

Development of Problem-Based Learning (PBL) Based Flipbook Media on Science Learning Atsdit Ar-Rohmaniyah, Bogor City

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Abstract: This study aims to develop and test the effectiveness of *problem-based learning* (PBL) flipbook learning media in class V science learning at SDIT Ar-Rohmaniyah, Bogor City. This study used the development model of Borg and Gall and Assure. To test this feasibility using the assessment of 3 experts, namely media experts, design experts and material experts. The media feasibility assessment by material experts obtained a score of 94% with the category "Very Decent". The assessment by media and instructional design experts obtained a score of 75% with the category of "worthy". The average rating by experts is 85% with the category "very worthy". To determine the effectiveness of *problem-based learning-based* flipbooks, an N-Gain test analysis was carried out. The calculation result of the N-Gain test was obtained by 0.82 or 82%. Where such results fall into the category of high N-Gain. Based on the results of expert feasibility tests and N-Gain calculations, *problem-based learning-based* flipbook media is feasible and effective for use in class V science subjects in SDIT Ar-Rohmaniyah Bogor City.

Keywords: Flipbook, IPA, Media.

Introduction

The existence of the 21st century is marked by the era of the industrial revolution 4.0, where this century makes the century of openness or the century of globalization. 21st century learning applies more creativity, critical thinking, cooperation, problem solving, communication skills, sociability and character skills (Mardhiyah et al., 2021). Therefore, the future educational process must be able to develop character and skills, both related to the pillars of education and skills needed in the 21st Century, including improving the profession and competence of teachers, learning characteristics, and characteristics of students, as well as life skills in a career.

With the development of increasingly sophisticated technology, there are many applications or websites that can be developed and used as a medium in helping teachers to carry out learning activities for students. The existence of learning media can help teachers to deliver difficult material to be easier for students to understand. In addition to teachers, distance learning activities (PJJ) using learning media in the process can make it easier for students to interact with teachers. The interaction process that was previously face-to-face can be done using several applications such as classroom, video conference, telephony or with live chat on Zoom, Google Meet, or WhatsApp Group. However, in schools where researchers conducted research, it was found that related to the use of technology-based learning media in this school, teachers have not used varied learning media. The use of *media conferencing* in learning is already applicable, but in the process of delivering the material is still in the form of lectures.

For this reason, it is necessary to develop interesting and effective learning media in improving student learning outcomes. With this, researchers are trying to develop interactive learning media with *Flipbook* to make learning more student-centered and more interactive. To meet the expectations of learning media developers, researchers chose interactive learning multimedia that includes text, images, audio, animation and video in one container. The existence of existing learning support facilities, interactive learning multimedia developed, is expected to be applied to learning by teachers. Based on the results of the needs analysis and other complementary data, research is needed on the development of interactive learning multimedia, in this case it is a *problem-based learning* (PBL) Flipbook in the 2013 Curriculum in science learning at SDIT Ar-Rohmaniyah Bogor City

Natural Sciences

Natural Science (IPA) is an important subject and is the foundation for technological development. The daily activities of human beings deal with science, from the simplest to those that require complex thinking, therefore science is taught from the elementary school level. Natural Science plays an important role in public education both as a direct object (facts, skills, concepts, principles) and an indirect object (being critical, logical, diligent, able to solve problems, and others (Sadiah, 2018). Natural Science is a learning based on principles, a process that can foster students' scientific attitudes towards science concepts through simple observation, discussion, and investigation (Giartama et al., 2018). According to (Dewi et al., 2021). To improve the quality of elementary school teachers, teachers are required not only to understand theory but also to understand the concept of attitudes and skills in subjects.

Science taught to children in elementary schools (SD) aims to explore children's ability to be able to explore and understand the surrounding nature literally, while its function is so that children master the concepts and benefits of science in everyday life and become a focus for learning subject matter at an even higher school level (Prastika, 2017). Classroom teachers in elementary schools who teach natural sciences (science) subjects must be able to provide concepts and benefits of science in everyday life to their students. In addition, Natural Science is a basic science that plays an important role in the development of science and technology (Yuliati & Lestari, 2019). Thus, through learning students are expected to have various skills such as creative and innovation skills, critical thinking and problem solving, communication, and cooperation.

Problem Based Learning

The Problem Based Learning (PBL) learning model is a learning approach that uses real-world problems as a context for students to learn (Nismaya, 2020). Furthermore, Nur (Suarsani, 2019) defines the PBL model as a learning model that is able to facilitate students in thinking about real life problems around students. Lalu (Kiranadewi & Hardini, 2021) explained that this PBL model has advantages to train students in improving their ability to think creatively, imaginatively, reflectively, about models and theories, and introduce and try new ideas, as well as encourage students to gain confidence. In achieving its goals, PBL has tricks/ways. One of these tricks lies in the problems both given by the teacher and those found and solved by the students themselves. This problem is certainly a problem in the real context.

Learning Using *Problem Based Learning* Flipbook Media

Basically, every learning process carried out is directed towards achieving predetermined goals. Learning is a process of behavior change through the interaction between the individual and the environment. Learning is a learning word given by pe and an, which means learning is an increase in knowledge, the process of remembering, and the process of obtaining facts or skills that can be mastered and used as needed (Fatimah & Kartikasari, 2018). There are two concepts that cannot be separated in learning activities, namely learning and teaching. Learning refers to what students do, while teaching refers to what the teacher does. According to Komalasari (Faizah, 2017) learning can be viewed from two angles; First, learning is seen as a system, learning consists of a number of organized components including learning objectives, learning media, classroom organizing, learning evaluation, and learning follow-up (remedial and enrichment). Second, learning is seen as a process that includes activities carried out by teachers ranging from planning, implementing activities to evaluation and follow-up programs that take place in educational situations to achieve predetermined learning goals.

Problem-based learning is learning that focuses on problem-solving activities, and the problems that must be solved are problems that are not finished or not well structured, so this can challenge students to think and have discussions in groups (Ismaimuza, 2020). Problem-based learning is a learning method that aims to prepare students to be skilled in real life (Cahdriyana, 2016). One of the problem-based learning methods is Problem Based Learning (PBL).

Improving student learning outcomes can be pursued with learning methods, strategies, or models and is supported by learning media. Learning media can also be used for student interaction media in improving learning outcomes. Through supporting learning methods and media, it can make it easier for teachers to achieve learning goals, improve students' abilities, and students' enthusiasm for learning in achieving learning outcomes. In order to improve learning outcomes, this research focuses on the development of learning media in learning strategies in the form of learning media in the form of flipbooks on science subjects in elementary schools.

Method

The type of research carried out is the type of research and development Research and *Development* (RnD) using the Borg and Gall and ASSURE models. The stages of development are; 1) preliminary studies in which in this stage there are steps of student analysis, material analysis, determining learning standards and objectives, choosing methods and media; 2) model design; 3) one to one test; 4) small group test; 5) Large Group Test; 6) the final model; 7) Effectiveness test.

The instruments used in this study were wawaacara, expert validation instruments, user response instruments, and written test instruments. Data analysis techniques for interview results using qualitative data analysis, the data obtained are data from observations with teachers and students. The results of the analysis of expert validation instruments, student responses and science test results use quantitative analysis whose results will be explained in sentence form or qualitative. For testing the effectiveness of the media will be tested using the N-Gain test.

Results and Discussion

Need Assesment

The development of learning using Flipbooks in science subjects class V semester I at SDIT Ar-Rohmaniyah Bogor is based on the results of field observations. Based on the results of observations, it was found that there was no material that could be accessed anywhere and anytime using flipbook media. The availability of internet networks in schools and the support of the foundation, devices owned by students at home and students have become accustomed to using teaching materials through gadgets that support the implementation of flipbook learning.

Results of the Initial Needs Analysis of Research

The first step taken by researchers is to develop flipbook-based teaching materials, namely by analyzing needs and goals with field observations and through interviews with teachers and distributing questionnaires to class V students, along with the results of interviews and questionnaire responses and the results of the analysis carried out.

A. Interview results

Interviews were conducted with class V teachers at SDIT Ar-Rohmaniyah Bogor which aimed to obtain data from teachers. Before the interview, the researcher compiles the interview grid and arranges the question instrument. The interview was conducted on May 04, 2022 with the following results:

- 1) The difficulties faced by subject teachers when conducting learning are that students are constrained by devices, unstable signals and do not have internet quota.
- 2) The purpose of learning is to equip students with teaching materials before doing online learning through flipbooks.
- 3) With the disturbance, students have difficulty in understanding the learning meter delivered by the teacher.
- 4) The availability of facilities and infrastructure in schools is quite good in schools.
- 5) Teachers try to create a fun and easy-to-understand learning process by associating learning with daily activities.

B. Questionnaire results

Researchers distributed questionnaires to class V students of SDIT Ar-Rohmaniyah Bogor to obtain data from students. Learners about learning. This data collection is carried out through a questionnaire on June 27-28, 2022.

Material Expert Validation Test Results

Before conducting trials on students, researchers conducted an Expert Judgment (expert test) of flipbook media product design. Validation is performed by two validators consisting of (1) material experts, 2) media experts and instructional design. Data is obtained from the assessment questionnaire given to validators, and validators are welcome to provide comments and suggestions for product improvement.

No.	Aspects	Score	Maximum score	Percentage of fatigue
1	Material	23	25	92%
2	Language	39	40	98%
3	Serving	54	60	90%
4	Display	25	25	100%

Based on the results of the assessment from material experts on the development of Problem-based Learning (PBL) Flipbook media, a percentage of results were obtained, namely:

$$presentase = \frac{Skor\ yang\ diperoleh}{Skor\ maksimum} \times 100\%$$

The result of 94% when interpreted using the interpretation of the validity of problem-based learning (PBL)-based Flipbook media is said to be feasible if the final value of the validation sheet is $\geq 61\%$ and is included in the very feasible category if the final score reaches $> 81\%$ (Arikunto, 2009: 35). Interactive media products are on the "very decent" qualification.

Media and Design Validation Test Results

No.	Aspects	Score	Maximum score	Percentage of fatigue
1.	Linguistic Structure	15	20	75%
2.	Media Display	18	25	72%
3	Software Engineering	19	25	76%
4	Deliverability	8	10	80%
5	Learning	52	70	75%

The result of 75% when interpreted using the interpretation of the validity of PBL-based flipbook learning media is said to be feasible if the final score is $\geq 61\%$ and if it is said to be very feasible if the final score reaches $\geq 81\%$. (Arikunto, 2009:35). PBL-based flipbook learning media products are on the "feasible" qualification of this in accordance with the conclusions given by media experts and instructional design that these learning media are worth testing.

Product Effectiveness Test Results

Testing the effectiveness of developing problem-based learning media based on science learning by comparing the results of the pretest, teachers before carrying out the learning process and conducting posttests after using and implementing the learning process. This test was conducted on 30 learners, with a comparison of the average scores of pretest and posttest in the table below:

No.	Test	Average
1	Pretest	71,1
2	Posttest	94,8

From the calculation above, the average N-Gain of learners is 0.82. Based on this data, it can be concluded that the science flipbook learning of class V students of SDIT Ar-Rohmaniyah Bogor is included in the High N-Gain category. Based on the N-Gain interpretation table, the PBL-based Flipbook science learning activities for grade V students of SDIT Ar-Rohmaniyah Bogor are effective.

Conclusion

The learning media development model used in this study is a combination of the Borg and Gall model and the ASSURE model which consists of 10 stages, namely: 1) analyzing students, 2) determining standards and goals, 3) choosing methods, media and teaching materials, 4) product development, 5) field tests, 6) product revisions 7) operational field trials, 8) large-scale trials, 9) final revision, 10) implementation. The results of the analysis of needs in the field that there is no PBL-based flipbook learning media available.

The feasibility of learning media products developed is based on the results of validation tests from material experts, media experts and instructional design, individual trials, small group trials and field trials. So it can be concluded that the PBL-based science learning flipbook learning media development product can be well received by users and experts who are targeted in the development, such as students and full support from science teachers at SDIT Ar-Rohmaniyah Bogor.

Based on the results of the trial, science learning development products in the form of flipbooks with a *problem based learning* (PBL), obtained scores from material experts of 94%, values from media experts and instructional design of 75%, then the average value of experts is 85%, then the products developed are included in the very feasible criteria. This assessment shows that this PBL-based flipbook learning media development product is very feasible for use by integrated Islamic elementary school students, where in learning to apply Natural Sciences. This PBL-based flipbook learning media is worthy of being produced by user institutions with the permission of science learning media developers. Then, the pretest and posttest results of class V students of SDIT Ar-Rohmaniyah Bogor were declared effective in the learning process. Judging from the calculations, the average N-Gain of students is 0.82 which is a High category.

Recommendations

The development of flipbook media is only limited to one science material, it is hoped that in the future it can be facilitated the development of flipbook media for science materials for one semester. So that it can make it easier for students

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