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Development of Prezi Media Based on Problem-Based Learning (PBL) Model in Natural and Social Science Subjects in Class IV Elementary School

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Abstract: The basic problem in the subjects of Natural and Social Sciences is the element of social understanding, namely the use of learning media and the planning and application of learning models that are not optimal, so student learning outcomes are not good. The purpose of this research is to develop Prezi media based on the Problem-Based Learning (PBL) model in the subject of Natural and Social Sciences in class IV of elementary school. Research and Development (R&D) with the Borg and Gall model is the type of this research. The tests used are t test and N-Gain test. The results of media validation by media experts and material experts amounted to 91.25% and 88.90% with a very feasible category. The significance value shows 0.00 and the N-Gain score obtained is 0.44 so it can be said that the increase in student learning outcomes classified as moderate. This study concludes that Prezi media based on the Problem-Based Learning (PBL) model in Natural and Social Sciences subjects in class IV elementary school is very feasible and can improve student learning outcomes.

Keywords: Learning outcomes; Natural and social sciences; Prezi media; Problem-Based Learning (PBL) model.

Introduction

Regulation of the Minister of Education, Culture, Research and Technology of the Republic of Indonesia Number 16 of 2022 states that Process Standards are used as guidelines in implementing an effective and efficient learning process to optimally develop the potential, initiative, ability and independence of students. Process Standards for Early Childhood Education, Primary Education, and Secondary Education include: learning planning; learning implementation; and learning process assessment. The direction of the Process Standards carried out will adjust to the current education curriculum in Indonesia, namely the Merdeka Curriculum. The Merdeka Curriculum is a form of renewal of the education system in Indonesia by prioritizing education based on the character development of students through the Pancasila Student Profile and the formation of basic competencies of students with 21st century skills (Dewi & Arifin, 2024; Ockta & Mardesia, 2023; Wardani et al., 2023). Merdeka curriculum frees teachers and students to innovate in order to improve the quality of learning (Dewi & Sumarni, 2024). Reinforcing the previous opinion, the Merdeka Curriculum makes learning principles learner-centered so that active learning is formed (Amiruddin et al., 2023; Nikmah et al., 2023; Putri et al., 2024).

Natural and Social Sciences can be said to be a fusion of the subjects of Natural Sciences and Social Sciences. Therefore, it is necessary to first understand the nature of each element. The nature of Natural Science is a subject that has three points of view which include in terms of: product, process, and attitude development. This means that learning Natural Science will go through stages from the process dimension, followed by

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how the product looks like, and completed with the dimension of developing scientific attitudes. Thus, it can be said that these three things are indeed interrelated and must be implemented in Natural Science subjects (Prasasti & Listiani, 2019). Social Science is one aspect of understanding that exists in Natural and Social Sciences subjects. Social Science is a science that discusses human social interactions both with other humans and the natural environment. Social Science is composed of several sub-disciplines such as: history, economics, geography, sociology, and anthropology into one solid unit in one subject. Basically, Social Studies teaches about human life and needs. With the combination of several sub-disciplines, Social Science is formed into a subject that can be useful in human interaction and life (Rohmanumerta & Dewi, 2019). The definition of Natural and Social Sciences is written in the Decree of the Head of the Education Standards, Curriculum and Assessment Agency of the Ministry of Education, Culture, Research and Technology Number 033/H/KR/2022 which reads: "Natural and Social Sciences is a science that studies living and non-living things in the universe and their interactions, and studies human life as an individual as well as a social being that interacts with its environment."

Problems that arise in Natural and Social Sciences subjects can occur due to several factors such as learning models and media. For example, the learning outcomes of students become less than optimal because the application of the learning model used does not attract the attention of students and learning media that does not support active learning (Miaz et al., 2019; Permatasari et al., 2019) The application of learning models that do not meet the requirements of the current curriculum will have a negative impact on student learning outcomes (Milasari & Setyasto, 2023).

The problems that occurred at State Elementary School 1 Tanjunganom, Kaliwiro Subdistrict, Wonosobo Regency were similar to the problems above. The results of interviews and observations with class V teachers show several problems. The focus of the problems that researchers raise is learning that more often uses the Discovery Learning model so that it requires students to find material independently and process it into mind mapping. In addition, the incomplete preparation of teaching modules or lesson plans in the Merdeka Curriculum is reflected in the application of immature learning models. LCD utilization is also more often used to display power points and videos that are only controlled by the teacher.

The results of the students' questionnaire show some problems. Some subjects including Natural and Social Sciences are less liked by students, difficult to understand, difficult to memorize, and too much theory. The learning outcomes of learners in the Natural and Social Sciences subject element of social understanding, precisely on the material of written and unwritten rules in society show that some learners have not reached the minimum completeness criteria. Of the 21 learners, 8 learners (38%) have not met the minimum completeness criteria and 13 learners (62%) have met the minimum completeness criteria. The class IV teacher also added that this could happen because the characteristics of the material studied lacked learning media or teaching aids.

The spearhead of the problems that occur in learning Natural and Social Sciences subjects, elements of social understanding in class IV of State Elementary School 1 Tanjunganom requires evaluation by referring back to the principles in the Merdeka Curriculum and the Process Standards listed in Regulations of the Ministry of Education, Culture, Research and Technology of the Republic of Indonesia Number 16 of 2022. The learning model that is relevant to the current curriculum is the Problem-Based Learning (PBL) model with learning steps that can improve students' critical thinking and learning outcomes (Abdulah et al., 2021; Aristin et al., 2023; Lestari et al., 2024). The Problem-Based Learning model has advantages in improving student learning outcomes compared to the Discovery Learning model (Prihatin, 2024). The Problem-Based Learning model is one of the learner-centered learning models by placing the teacher as a facilitator and oriented to real problems as reference material to be solved in groups so that learning becomes more meaningful because students become accustomed to solving problems even in everyday life (Ade & Hasan, 2017; Ahmad et al., 2023; Djamaluddin & Wardana, 2019). The problem-solving process in the Problem-Based Learning (PBL) model will produce solutions obtained from the previous analysis stage (Dwikoranto et al., 2024; Sulastry et al., 2023; Yansah et al., 2023).

The Problem-Based Learning (PBL) model has five learning steps. The steps contain certain functions so as to flow learners to go through several activities that hone their abilities and skills. The Problem-Based Learning model will enhance deep learning experiences for students (Affandy et al., 2024). The benefits that will be obtained by students when using the Problem-Based Learning (PBL) model are increasing positive skills in group activities such as: mutual cooperation, mutual respect, being critical and independent in processing literature, and proficient in presentation activities so as to form a long-life learner (Djamaluddin & Wardana, 2019). Positive group skills can also shape learners' motivation to learn (Safitri et al., 2023). In addition, the application of the Problem-Based Learning model assisted by video media also increases students' learning motivation (Ananda et al., 2023). The advantages of the

Problem-Based Learning (PBL) model for students are making it easier to understand learning content, providing challenges and satisfaction in discovering the latest insights, increasing learning activities, helping to realize knowledge into life, helping to expand new knowledge and train to be responsible for learning, showing that problem solving is a way of thinking that is not only obtained from school, making learning fun, developing critical thinking and the ability to adapt to new knowledge, providing opportunities for applying knowledge that is already owned in reality, and developing interest in learning throughout the continuum even though formal education has been completed (Ade & Hasan, 2017; Mayasari et al., 2022; Yunitasari & Hardini, 2021).

Other research relevant to this study proves that the application of the Problem-Based Learning (PBL) model supported using Prezi media has an impact simultaneously or partially on the scientific literacy and independence of elementary school students (Kristiantari et al., 2022). The learning outcomes of elementary school students in Science subjects also increased due to the application of the Problem-Based Learning (PBL) model assisted by audiovisual media (Afifah & Minsih, 2021). Both studies strengthen researchers to present solutions in the form of applying the Problem-Based Learning (PBL) model in teaching and learning activities.

The results of interviews and observations of learning practices of class IV teachers at State Elementary School 1 Tanjunganom show that the use of LCD is more often used to display power points and videos that are only controlled by the teacher and the lack of learning media or teaching aids that can be utilized in Natural and Social Sciences subjects, elements of social understanding. The use of learning media in the form of previous technology shows the lack of student participation in this media. Thus, the principle of the Merdeka Curriculum, which emphasizes the 21st century skills of students, needs to be raised by involving them directly (Rahmawati et al., 2023; Wardani et al., 2023). The solution that researchers offer is the use of learning media in the form of Prezi. Prezi is a solution because of the learners' perspective that the application of technology in Merdeka curriculum is very interesting (Setyaningsih et al., 2023).

Prezi is a form of software that is utilized as a presentation media maker. Prezi is a web tool used to create presentation media. Prezi has similarities with Microsoft Office PowerPoint presentation slides, Focusky, Google Slides, and so on, but in terms of presentation Prezi is a very good choice because of its distinctive and attractive appearance (AMC College, 2022). Prezi is a multi-frame software that forms an infinite canvas for creating learning presentations. The feature of zoomed-in and zoomed-out effects as transitions between slides is available on this Prezi web. These transitions will create an optical impression of moving like a video (Hariadi, 2018; Kumala et al., 2019; Rosmiati & Siregar, 2021).

Some of the reasons Prezi is highly recommended for use are: Prezi is a free media maker with everything needed in it also free, although there are certain paid features; Prezi has the same web interface on any type of computer or other supporting device; Prezi has a unique display style for presentation, comes with inter-slide transitions that support the delivery of material, and can provide a view with a certain perspective that has been available (AMC College, 2022; Mayhew, 2019; Susilawati & Nuraida, 2021). Prezi is also an easy-to-use media and has been rated favorably by teachers (L. Tomczyk et al., 2022; Ł. Tomczyk et al., 2024). In addition, Prezi is one of the media that can improve students' literacy skills (Irhasyuarna et al., 2022; Maryanne & Halili, 2022; Milad, 2022).

The results of interviews and observations of teachers and observations of class IV students show that the basic problems in Natural and Social Sciences subjects, elements of social understanding that occur in the form of the use of learning media are not optimal and the planning and application of learning models that are less mature. Students will be more interested if in learning using technology-based media such as LCD to display everything related to the material. The results of the literature review and other relevant studies strengthen researchers to develop learning media as a solution to existing problems. With this foundation, researchers developed learning media in the form of Prezi so that things related to the material can be displayed on the LCD to be even more interesting. Therefore, the researcher will develop Prezi media based on the Problem-Based Learning (PBL) model in the subjects of Natural and Social Sciences in class IV of State Elementary School 1 Tanjunganom, Kaliwiro District, Wonosobo Regency.

The novelty that researchers bring up in this study lies in the product developed. The presentation features of Prezi are collaborated with templates made using Canva so that Prezi looks more attractive. In addition, Prezi is a media that is rarely used by teachers and students so that in its application it will be a new experience of using presentation media with a different sensation. Prezi media made by researchers is based on the Problem-Based Learning (PBL) model so that this media can be used from the beginning to the end of learning. Researchers made this media can also be used by students so that learning can be centered on students and teachers act as facilitators. Not only pictures and

readings, this media is also integrated with videos, student worksheets, comment boards, and quizzes. The most noteworthy thing in the development of this media is the learning material that is applied. Researchers used the topic of learning written and unwritten rules in society, elements of social understanding, Natural and Social Sciences subjects, Class IV elementary school. Researchers have not found research that uses similar topics.

Method

This research uses the Research & Development (R&D) method. This method is an intermediary between basic research that aims to find novelty in science and applied research that aims to apply science or products practically. Product discovery, development, and validation are the stages of the R&D method (Sugiyono, 2016). This method will be the foundation of the research implementation because it is in accordance with the form of the problem at hand. To focus the path of this research, researchers used the Borg and Gall product development procedure.

Borg and Gall product development steps that researchers will carry out to develop Prezi media based on the Problem-Based Learning (PBL) model, namely: potential and problems; data collection; product design; design validation; design revision; design validation; product revision; trial use; product revision; and mass product manufacturing. Researchers can only carry out up to the trial use step due to time and cost constraints.

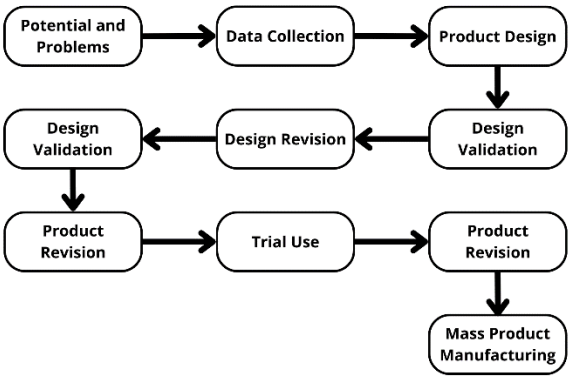

Figure 1. Borg and Gall development model

The potential and problem stage begins with observation. Researchers identified problems through student learning outcomes, the results of interviews with teachers, and observations of existing infrastructure in the classroom. At the data collection stage, researchers sharpen the problem by collecting data such as teacher questionnaire results, student questionnaire results, and teaching and learning activities assessment results. The existence of identified problems and school potential that can be utilized requires researchers to continue at the product design stage. The product design stage begins with sketching the appearance of the product from a picture on paper to visualizing it into a template that researchers make through the Canva application. After the design was completed, the next step was to validate it through material experts and media experts. Input from material experts and media experts on the product design was followed up with the product revision stage. After the product was revised, the researcher sent the results to the material experts and media experts. After further validation is considered sufficient by material experts and media experts, the product is ready to be tested on students.

This research was conducted at State Elementary School 1 Tanjunganom, Kaliwiro District, Wonosobo Regency. Fourth grade students totaling 20 people became the research trial subjects. Data collection techniques used were observation, interview, questionnaire, test, and documentation. Observation was used to get information from everything in the school. Interviews were used to obtain information from teachers. Tests are used to get information from students. Questionnaires are used to obtain information from students, teachers, media experts, and material experts.

The two variables in this study are the independent variable (X) in the form of Prezi media based on the Problem-Based Learning (PBL) model and the dependent variable (Y) in the form of student learning outcomes in Natural and Social Sciences subjects. The hypothesis in this study consists of two, namely the null hypothesis (H_0) and the alternative hypothesis (H_a). H_0 states that Prezi media based on the Problem-Based Learning (PBL) model does not improve student learning outcomes. H_a states that Prezi media based on the Problem-Based Learning (PBL) model improves student learning outcomes.

The data processing techniques used in this research are qualitative descriptive analysis techniques, quantitative descriptive analysis techniques, and inferential statistical analysis techniques. The technique used to analyze input from material experts and media experts is qualitative descriptive analysis technique. The technique used to analyze the validity of media from students, teachers, media experts, and material experts is quantitative descriptive analysis technique. The technique used to analyze student learning outcomes is inferential statistical analysis techniques. The inferential analysis technique uses the t test and the N-Gain test in the Microsoft Excel application.

Result and Discussion

The media development procedure used in this study uses the Borg and Gall development procedure. The first steps of the media development procedure are potential and problems. The potential problems that researchers find are the learning outcomes of Natural and Social Sciences, elements of social understanding of written and unwritten rules in society showed that some students had not reached the minimum completeness criteria. Of the 21 students, 8 students (38%) have not met the minimum completeness criteria and 13 students (62%) have met the minimum completeness criteria. Results of interviews as well as observations of facilities and infrastructure that are a problem in Natural and Social Sciences subjects, especially the element of social understanding, namely limited and non-variative learning media. These problems have the potential to make learning sometimes feel boring

The second stage of the media development procedure is data collection. Previously, initial data in the form of student learning outcomes and observations of facilities and infrastructure had been carried out. After that, researchers collected data in the form of interviews with teachers, teacher questionnaires, and student questionnaires. The combined results of the data collection show that: the making of incomplete teaching modules is reflected in the application of an immature learning model; LCD utilization is more often used to display power points and videos that are only controlled by the teacher; Natural and Social Science subjects are less preferred by students because they are difficult to understand, difficult to memorize, and too much theory; the characteristics of the material studied lack learning media or teaching aids; students feel more understanding when the teacher explains using learning media; and learning media preferred by students in the form of videos. The existing problems and potential become the basis for researchers to develop Prezi media based on the Problem-Based Learning (PBL) model.

The third step of the media development procedure is product design. Product design begins with sketching images that contain the arrangement of icons and core writings on the media. After the sketching is complete, the product template is made using the Canva application. The initial results of product design can be seen in Figure 1 and Figure 2.

Figure 2. Cover

Figure 3. Display of PBL model steps

The fourth step of the media development procedure is design validation. Prezi media based on the Problem-Based Learning (PBL) model was validated by media experts and material experts. The percentage range of validation results is divided into four, namely: 0-25% (less feasible); 26-50% (quite feasible); 51-75% (feasible); and 76-100% (very feasible). The validation results from media experts and material experts are shown in Table 1.

Table 1. Validation Results from Media Experts and Material Experts

	Media experts	Material experts
Total score	73	40
Maximum score	80	45
Percentage	91.25%	88.90%
Category	Very feasible	Very feasible

The validation results from media experts and material experts show that Prezi media based on the Problem-Based Learning (PBL) model is very feasible. The product is considered very feasible by media experts because it has fulfilled the aspects of: learning, language, appearance, use, and usefulness. The product is considered very feasible by material experts because it has fulfilled the aspects of: media development principles, content feasibility, and language.

The fifth step of the media development procedure is design revision. Media experts and material experts provide input on the products that researchers make.

Media experts provide input, among others: in the second step, an instruction sentence is added related to group formation; the display of the steps of the PBL model added an arrow icon; media added instructions for use and developer profiles; the background image on each slide is adjusted to the icons related to the material; square icons and the like in the product are added with a border with a contrasting color; and the writing color is made to be more contrasting with the background color. The material expert provided input, among others: the presentation group's comment board was added with commenting instructions; the writing of the steps of the PBL model was; in the video section, an instruction sentence is added; in the fourth step, an instruction sentence is added about completing the learner worksheet, a link to draw the order of presentation groups, and a link to comment on group presentations; in the third step, material is added in the form of a video before working on the learner worksheet; learning outcomes are adjusted to the material; and the question in the first step was changed to an analytical question. The results of design revisions from media experts and material experts will be displayed in Figure 3.

Figure 3. Results of Design Revisions from Media Experts: (a) Instruction sentence, background image, and icons before revision; (b) Instruction sentence, background image, and icons after revision; (c) Arrow icon and the color before revision; (d) Arrow icon and the color after revision; (e) Cover before revision; and (f) Cover after revision.

The sixth step of the media development procedure is design validation. The results of previous design revisions have been reported to media experts and material experts. Media experts and material experts direct proceed to the next step. The seventh step of the media development procedure is product revision. The product was not revised because there was no new input from media experts and material experts.

The last step in this research is the trial of use. The trial of use was conducted on class V students totaling 12 people selected through purposive sampling method with a range of low, medium, and high cognitive levels. Each cognitive level consists of 4 children. This usage trial can be said to be a small-scale trial. The results of the response questionnaire from students were 81.81%, while the results of the response questionnaire from the class V teacher were 93.33%. This means that the product is considered very feasible by class V students and teachers based on the percentage range in the fourth step of the media development procedure.

The next product usage trial targeted a larger scale, namely all class IV students totaling 20 people. The results of the response questionnaire from class IV students and teachers get a percentage of 87.96% and 91.67% with a very feasible category based on the percentage range in the fourth step of the media development procedure. In addition to the response questionnaire, researchers also collect data in the form of student learning outcomes before and after the product usage trial or can be called pretest and posttest value data. The data collection techniques used by researchers are the t test and the N-Gain test. Paired Two Sample for Means is the formula used in this research t test. If $P=(T\leq t)$ *two-tail* less than 0.05, then the significance value indicates that H_0 is rejected and H_a is accepted. The significance value shows 0.00, which means that the use of the product can improve student learning outcomes. The results of the N-Gain test also showed an increase. The N-Gain score range consists of three, namely: $g>0.70$ (high); $0.30\leq g\leq 0.70$ (medium); and $g<0.30$ (low). The N-Gain score obtained is 0.44 so that it can be said that the

increase in student learning outcomes is classified as moderate.

(a) (b) (c)

(d) (e) (f)

(g) (h) (i)

(j) (k) (l)

(m) (n)

Figure 4. Results of Design Revisions from Material Experts: (a) The presentation group's comment board before revision; (b) The presentation group's comment board after revision; (c) The steps of the PBL model before revision; (d) The steps of the PBL model after revision; (e) Instruction sentence about video section before revision; (f) Instruction sentence about video section after revision; (g) Instruction sentence about next step before revision; (h) Instruction sentence about next step after revision; (i) Material before revision; (j) Material after revision; (k) Learning outcomes before revision; (l) Learning outcomes before after revision; (m) The questions before revision; and (n) The questions after revision.

The results of the data obtained have shown that Prezi media based on the Problem-Based Learning (PBL) model is very feasible to use in learning Natural and Social Sciences, elements of social understanding. This media is very feasible to use because it is able to improve the learning outcomes of students, both in terms of Prezi media such as the research from (Pratiwi, 2020; Yunitasari et al., 2019) and Problem-Based Learning (PBL) models such as research (Durrotunnisa & Nur, 2020). (Yasin et al., 2020) also stated that students' critical thinking skills can also increase when using Prezi media, as well as the Problem-Based Learning (PBL) model (Susanto et al., 2022; Widiastuti et al., 2023).

The results of research conducted by (Kumala et al., 2019) showed that Prezi media can improve thinking skills. In line with the results of previous studies, research from (Arviani et al., 2023) Problem-Based Learning (PBL) model can also improve higher order thinking skills (HOTS). Prezi media based on Problem-Based Learning (PBL) model is a good combination as a practical and interactive media (Hafizhah et al., 2022; Rosmiati & Siregar, 2021) that support active learning (Mayasari et al., 2022).

Prezi media is an effective media applied in accordance with research from (Kasmawati et al., 2023; Pratiwi, 2020) so that learning motivation and problem solving skills in students can increase in accordance with the research from (Moslimah, 2023; Safithri et al., 2021). The impacts mentioned earlier cannot be separated from the advantages of Prezi media based on the Problem-Based Learning (PBL) model, namely: the media has been integrated with the learning model so that all learning activities have been covered in one media; the media display becomes more attractive using templates derived from Canva; the media created is collaborated with other supporting online learning tools such as YouTube, LiveWorkSheet, Wheel of Names, Jamboard, and Quizizz; and the media can be used freely by students. The disadvantages of the media that researchers make also exist, such as: the media can only be used on Written and Unwritten Rules material; and the media requires electricity, internet, and supporting devices so that learning runs smoothly.

Research that supports the solution of the problems that researchers find are: Kristiantari et al. (2022) with Prezi media assisted by the Problem-Based Learning (PBL) model has a simultaneous or partial impact on scientific literacy and independence of elementary school students. Kasmawati et al. (2023) with Prezi media in Science subjects is very effective; and (Afifah & Minsih, 2021; Hafizhah et al., 2022) with the learning outcomes of elementary school students in Natural Science subjects that increased due to applying the Problem-Based Learning (PBL) model assisted by audiovisual media.

Conclusion

The results of this study indicate that Prezi media based on the Problem-Based Learning (PBL) model shows an increase in student learning outcomes and its feasibility when applied to Natural and Social Sciences subjects, especially the material of written and unwritten rules. This can be proven through the results of media validation by media experts and material experts of 91.25% and 88.90% with a very feasible category. The results of the response questionnaire from class IV students and teachers get a percentage of 87.96% and 91.67% with a very feasible category. The significance value shows 0.00 and the N-Gain score obtained is 0.44 so that it can be said that the increase in student learning outcomes is classified as moderate. This study concludes that Prezi media based on the Problem-Based Learning (PBL) model in Natural Science and Social Science subjects in class IV elementary school is very feasible and can improve student learning outcomes.

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Authors Contributions

The first author, Arga Pratama, collaborated with the second author, Novi Setyasto, in the preparation of this research article. Arga Pratama contributed to making research products in the form of learning media, conducting research, analyzing research data, and compiling articles. Novi Setyasto is a supervisor for research activities and article writing. The first and second authors double-checked the article and decided to finalize it.

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Conflict of Interest

The authors declare no conflict of interest.

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