



## Development of Assessment on Problem-Based Thematic Learning to Assess Students' Critical and Creative Thinking Ability in Elementary Schools



Ayu Pratiwi Kusuma Wardhani<sup>1</sup>, Undang Rosidin<sup>2</sup>, Handoko<sup>3</sup>

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### Abstract

The problem of this research stems from the results of analysis needs in assessment student learning. This study aims to produce a feasible and effective problem-based thematic learning assessment to assess the critical and creative thinking skills of grade V elementary school students. This research is a type of Research and Development (R&D) research, development is carried out referring to the theory of Borg & Gall. The population of this study was grade V students of SD Raden Intan Cluster, Ketapang District, South Lampung. Data collection tools use valid and reliable assessments. The data analysis technique uses a Paired t-test with a calculation result of 0.000 or less than 0.05 which means that it is proven that there is a difference between the pretest and posttest results in the experimental class and the results of the unpaired t test with a significance level value of less than 0.05 in the experimental and control group. Based on this research, it can be concluded that problem-based thematic assessments are effective in improving students' critical and creative thinking skills.

### 1. Introduction

Critical and creative thinking skills are essential in the world of education. The ability to think critically and creatively is a competency, goal, and objective to be achieved by Indonesian education. This is by the contents of the Minister of Education and Culture Regulation No. 64 of 2013

<sup>1</sup>University of Lampung, Bandar Lampung, Indonesia; [apратиwi09@gmail.com](mailto:apратиwi09@gmail.com)

<sup>2</sup>University of Lampung, Bandar Lampung, Indonesia; [undang.rosidin@fkip.unila.ac.id](mailto:undang.rosidin@fkip.unila.ac.id)

<sup>3</sup>University of Lampung, Bandar Lampung, Indonesia; [handoko@fkip.unila.ac.id](mailto:handoko@fkip.unila.ac.id)

concerning content standards for primary and secondary education to meet future needs and welcome Indonesia's Golden Generation in 2045; graduate competency standards have been set based on 21st-century competencies, which require students to have 4C skills (creativity, critical thinking, communication, and collaboration (Mustakim, 2020).

The learning process must be designed in such a way as to achieve the desired goals. All aspects must be well managed to achieve the learning objectives. The 2013 curriculum is the curriculum that currently applies in the Indonesian education system. The curriculum used at the elementary school level is the 2013 curriculum which uses thematic subject-oriented learning. (Majid Abdul, 2013) explains that thematic subjects are learning approaches that integrate various competencies from various topics into a theme. Skill-based thematic learning of the 21st century is an educational innovation in Indonesia designed to optimize the golden generation by fostering creativity and critical thinking in students. Educators can make students feel interested and motivated in learning in various ways, for example, by using approaches, models, or learning media that are appropriate to the material to be taught so that students can think critically and logically and be able to solve problems with an open, creative attitude. An innovative and not dull. One of the learning models that can be implemented in thematic learning is the problem-based learning model.

The quality and accuracy of the assessment can affect student learning outcomes. Assessment of critical and creative thinking skills is an innovative evaluation tool that makes it easier for educators to find the profile of students' critical and creative thinking skills in thematic learning. Linn & Gronlund (Uno, 2014) explained that assessment is a general term that includes the procedures used to obtain information about student learning (observation, average implementation of written tests) and the format of assessment of learning progress. Appropriate assessment can reflect learning events experienced by students.

Educators are very aware of the importance of critical and creative thinking skills as one of the outputs of the learning process. But in fact, Indonesian individuals' ability to think critically and creatively is still relatively low. The results of the pre-survey needs analysis via questionnaire in Appendix 3. which was carried out on January 19, 2022, with the target of 10 grade V educators in different schools who had implemented the 2013 Curriculum in Ketapang District, South Lampung Regency are shown in Table 1.

Table 1. Educator Needs Analysis Results

No	Analysis of Student Needs	Answer	Percentage
1	Have you implemented the 2013 curriculum at your school?	Ok, it is finished	100%
		Not yet/ No	0%
2	Do you map KD in every lesson?	Ok, it is finished	70%
		Not yet/ No	30%
3	Is the determination of KKM based on the ability of students, the complexity of KD, and the availability of learning support?	Ok, it is finished	70%
		Not yet/ No	30%
4	Have you implemented a problem-based learning model?	Ok, it is finished	50%
		Not yet/ No	50%
5	Have you implemented an assessment associated with the problem-based learning model?	Ok, it is finished	30%
		Not yet/ No	70%
6	Do you understand assessment?	Ok, it is finished	40%
		Not yet/ No	60%
7		Ok, it is finished	40%

No	Analysis of Student Needs	Answer	Percentage
	Did you make an assessment grid to measure students' critical thinking skills?	Not yet/ No	60%
8	Did you make an assessment grid to measure students' creative thinking abilities?	Ok, it is finished	30%
		Not yet/ No	70%
9	Have you applied assessments to measure students' critical thinking skills?	Ok, it is finished	40%
		Not yet/ No	60%
10	Have you applied assessments to measure students' creative thinking abilities?	Ok, it is finished	30%
		Not yet/ No	70%

*Source: Processed primary data*

Based on Table 1. shows that all ten educators have implemented the 2013 Curriculum in the learning process. Then as many as 30% have not mapped KD in each lesson, and educators still need to determine KKM based on students' abilities, the complexity of KD, and the availability of learning support. As many as 50% of educators have implemented a problem-based learning model. Furthermore, 70% of educators have yet to implement assessments associated with problem-based learning models, 60% do not understand evaluations, and have not made assessment grids to measure students' critical and creative thinking abilities. Then 60% of educators still need to implement assessments to measure students' necessary thinking skills, and 70% still need to implement checks to measure students' creative thinking abilities. Based on the results of the needs analysis in preliminary research through questionnaires regarding assessment in problem-based thematic learning to measure critical and creative thinking in thematic education in elementary schools still needs to be evaluated. This is due to the limited evaluation tools or student assessment instruments. Learning and assessment are still conventional and have yet to lead to the expected results in 21st-century skills.

Further research was carried out on January 24 2022 at Sidoasih Elementary School, Ketapang District, South Lampung Regency to see student responses regarding students' critical and creative thinking abilities in problem-based thematic learning. Researchers distributed questionnaires to 20 students, the results were obtained in table 2.

Table 2. Results of Student Needs Analysis

No	Analysis of Student Needs	Answer	Percentage
1	I listen to the explanation of learning material well.	Yes	80%
		Not	20%
2	I like the way the teacher explains the learning material in class.	Yes	80%
		Not	20%
3	I study the learning material seriously	Yes	60%
		Not	40%
4	I ask questions when I don't understand the teacher's explanation.	Yes	30%
		Not	70%
5	I try to find answers to questions or problems given by the teacher	Yes	40%
		Not	60%
6		Yes	40%

No	Analysis of Student Needs	Answer	Percentage
	I give opinions on questions or problems given by the teacher	Not	60%
7	I work together with my peers in learning	Yes	70%
		Not	30%
8	I discuss the learning material with the group	Yes	70%
		Not	30%
9	I compiled a report on the results of the problem solving discussion	Yes	40%
		Not	60%
10	I develop and present the results of work in learning.	Yes	30%
		Not	70%

*Sumber: Data primer yang diolah*

Based on table 2, 80% of students listened to the explanation of the learning material well and liked how the teacher explained the learning material in class. Furthermore, 60% of students study the learning material seriously. As many as 30% of students asked questions when they did not understand the teacher's explanation. Then as much as 40% of students try to find answers to questions or problems given by the teacher and share opinions on questions or issues presented by the teacher. As many as 70% of students work with their peers in learning and discuss learning material with groups. Furthermore, 40% of students compile reports on the results of problem-solving discussions, and 30% develop and present their work in learning.

This shows that the activity of students in the learning process is still low; it can be seen from the low percentage of answers to asking questions and looking for answers to questions or problems given by educators. These two problems indicate that in learning, students' thinking abilities have yet to lead to 21st-century skills, namely critical thinking, communication, collaboration, and creativity. This is partly due to the inaccuracy of the assessment system used by educators in the learning process. An appropriate assessment system in assessing the process and results of student learning is expected to make students play an active role in learning. The development of assessments on problem-based thematic learning is expected to be used to achieve 21st-century learning objectives that are required to be technology-based to balance the demands of the times.

Based on the needs analysis above, the models and assessments applied are still not optimal. There is a need to develop assessments in problem-based thematic learning to measure elementary school students' critical and creative thinking skills. So, the researcher will carry out development with the title "Development of Assessments in Problem-Based Thematic Learning to Assess Students' Critical and Creative Thinking Ability in Elementary Schools."

## 2. Materials and Methods

The research method used is research and development (Research and Development). This study refers to the design model of Borg and Gall. R&D research steps described by (Borg & Gall, 1983) can be seen in Figure 2.

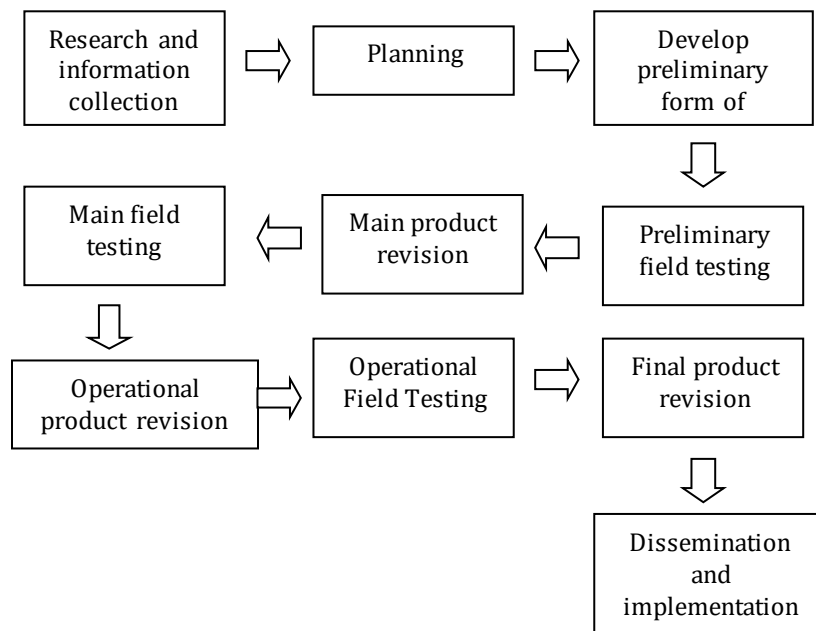


Figure 1. Borg and Gall Research and Development (R&D) Procedures

This study aims to produce a product as an assessment instrument in problem-based thematic learning to measure elementary school students' critical and creative thinking abilities. The research that researchers will carry out is to develop a product in the form of an assessment of problem-based thematic learning. The check-in question is in the form of essay test questions totaling 20 essay questions. The evaluation that has been made is carried out according to the procedure so that the final assessment results will be obtained, which can measure the cognitive domain of students, especially in Theme 3. Healthy Food, Sub-theme 3. The Importance of Maintaining Healthy Food Intake.

This research procedure uses seven stages, namely as follows: (a) research and initial data collection (Research and Information Collecting), Planning (Planning), Develop Preliminary form of Product, Preliminary Field Testing, Initial Product Revision (Main Product Revision) Main Field Testing. The trial form used a quasi-experimental design with a nonequivalent control group design, namely by looking at the differences in the results of the pretest and posttest. The subjects of this study were divided into two, namely product trial subjects and usage trial subjects. The product trial subjects were expert validation, including material, evaluation, and language experts. The topics for the use trial were class V educators at Gugus Raden Intan Elementary School, Ketapang District, South Lampung Regency. The object of this development research is an assessment of problem-based thematic learning to assess elementary school students' critical and creative thinking abilities. The instruments used in this study were needs analysis questionnaire sheets, expert validation questionnaire sheets, educator response questionnaires, student response questionnaire sheets, and observation sheets for critical and creative thinking skills. Data collection techniques include observation, questionnaires, documentation, and tests. Data analysis techniques aim to find the value obtained from the collected data. The data obtained in this study were analyzed using qualitative and quantitative analysis, including; the instrument prerequisite test, the feasibility of

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assessing critical and creative thinking abilities, and the effectiveness of critical and creative thinking skills.

### 3. Results and Discussions

The product results in this study are problem-based thematic learning assessments to assess students' critical and creative thinking abilities. This research is research and development with a seven-step R&D research model (Borg & Gall, 1983) as follows;

#### *Feasibility of Problem-Based Thematic Learning Assessment*

The feasibility of problem-based thematic assessment assessments to measure students' critical and creative thinking abilities were seen from the assessment results of three experts, namely evaluation experts, materials experts, and language experts. Based on the assessment results of three experts, this assessment instrument is theoretically feasible because it obtains an expert evaluation score of 80%, a material expert of 88%, and a language expert of 86%. The overall expert score average is 85%, with very decent criteria. In addition, the thematic assessments developed by researchers use problem-based steps. The problem-based model is a problem-oriented learning model as a stimulus for students to solve through collaboration or individually as new knowledge. So the problem-based thematic assessment is a learning package that is validated by several expert validators so that it is suitable for use; the product is also tested on practitioners, namely elementary school educators who have master's or bachelor's degrees who are competent in their fields with a test result of 85%. After asking for an assessment of practitioners at this stage, an assessment of 87% of students will be continued through small group trials.

In line with the results of previous research conducted by (Rosidin et al., 2018) "The Development of Assessment Instrument for Learning Science to Improve Student's Critical and Creative Thinking Skills," The results showed that the instrument has a high category in aspects of language, construction, and content based expert and practitioner validation. In addition, it is also effective in improving students' critical and creative thinking skills, with an increase of 28.8% and 35.1% for written tests and 25.3% and 32.2% for portfolios. The results of (Pradita et al., 2021) research show that three expert evaluation lecturers validate this critical thinking assessment instrument product with expertise in their fields. The analysis results of the three aspects of the expert's assessment, namely the feasibility aspect of the content after revision, received a score of 95% with very feasible criteria. In the construction aspect, a score of 87.50% is possible, and the linguistic element scores 79.16%, a feasible standard.

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The research above follows the theory of (No. 67 Tahun 2013 Tentang Kerangka Dasar Dan Struktur Kurikulum SD/MI, 2013; Sunarti & Rahmawati, 2013; Wahyuni & Ibrahim, 2012), which states that when compiling instruments, it is necessary to pay attention to construction or evaluation aspects, material aspects, and language aspects. The existence of assessments tailored to the needs, creative, innovative, and interactive is the hope of students because these assessments can improve their critical and creative thinking skills. As we know that the 2013 curriculum currently used requires students to think critically and creatively.

This is in line with Vale's opinion in (Siew & Mapaela, 2016) which states that students who can think critically are considered to be better able to understand the scientific process and become better at asking questions which are the basic abilities of independent learning and investigation. (Mursidik et al., 2015) explains that the ability to think creatively can be interpreted as the ability to create something new or the ability to place and combine several different objects originating from human thought that is understandable, efficient, and innovative with various factors influencing factors. Based on the results of observations regarding the assessment, educators said that they had yet to try to develop problem-based thematic learning assessments to assess critical and creative thinking skills. Although educators sometimes develop assessments for students to use in thematic learning, these assessments have yet to be able to improve critical and creative thinking. In addition, educators said that there were deliberately purchased assessments that could not be used to enhance students' critical and creative thinking skills because these assessments were only sometimes on the characteristics of students. Therefore, it is necessary to have reviews that improve students' critical and creative thinking in the learning process.

Test instrument products based on critical thinking assessment for mapping student learning outcomes on cognitive competence can facilitate and be useful for educators in conducting evaluations. So that active learning can attract students' interest when they show their abilities and develop thinking processes through discovery, observation, and logical thinking. Besides that, it can increase the effectiveness, efficiency, and alignment of learning with learning objectives (H & S., 2021). Based on these explanations in the form of the results of expert and practitioner validation tests proven by the quality of assessment, theory, and relevant research, which form the basis of reference in the development of reviews, an estimate of the feasibility of the evaluation with appropriate criteria or can be used in research and development is obtained.

### *The Effectiveness of Problem-Based Thematic Learning Assessments for Assessing Critical and Creative Thinking Skills*

One aspect that was measured in this study was the effectiveness of increasing students' critical and creative thinking in the thematic subject matter. According to (Sudjana, 2010), the point

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of the learning process is about roads, technical efforts, and strategies used to achieve goals optimally, precisely, and quickly. An assessment can be practical if the desired learning outcomes can be achieved using an appropriate model, one of which is problem-based. In line with (Sofyan et al., 2016), PBL is learning that uses real-world problems as a context for students to learn about critical thinking and problem-solving skills and acquire essential knowledge and concepts from the subject matter. Likewise, the opinion of (Rizkianto & Murwaningsih, 2018). The results of their research literature review show that the application of Problem-Based Learning can improve students' critical thinking skills and creative thinking.

The effectiveness of problem-based thematic learning assessments for assessing critical and creative thinking skills can be seen from the results of effectiveness tests in large group trials. This effectiveness assessment (Putra, 2017) uses paired t-test and unpaired t-test which are analytical techniques for comparing two classes of data or variables. This technique is used to test whether the value of critical and creative thinking skills from the results of this study is significantly different or not with the average of a sample. The results of the effectiveness test of problem-based thematic learning assessment products to assess critical and creative thinking skills based on the asymp sig (2 tailed) value for critical and creative thinking skills is  $0.00 < 0.05$ , so it is concluded that it is effective. Measuring critical and creative thinking skills can be seen from the observation sheet in lessons 1 to 6 for each indicator. Achieving necessary thinking skills achieved an average percentage of 85.2% with high criteria. While the results of achieving creative skills obtained an average percentage of 84.2% with high criteria. The instrument is said to be effective due to the detailed and clear assessment of assessment in learning.

The effectiveness of problem-based thematic learning assessments for assessing students' critical and creative thinking skills is used when students work on previously arranged assignments. Improving students' critical and creative thinking in the learning process requires an innovative and exciting assessment sheet. In addition, educators are also expected to package learning in the form of planning and learning experiences that will be provided to students properly (Perdana, 2021). So when students are directly involved in the learning process, they will experience a meaningful learning process for themselves. This is shown by Jennifer Lyn's research findings, which show that a learner who gains a deep conceptual understanding of ideas through direct participation in the learning process will be much more likely to apply that knowledge to new problems (J.L.S., Dolipas and Villamor, 2018). Learning products that are by the current situation are assessments that contain questions that are by KD and learning objectives to be achieved to refer to students' critical and creative thinking so that the use of problem-based thematic learning assessments in this study is more effective than learning without using problem-based thematic learning assessment.

In line with the opinion of (Mangiante, 2013), assessment is a tool to measure the extent to which students have improved their learning based on standards. So that the evaluation is a tool used by researchers to measure and collect information about the variables studied. Based on the research results above and relevant theory and research, thematic problem-based learning assessment is suitable for evaluation in thematic learning because it can overcome the learning difficulties of individual students to understand concepts. After all, they are more widely used for problem-solving and are proven to improve critical thinking skills and creative students.

#### 4. Conclusion

Based on the results of the research and discussion, it can be concluded as follows: an assessment of problem-based thematic learning to assess critical and creative thinking skills

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developed using Borg and Gall R&D steps, thematic learning for class V Elementary School Theme 3 "Healthy Food" Sub-theme 3 "The Importance of Maintaining Healthy Food Intake" is suitable for use in research. The results of expert validation evidence this; the average value is 85%, the practitioner's response is 85%, and the student's response is 87%, with the category very suitable for use in learning. Problem-based thematic learning assessments assess critical and creative thinking skills that are developed effectively. This is evidenced by: the results of the different tests using the paired t-test with a significance level value of less than 0.05, which means that there is a difference between the pretest and posttest results in the experimental class. The results of the unpaired t-test with a significance level value of less than 0.05 indicate differences in critical and creative thinking abilities in problem-based thematic learning of students in elementary schools. Then this was proven again by the learning outcomes of students' critical and creative thinking skills in the high criteria.

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