of students enjoy following the learning process, 100% of students are interested in following the learning process using PBL-based comic teaching materials, 100% of students are very enthusiastic in following the learning process, 100% of students like learning activities using PBL-based comic teaching materials, and 100% of students are able to understand the material well after using PBL-based comic teaching materials in learning activities. From the results of the student response questionnaire assessment during the limited trial, PBL-based comic teaching materials are suitable for use by researchers in field trials.

The effectiveness of using PBL-based comic teaching materials can be seen from the implementation of learning activities using PBL-based comic teaching materials. During the limited trial, students were very active and enthusiastic in following the learning process. And from the results of the field trial, the assessment of students' scientific communication skills after using PBL-based comic teaching materials experienced a significant increase. Students became active in asking questions, were able to convey ideas/concepts both verbally and in writing, were able to respond to opinions and were able to conclude very well. The hypothesis of this study states that PBL-based comic teaching materials are effective in improving the scientific communication skills of fourth-grade students in science lessons on the animal life cycle material. Based on the results of the hypothesis test in this study, it shows that there is a difference in the average results of the assessment of students' scientific communication skills who use PBL-based comic teaching materials compared to students who do not use PBL-based comic teaching materials in the learning process. The results of the posttest assessment are better than the pretest score. The average posttest score is 84.77, while the average pretest result is 67.93. The average posttest result is higher than the pretest score. The average difference between the pretest and posttest results was 16.84. Based on the results of the pretest-posttest comparison test, it can be seen that the posttest results were higher than the pretest scores. The significant difference in the results of the assessment of students' scientific communication skills indicates that the scientific communication skills of students who use PBL-based comic teaching materials are better than the results of the scientific communication skills of students who do not use PBL-based comic teaching materials. So, it can be said that PBL-based comic teaching materials can effectively improve the scientific communication skills of fourth-grade elementary school students. In line with the results of research conducted by Takari (2015) which stated that after using comic media as science teaching materials for fourth-grade students of Pendowoharjo Elementary School, Sleman, the average student completed 80% in participating in learning activities compared to before using comic

media as teaching materials, the average student had not completed 80%. And supported by the results of Yunita's research (2017) that the development of science comic teaching materials for fourth-grade students of Beji 03 Elementary School was effectively used, the results of the study obtained by student learning achievement increased by more than 80% of students who could exceed the KKM score. And the results of research from Sujiono (2014) that the development of integrated science modules based on PBL can effectively improve students' critical thinking.

Learning activities using comic teaching materials are used to find out the life cycle of animals. The learning activities using comic teaching materials are carried out during one meeting. The activities carried out in learning using PBL-based comic teaching materials. In this learning, students actively seek information by conducting discussion activities with other group members. This is in accordance with the researcher's observations, that in learning students are very active and enthusiastic, especially when conducting discussion activities, reading and observing animal life cycle comics and solving problems that arise from a question. This is in line with Majid's opinion (2014: 162) that the PBL model is carried out by providing stimulation in the form of problems which are then solved by students.

By using the PBL learning model, students are not only active in thinking but are also able to improve their communication skills in accordance with one of the objectives of the PBL model stated by Evelin in (Sumantri, 2016: 44) that the PBL model can improve discipline and success in terms of effective communication skills.

Based on the overall results that have been presented, it can be concluded that PBL-based comic teaching materials are effective in improving the scientific communication skills of fourth grade students of SD Negeri Wanatirta 02. The average results of the assessment of students' scientific communication skills after using PBL-based comic teaching materials are higher than the average results of the assessment of students' scientific communication skills who do not use PBL-based comic teaching materials in the learning process.

Conclussion

The results of the research and discussion can be concluded that the development of PBL-based comic teaching materials through 4 stages, namely Define, Design, Develop and Disiminate. From this development, the results obtained that PBL-based comic teaching materials are feasible and valid for use in the field, seen from the media expert score, showing that PBL-based comic teaching materials are included in the very good criteria, then the validation results from material experts show that PBL-based comic teaching materials are included in the good criteria. Meanwhile, from the responses of students in the limited trial, students were very enthusiastic and motivated in participating in learning activities and were able to understand the subject

matter contained in PBL-based comic teaching materials. So PBL-based comic teaching materials are feasible to use. The results of the effectiveness test obtained a value that showed that PBL-based comic teaching materials were effective in improving students' scientific communication skills. This is based on a hypothesis test using a comparative test, the average results of students' scientific communication skills after using PBL-based comic teaching materials increased and were included in the good category. So it can be concluded that PBL-based comic teaching materials are effective in improving the scientific communication skills of grade IV students..

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