

Project-Based Learning Model for Fifth Grade Students: Testing Theme 2 Thematic Teaching Materials Validity

Betridmela Nasti¹, Nur Azmi Alwi²

¹ Universitas Negeri Padang, Padang, Indonesia; albetbetri@gmail.com

² Universitas Negeri Padang, Padang, Indonesia; nurazmialwi@fip.unp.ac.id

ARTICLE INFO

Keywords:

education;
Project Based Learning;
teaching material

Article history:

Received 2022-12-06

Revised 2023-01-02

Accepted 2023-09-08

ABSTRACT

Education will be better and more focused by following an increasingly sophisticated era. Environmental changes that are progressively developing also affect the development of education. The 2013 curriculum has a more complex level of material than before. Therefore, effectiveness in the teaching and learning process must be improved, one of which is in learning tools. Teaching materials are a set of learning activities that affect the effectiveness of delivering material to students. The purpose of this research is to produce thematic teaching materials theme 2 that are effective and efficient using the Project Based on the Learning model. Thematic teaching materials theme 2 are developed based on an analysis of students and teachers. The analysis uses the 4D model technique, which uses four stages. The four stages are definition, design, development, and dissemination. The data was obtained from the results of interviews and questionnaires. The preparation of teaching materials begins with observation and content validation by a team of experts. This research produces teaching materials based on the PJB model with good validity.

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Corresponding Author:

Betridmela Nasti

Universitas Negeri Padang, Padang, Indonesia; albetbetri@gmail.com

1. INTRODUCTION

Learning is a process that occurs continuously from birth to death. Learning is a process that occurs in every individual and lasts a lifetime, from birth to death (Pohan & Dafit, 2021). In the implementation of learning, combinations of audio/data, video/data, audio/video, and internet technologies are often found, which allows interaction between one another in a short and fast time (Maatoke et al., 2020). These activities can improve students' ability to apply new knowledge and knowledge as an effort to increase student mastery of the material being taught or studied (Bell, 2010). Furthermore, this century's learning is a transition that requires schools to provide changes with a student-centred learning approach. Knowledge and skills need to be supported by a good attitude and character.

This calls for a speedy reaction and effective action from the education community (Dewi & Sutisna, 2019). Still, the country is feeling the pandemic's effects now that the COVID-19 virus has struck. The implementation of education has been hampered by the pandemic. During the epidemic,

classes and lessons were held virtually or in an indirect fashion. Teachers, then, need to be flexible enough to respond to changing classroom needs. Teachers' continued interest in their subjects and their interactions with students helps them keep their pupils' attention on the lessons at hand (Herliandry et al., 2020).

Implementing the learning process requires learning devices. Learning tools are an essential component of the success of educators in carrying out the learning process (Putra, 2017). Learning tools are also a guide for educators in classroom learning activities for teachers to understand and determine the level of achievement of competency standards carried out by students as a form of evaluation (Adi, 2016). Teaching materials as a guide for educators to determine the direction of learning. Teaching materials in elementary school units are the initial basis for the success of students or students at a later stage. The role of teaching materials in making learning more effective and able to improve student learning outcomes (Azis, 2010). design teaching materials that are by the curriculum in implementing learning activities oriented towards project activities that will help improve student learning skills. The learning process with Project Based Learning (PjBL) directs students to discuss and build their knowledge and solve problems and apply skills or information that is already known (García, 2016; de Graaff & Kolmos, 2019). a project-based learning process aims to enable students to acquire knowledge through the realization of projects created by working together (Amamou & Cheniti-Belcadhi, 2018). The PjBL model described above greatly facilitates teachers in providing subject matter to students. Therefore, teachers are expected to be able to design and develop teaching materials by learning models that support them optimally (S. F. R. Iskandar & Raditya, 2017).

Teaching materials in the form of conventional textbooks are still used in America. The poor ability of students in this condition hampers the intellectualism and professionalism of teachers in teaching (Berg & Shaw, 2014). This study is in line with the actual conditions in the field; the implementation of learning implementation plans still does not use models and still uses textbooks. This problem was found in teacher interviews for class V in each school. Where the observation activities the researchers carried out in the form of curriculum analysis and needs analysis (Setiadi, 2016). Analysis of teaching material following the 2013 curriculum and results of a study of teaching materials in the form of fifth-grade teacher's books obtained information that the learning model contained in the learning process steps in the teacher's book is still general and not equipped with a model. The problems above influence the achievement of predetermined learning objectives (Ikhsan & Hadi, 2018).

Meanwhile, these problems in the teaching materials and learning implementation planning (RPP) designs always use learning tools. Therefore, one of the causes of the ineffectiveness of the implementation of the learning process carried out and the purpose of education is that it starts with the use of teaching materials that are not optimal and the planning of lesson plans that are not yet appropriate (Sampurna, 2020). This study has the ultimate goal of developing teaching materials using the PjBL model to improve the implementation of learning. The purpose of this initial study was to determine the level of validity in developing teaching materials, such as designing the content or graphics of teaching materials.

2. METHODS

This study uses a 4D model (Four-D models). The 4D model technique has four main stages: definition, design, development, and dissemination. This technique does not require many stages, so it is suitable for developing a Project Based Learning model (R. Iskandar, 2017).

2.1. Definition Steps

This step defines the learning purpose included in the curriculum. This phase requires an analysis of the curriculum, needs, and student characterization of the material in the 2013 revision of the syllabus for Grade V Elementary School Theme 2 (Clean Air for Health). The curriculum was analyzed to examine the suitability of each component of Main Competency, Basic Competency, indicators of competency attainment, and learning outcomes. This analysis refers to the teacher's and student's book analysis tools. This analysis aims to identify urgent and urgently needed problems in the development of teaching materials and lesson plans. These activities include material analysis and lesson plans using observation sheets of the learning process through teacher interviews. Student character was analyzed to determine student characteristics in all aspects of development. This study analyzes the teaching material with a questionnaire containing students' intellectual development indicators. These indicators consist of reading, writing clearly, classifying problems related to learning materials, matching numbers, and solving simple problems from learning materials (Mulyadi, 2016).

In addition to the character analysis, this study observed language skills, learning motivation, and student learning responses. We can see the indicators of language ability in students' capability to use clear and concise sentences, pronounce words correctly, reason, and see implied meanings. Indicators of analysis of learning motivation include the development of a student's skills and interest in learning systematically during the learning process. Then, survey student responses to determine student learning styles with a questionnaire technique. Learning style indicators include the enjoyment of learning by looking at pictures, charts, maps, posters, graphs, and direct presentation of material, and the pleasure of learning by listening to news, radio, and study tapes. In addition, indicators of physical activity and practical direction (Allanta & Puspita, 2021).

2.2. Design Steps

This activity aims to design a learning plan and project-related materials according to the PjBL model. The design uses concept maps and images according to main competency, basic competency, indicators, learning purposes, and prepared materials.

2.3. Development Steps

Experts validate learning implementation planning (RPP) and teaching materials designed according to their fields. The first step is the validation of the instruments by a team of experts. The instrument validation criteria can be seen in Table 1 (modification of Atmazaki, 2013). Instrument sheets valid according to the criteria can validate lesson plans and teaching materials developed. RPP components must exist: subject identity (academic units, classes, semesters, subjects, and time allocation), primary and basic competency, indicators achievement, learning objectives, teaching materials, learning models used, learning activities according to the model PjBL, learning resources, and assessment. Meanwhile, the criteria for material teaching components are title, preface, instructions for using the book, graduate competency standard and primary competency, basic competency, learning materials, summaries, and evaluations. Validation of the feasibility of teaching materials adjusts the indicators in eligibility of content, grammar, presentation of materials, and graphics. The contents of teaching materials conform to primary and basic competencies. It has learning exercises, gives information on moral and social values, and contains learning steps according to the PjBL model. The grammar must be standard and easy to understand according to enhanced spelling. Layout, images, and colours support the presentation of data and graphics (Ismail et al., 2021).

3. FINDINGS AND DISCUSSION

Based on the analysis of learning activities in theme 2 (Clean Air for Health), the learning activities in the book have yet to fully answer the implementation of learning in the teacher's manual. It impacts students' lack of problem-solving, collaboration, and communication skills and increases resource management skills. This book needs to contain precise learning objectives. The development of teaching materials using barcodes with the PjBL model aims to develop students' skills, attractiveness, and intellectuality (Pratiwi et al., 2019).

Activity analysis based on observations of the implementation of learning in class V shows that educators still need to maximize the implementation of the learning process. It can be seen in the lecture method's delivery of material that could be more coherent and dominant. Learning resources are focused on teacher and student books and LKS (student paper sheets). Evaluation only focuses on aspects of knowledge, facilitating students' skills in expressing thoughts and collaborating in the learning process (Susanti et al., 2020). So students are less able to communicate, have not been involved in cooperative work groups, and have not seen any information exchange. The teacher needed help formulating indicators and assessing the learning process (data not shown). On this basis, teaching materials must contain directions for students to have skills by aspects of the core competencies of the 2013 curriculum.

Teaching materials are developed by taking into account personal and environmental aspects. At the definition, stage data was obtained that the assessment of students' abilities and responsiveness based on parameter aspects showed above an average of 70%. The student's intellectual development percentage reached 71.42%, verbal 80%, visual, kinetic 79-87%, and learning motivation 92.5%. The results of the analysis of intellectual and visual development, which are lower than the others, are the main factors in developing appropriate teaching materials for fifth-grade students. The analysis of this aspect becomes a reference for developing thematic teaching materials with the PjBL model.

The material has attractive colours and pictures, steps for student activities to be active, invites students to learn while doing assignments and facilitates students to communicate and work together (ABD Ghofur, 2020). These details are closely related to honing students' abilities, as seen in the following developed teaching material design drawings:



Figure 1. The display of teaching materials

It can be seen that integrated thematic teaching materials with the PjBL model will train students to increase their creative abilities because this learning step stimulates motor nerves and guides students to design creativity.

The preparation of teaching materials consists of (1) cover, (2) introductory words, (3) instructions for use, (4) Graduate Competency Standards and Basic Competencies, (5) mapping of Basic Competency, (6) learning materials, (7) table of contents, (8) Basic Competency and Indicators (9) PjBL steps in teaching materials, (9) summary, (10) evaluation, (11) bibliography. Images, colors, types of writing, and barcodes on the cover can stimulate students' interest in using the theme (Figure 1). The type of writing used in that chapter is Comic San MS, size 14. The page design must be attractive by adding colors or charts (Figure 2). While the size of the writing on Basic Competency mapping, learning materials, summaries, evaluations, and bibliography is 12 (Figure 2). The writing size of Basic Competency and Learning Indicators is 11. The mapping or chart form of Basic Competency and learning indicators is in Figure 2.



Figure 2. The display of teaching materials contents. **a.** Cover. **b.** Chapter topics.

The design of such teaching materials gives an attraction for students to learn. The appearance of teaching materials varies, so students are not bored with using teaching materials. It is adjusted to the results of the analysis of the visual and kinetic aspects of the students. The design and design of interesting teaching materials stimulate students' motor skills to learn, so the material presented will be easier to understand when students feel learning is fun and not dull (Santoso et al., 2020).

After the design step, the experts validated the teaching materials. However, before validating teaching materials, an assessment of the validation instrument is first carried out to obtain valid data collection instruments. The data collection like instrument sheets of teaching material validation, learning implementation planning (RPP), teacher and student response to practical teaching materials, student activity instrument sheets, and student skills instrument sheets. Five experts validated the instrument sheet in content, language, and graphics. Each validator validates different aspects.

Table 1. Recapitulation of Instrument Assessment Results by Expert Validators.

Instrument	Aspect				average	Category
	Content	Language	Presentation	Graphic		
RPP validation	92	92	92	92	92	Very Valid
Teaching material validation	93	89	89	93	91	Very Valid
RPP implementation	100	100	100	100	100	Very Valid
Teachers response	92	95	95	95	94	Very Valid
Students response	91	86	86	86	87	Very Valid
Students activities	92	84	82	88	87	Very Valid
Students skills	91	88	85	90	89	Very Valid
Final average (%)					91,42	Very Valid

Table 1 informs that the data collection instrument has been declared very valid from content, language, and graphics, with an average of 91.71%. So, the research data collection instruments can be used for lesson plan validation, validation of teaching materials, the implementation of lesson plans, and the collection of student data and skills. Several things were revised based on the validator's suggestions, namely, related to the presentation of data that needed to be clarified better, the use of language in teaching materials to make it more standardized, and the use of graphic instruments was improved and supplemented.

3.1 The Validity of RPP Using the PjBL Model

RPP content validation has two aspects: the RPP component and the RPP content eligibility components. The average for component aspect statements in the RPP is 92% in the excellent category. The teaching materials include RPP according to the 2013 curriculum. Validation of the eligibility RPP content includes several components appropriate by the 2013 curriculum like subject identity, academic unit, class, semester, subjects, time allocation, core competencies and basic competency, competency achievement indicators, learning objectives, teaching materials, learning resources, learning activities according to the PjBL model, and assessment (Ismail, 2021).

The validation value on the aspect of the indicator formulation has a value of 86.67%, which is in the excellent category. It means that the indicators formulated are by Basic Competency and the formulation of indicators uses precise operational verbs. Regarding learning purposes, it has a value of 88.33% in the correct category. The learning purposes have the criteria A (Audience), B (Behavior), C (Condition), D (Degree), and the PjBL model. Furthermore, the principal aspect of selecting learning materials is 95.00%, with a correct category. It means selecting selected materials according to competence, learning objectives, and teaching materials selected from various sources. In selecting the learning model, it scored 91.67%, with a very valid category. The sources and learning media according to learning objectives, selected learning materials, and characteristics of students.

In the RPP content analysis, aspects of learning activity steps score 95.00% in the very valid category. It indicates that the lesson plans for learning have included preliminary, core, and closing learning activities. In the preliminary activities, some activities can motivate students to participate actively in following the learning process. The designed core activities have described Basic Competency achievements, improving students' learning skills, and learning with the PjBL model learning steps. While in the closing activities, it has been illustrated that the activities emphasize overall learning and provide feedback and follow-up to students. It means that overall the preparation of learning activities follows the specified aspects (Suparni, 2020).

Learning assessment is in the valid category with a percentage of 91.67%. It means that the learning assessment is by the learning objectives, the prepared student worksheets can measure the achievement of the learning objectives, and the assessment rubric is under the aspects being assessed (Ahmad, 2019). The results show that the eligibility category for the contents of the RPP is valid. Then, the language is validated to see the readability and accuracy of using language to make it easier to understand the designed RPP. The use of language in RPP is very valid (83.33 from the expert team and 91.66% from practitioners).

3.2. The Validity of Teaching Material Using The PjBL Model

3.2.1. Contents of Teaching Material

The teaching material validation activities involve component and eligibility validation. The results showed the average total score of the component is 100%. It means the value includes a very valid category. The teaching material contains all of the components needed. The percentage validity of the feasibility aspect of the content of teaching materials is 93%, with a very valid category. It showed that teaching materials are designed according to Main Competency and Basic Competency, themes, sub-themes, content, main competency, basic competency, indicators, and learning purposes. The teaching materials have supporting information about the learning materials, exercises for students, and instructions. Teaching materials can be a medium that bridges communication in effective learning between students and their teachers (Anshori, 2018). The teaching materials are designed to contain learning components or steps that use the PJBL model. Based on the results, the components and eligibility of the contents of the teaching materials validity can be concluded as valid when using the PJBL model.

3.2.2. Language of Teaching Material

The percentage of teaching material assessment on the language aspect is 89%, which is very valid. Thus the language is easy to read (readability aspect), the information in the teaching materials is clear and easy to understand, and the teaching materials comply with the rules of the Indonesian language effectively and efficiently (brief and precise). The style of writing on teaching materials is communicative and semi-formal. Overall, the feasibility aspects set the language in the teaching materials so that the thematic teaching materials on theme 2 (Clean Air for Health) with the PJBL model from the aspect of language are good and valid to use in the learning process.

3.2.3. The Presentation of Teaching Material

The average value of the aspect of the presentation of teaching materials is 88% in the very valid category. The teaching material display has the clarity of achievement indicators, the systematic order of representation in the teaching materials, the teaching materials can motivate and attract students' attention, teaching materials are able to make students interact, and teaching materials provide information ultimately.

3.2.4. The Graphics of Teaching Material

The overall validity of graphics of teaching materials is 93%, with a very valid category. Teaching materials have been written with varying sizes and types of letters but are still proportional. Cover layout design on teaching materials neatly arranged. The teaching material display design is exciting and unconventional or monotonous. Typography of the content of teaching materials does not use more than two types of letters, the size of the letters is according to the level of education, and the space between notes is standard. The illustrations used in the teaching materials clearly describe the material in a proportional form and represent the object's character, and the overall images are harmonious. It means that the graphics of teaching materials are by the required graphical aspects.

Table 2. Recapitulation of The Teaching Material Validation

No	Component	Value (%)	Category
1.	Content	93	Very Valid
2.	Language	89	Very Valid
3.	Presentation	88	Very Valid
4.	Graphics	93	Very Valid
Average		91	Very Valid

Based on Table 2 4.36, the overall average validation percentage obtained was 91%. Validation on the content got a ratio of 93%. The portion of linguistics is 89%, and the presentation is 88%. The graphical element obtained a ratio of 93%. They are very valid criteria, so the validation results carried out by expert validators on teaching materials are very valid, with a validation of 91%.

4. CONCLUSION

The study shows that the existing teaching materials must meet the proper learning criteria. Therefore, this study examines and develops new teaching materials using the project-based learning method. The results showed that the thematic teaching materials were valid in content, language, and graphics. These results illustrate that the learning implementation planning (RPP) and teaching materials developed are valid. The teachers and students can use it as learning material. The design and the appearance of teaching materials varies, so students are not bored with using teaching materials. The design of interesting teaching materials stimulates students' motor skills to learn, so the material presented will be easier to understand when students feel learning is fun and not dull.

Acknowledgements: The author would like to thank the teachers of grade 5 SD Negeri 38 Api-API, SD N 05 Pasar Baru and SD N 34 Pasar Baru for their assistance during research data collection. To the validators of language validation instruments, content, presentation, graphics and educational practitioners..

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