

## The Development of Critical Thinking Assessment Instruments on Thematic Learning of Life Events in the Fifth Class of Elementary School Students

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### Abstract

*This study aims to: (1) investigate the feasibility level of developing a critical thinking assessment instrument in the fifth grade thematic lesson of state primary school number 107396 Paluh Merbau, (2) find out the level of effectiveness of critical thinking assessment in the fifth grade thematic lessons at the school, and (3) find out the practicality level of the assessment instrument for critical thinking in the fifth grade. The subject in this study is students of class V state primary school number 107396 Paluh Merbau and the object in this study is the developed critical thinking instruments. The data collection instruments used consisted of learning outcomes test and observation. The results show that the product of this critical thinking assessment instrument is validated by three expert evaluation lecturers who have expertise in their fields. The results of the analysis on three aspects of the evaluation expert are the aspect of content feasibility before the revision received a score of 95% with the criteria very feasible. In the construction aspect, it obtains a score of 87.50% with the criteria very feasible and the linguistic aspect obtains a score of 79, 16% with the feasible criteria. The product of critical thinking assessment-based test instruments for mapping primary school student learning outcomes on cognitive competencies is able to facilitate and benefit teachers in conducting assessments. It is in line with the formulation of the problem which states that critical thinking assessment-based test instruments are for mapping student learning outcomes in effective critical thinking used by the teacher in assessing students' critical thinking assessment.*

### Keywords

assessment instruments; critical thinking; thematic learning



## I. Introduction

Assessment is an important process in learning. It can provide feedback to both educators and students. It provides motivation to students. Moreover, it can influence learning behavior because students tend to direct their learning towards assessment by educators. The quality of assessment instruments affects the achievement of results learning, therefore the assessment instrument is very strategic in making decisions related to the achievement of the learning process, including the ability to think critically.

Increasing critical thinking has now become a priority in lessons. Primary school students must begin to practice critical thinking according to their age since they need great attention and high curiosity. For educators here is a place to show their abilities by practicing higher order thinking skills in primary school students. Characteristics of high-level abilities are critical and creative thinking. In addition, the purpose of primary and

secondary school education is to build a foundation for the development of the potential of students to become knowledgeable, capable, critical, creative and innovative people (Purwanto, 2009: 146). Practicing critical thinking can be done by practicing questions that are characterized by critical thinking.

The ability to think critically is a necessity that must be possessed by individual in the era of globalization. The importance of critical thinking skills deals with the construct theory of thought. In the 2013 curriculum, students should be able to have a power in terms of building a critical thinking framework, so that the output will be produced and truly guaranteed in developing their thinking skills. This ability is often not empowered by teachers in understanding students 'cognitive abilities, so that the learning process used by teachers who only rely on a term that is important for learning exists. One's ability to succeed in life is determined by thinking skills, especially in solving life's problems. The ability to think will affect the success of life because it is related to what will be done and what will be the individual output.

In referring to the importance of critical thinking skills, Indonesian government has integrated critical thinking skills into the education curriculum. This is formulated in accordance with the Regulation of the Minister of Education and Culture No. 64 of 2013 concerning Basic and Secondary Education Content Standards to meet future needs and welcome the Golden Generation of Indonesia in 2045, it has established Graduate Competency Standards based on 21st Century Competencies. Students in the 21st century must be able to develop competitive skills that focus on development of higher order thinking skills, one of which is critical thinking. Therefore, the teacher's job is to create opportunities for students to develop and improve critical thinking skills as students with critical thinking skills are able to understand the world around them, make good decisions, improve performance, and increase their motivation to learn.

It is hoped that the integration of critical thinking skills into the world of education and thematic learning is expected to be able to improve the critical thinking skills of individuals in Indonesia. However, the fact is that Indonesian individuals' critical thinking skills are still relatively low. The low TIMSS and PISA achievement results are of course caused by several factors, including the low ability of students to solve problems with the same characteristics as TIMSS and PISA questions which use problems that promote critical thinking, demand reasoning and argumentation in solving them (Wardhani 2011:12). In order to support this, educators should not immediately copy the material in the package books, but look for other references as well so that it is more qualified.

Based on interviews conducted in several schools in region 3, Precut Sei Tuan Subdistrict, the problem faced by educators is that the ability to develop critical thinking assessment instruments is still lacking. Furthermore, there is no assessment instrument specifically designed to train critical thinking. The problem which occurs in school is that the questions tend to test the areas of memory that are lacking to train critical thinking. Thus, the thinking process is considered low. One of the reasons is because students are not trained enough to do questions that measure critical thinking skills. Furthermore, the problem faced by educators is in developing assessment instruments for critical thinking that are still lacking and assessment instruments specifically designed to train critical thinking skills are not yet available. Hence, it is necessary to develop assessment instrument. The development of a critical thinking assessment results the proficiency in problem-solving strategies is better. The level of confidence in learning increases and so does the achievement of critical thinking problems.

Based on the results of observations carried out at state primary school number 107396 Paluh Merbau, it shows that students do not pay attention to critical thinking in designing the learning instruments used. Hence, the level of critical thinking skills of students is not revealed. The assessment instrument used by class teacher at the school consists of ten essay items. It has instructions for filling in the assessment instruments to make it easier for students to work on questions. The assessment instrument includes material values contained in the character of the nation. The language used in the assessment instrument is also easily understood by students and it is in accordance with good and correct language rules.

Obviously, it shows the lack of critical thinking instruments. The assessments are only carried out at the end of the lesson without any assessment of the learning process. Therefore, in order to reveal the critical thinking skills of students appropriately, an appropriate assessment is needed. The results of the survey and interviews show that the learning process has not been carried out and there is still minimal use of instruments to reveal the critical thinking skills of students. The assessment carried out by educators should need to review the skills of each student not only assessing cognitive aspects, but also being able to train to think critically. The needs of students at state primary school number 107396 Paluh Merbau show that the learning outcomes of students are still low, according to Arikunto, a score below 41% is in the low category.

With an assessment carried out in a learning process, it can help educators to find out the level of understanding of students after learning a competency. Therefore, assessment instruments that are well designed and in accordance with the level of thinking ability can improve students' thinking power (Prasasti, 2012: 3). It is not only assessed at the end but it is carried out when the learning process is taking place in the classroom. Assessment of all lessons in school, the area that is assessed needs to be expanded. Not only the realm of knowledge, but also the realm of attitudes and skills need to be assessed. The balance between the instruments in this area is expected to be useful for describing overall learning achievement at school (Yuberti, 2015: 3). Therefore, in learning an assessment is carried out to determine the development of abilities students, especially in thematic lessons.

Kurniawan (2013: 38-39) explains that thematic education lessons are lessons that focus on the formation of citizens who are able to understand and exercise the rights and obligations of citizens. The ability of the education level is in accordance with the demands of the application of the curriculum which consists of three domains, namely skills to think, the skills to do work. Learning outcomes as learning achievement consist of several aspects, one of them is the process of skills and knowledge (cognitive products) of cognitive mastery. By using the applicable curriculum, the Indonesian government has supported students to achieve learning achievement.

Critical thinking is a result to be achieved in an educational level. Individuals who think critically often discover or even create something new. With synthesized knowledge, people may find certain relationships. Testing synthesis skills can be clarified into several types, firstly to find the relationship between valuable units and connect them with certain elements so that they become valuable units. Secondly, it is the ability to design the task or problem presented. Thirdly, the ability to abstract a symptom, data and observation results so that it becomes focused (Sudjana, 2008: 28).

This study is conducted at state primary school number 107396 Paluh Merbau. It deals with critical thinking skills are still low as evidenced by the results of interviews with the class teacher in class VB at the school. It is conducted by providing a list of interview questions which show that the teachers only used task-oriented evaluations and daily tests. In assessing critical thinking skills, the teacher has not implemented it. A solution to

overcome the problem, it requires the development of an appropriate assessment to assess critical thinking skills.

## **II. Theoretical Framework**

### **2.1 Assessment Instruments**

An effective learning must get a good quality of learning. The quality of a lesson can be seen from the results of its evaluation. One of the requirements of an evaluator is to arrange various instruments to produce data in the assessment activity. Aedi (2010: 54) elaborates that the word instrument can be interpreted as: (1) a tool used in certain activities, and (2) as a means to collect information required for data processing. The instrument is a tool that can be used to collect information that is sought and used for the benefit of researchers.

The type and number of instruments that can be used for research and development are adjusted to the design, level or needs being researched (Sugiono, 2017: 157). Assessment is a general term that is defined as a process taken to obtain information used in order to make decisions. Decisions regarding students, curricula, programs and educational policies, methods or other educational instruments by an organization or institution that carries out a particular activity. Assessment is a process needed to obtain information that will be used in making decisions related to students, curricula, educational programs, educational policies, educational methods or instruments implemented by an agency, institution, organization, even a certain official institution (Uno, 2013: 1).

From the above opinion, it is concluded that assessment is a form to determine the achievement of the learning objectives that have been previously set. It has an important role in all forms of effective teaching in the evaluation process. Planning in the preparation of the assessment, namely: (1) Determining the purpose of conducting the test, (2) Limiting the material to be used as the test, (3) Formulating specific instructional objectives for each exercise section, (4) Listing all the indicators in the preparation table which also contains behavioral aspects are contained in these indicators, (5) Arranging a specification table that contains the subject matter, (6) Writing down item questions.

### **2.2 Critical Thinking**

Basically every human being must always think, but the level of thinking is different. Thinking more critically in dealing with a problem and situation must have extensive knowledge. This is in accordance with the demands of students to think more critically. This critical process is carried out with the knowledge gained through the process of reading, language and other aspects. Fisher (2009: 13) defines that critical thinking is a skilled activity that can be done better or vice versa and good critical thinking will meet various intellectual standards, such as clarity, relevance, adequacy, coherence, and others. Thinking is generally considered a cognitive process, a mental act to acquire knowledge. According to Ennis (2005) critical thinking is a reflective way of thinking that makes sense or is based on reason that is focused on determining what to believe and do. Supriya (2012: 144) defines critical thinking as sensible and reflective thinking that focuses on deciding what to believe or do. Thinking skills are a gift that God has given us to always be grateful for all that He has created. Nur in Khairani (2020) states that "thinking is a person's ability to analyze, criticize, and formulate conclusions based on careful consideration.

Safitri (2020) states that Critical thinking ability is the basis for analyzing arguments and developing a logical mindset. Based on the opinion above, it can be concluded that critical thinking is a strategic process to ask for an explanation of something that makes

someone curious about it as well as a person's way of looking at a statement, problem or idea objectively. The indicators of critical thinking in this study are: (1) Identifying, the ability to provide correct answers with proper explanations in recognizing assumptions, (2) Generalizing, to find concepts and show supporting evidence to generalize correctly, (3) Analyzing arguments, to choose important information, right in choosing the right strategy in solving it, and correct in giving reasons or doing calculations, and (4) Clarifying, to do and consider the induction of the questions.

### **2.3 Development of Critical Thinking Assessment Instruments**

The development of a cognitive assessment instrument in the form of critical thinking questions requires a variety of criteria both in the form of the problem and the content of the subject matter. The technique of writing critical thinking questions in the form of descriptions is generally the same as writing low-level questions, but there are several characteristics that distinguish it. There are several ways that can guide for writing questions. It requires critical thinking. The material to be measured with behaviors in accordance with Anderson's cognitive domain at levels C1 to C6, each question is given a basic question (stimulus) and questions measure critical thinking skills. Instruments or measuring instruments are very important factors in educational assessment. Purwanto (2009: 99) explains that instrument is a tool used by researchers to collect data by taking measurements. In other words, the instrument is a data collection tool. It must be well made and able to collect data according to the needs of the research. The Regulation of Education Minister Number 20 of 2007 concerning Assessment Standards, an assessment instrument used by in the form of school examinations meets the requirements of substance, construction, and language and has evidence of empirical validity.

Azwar (2012: 2) states that psychometric experts have set several important criteria for each psychometric measuring instrument to be able to be declared a good measuring tool. It enables to produce data and provide accurate information. Criteria include valid, reliable, objective, standard, economical, and practical. Furthermore, the two aspects used in a good test are reliability and validity. Some of the opinions above, it can be argued that a good measuring instrument is one that has valid and reliable requirements or characteristics.

Validity describes how well one can legitimately trust the test results as interpreted for specific purposes (Cook and Beckman, 2006: 2). The validity and reliability of research instruments is very important to increase the effectiveness in the data collection process. The instrument is valid if the measuring instrument used gets the data valid. Valid means that the instrument can be used as a tool to measure what should be measured. A reliable instrument if the measuring instrument is used several times to measure the same object, it will produce the same data too.

(Azwar, 2012: 7) explains that reliability is a requirement so that an instrument can be said to be good. The concept of reliability is the extent to which a measurement process can be trusted. In other words, reliability shows that the degree of the test produces a consistent score and reliable information. Mardapi (2008: 15) elaborates that reliability is an index that shows the level of consistency or consistency of a test. It is related to confidence in the consistency of measurement results and errors. The measurement results of an instrument. Basically there are two kinds of instruments, the instrument in the form of a test and a non-test instrument. The test instrument is used to measure learning achievement while the non-test instrument is used to measure attitudes.

### **III. Research Methods**

#### **3.1 Type of Research**

It is research and development (R&D). This development research is focused on developing an assessment instrument for critical thinking skills in primary school about thematic learning in grade V semester I. The product developed is a cognitive assessment instrument in the form of essay test questions. Prototype development, in this study an adaptation of the Borg and Gall Research and Development (R&D) development model is carried out (in Sugiyono, 2015: 35). In accordance with the ten steps of implementing the development research, in this study the researchers only carried out steps one to seven, namely Research and information collecting (introduction) to Operational product revision (the final product is based on input from the main field test). Steps eight to ten are not implemented due to time constraints and expensive costs for the development of research products and this is done in accordance with research standards thesis requirements.

#### **3.2 Population and Sample**

The population in this study is all students in K3S District of 3 Percut Sei Tuan, totaling 7 schools. The study is conducted in class V state primary school by implementing the 2013 curriculum. Based on these data, it determines the sample and uses cluster sampling technique. This sampling technique is used with the consideration that the characteristics of the schools being sampled are almost the same, namely using the 2013 Curriculum and being the core school in each cluster. Hence, the researchers are interested in observing the three schools because there is no assessment instrument made by the teacher to measure critical thinking.

#### **3.3 Data Analysis Technique**

The data obtained are analyzed and directed to answer the question whether the critical thinking assessment, learning tools and instruments being developed have met the criteria of validity, practicality, and effectiveness or not. Data obtained from experts and practitioners are analyzed to answer whether the assessment is critical thinking. The learning tools and instruments that are being developed have met the validity criteria in terms of the strength of the theoretical basis and consistency among of the components of the assessment of critical thinking maximally. While the data from field trials are used to answer whether the assessment of critical thinking, learning tools and the research instrument being developed has met the criteria of validity, practicality and effectiveness.

### **IV. Results and Discussions**

#### **4.1 Results**

The development carried out by the researcher results in a critical thinking assessment instrument on the subject of events in life. This research and development is carried out using the steps to develop measuring instruments from stage 1 to stage 8, namely: (1) Development of measuring instrument specifications, (2) Writing a statement or question, (3) Review of statements or questions, (4) Instrument assembly (for testing purposes), (5) Testing, analysis of trial results, (6) Selection and assembly of instruments, (7) Instrument administration (final form), (8) Formulation of scales and norms.



After reviewing the statement or question, the next step is assembling the instrument for the product being developed. There are several things that are done in the instrument assembly stage for the product being developed. They are the critical thinking assessment instrument, designing the product, developing a critical thinking assessment instrument on the material of events in life, product design of critical thinking assessment instruments, including adjusting competency standards and basic competencies as well as a syllabus based on the K13 curriculum. The product of the critical thinking assessment instrument on the material of events in life using legal paper sizes with a landscape position; space scale 2.0; Cambrian fonts and critical thinking assessment steps are included in each assessment.

As for the product design, the development of critical thinking assessment instruments consists of front and back covers, table of contents and bibliography. The product development of the critical thinking assessment instrument consists of content standards, core competencies, basic competencies, observation instrument grids, self-assessment instrument grids, peer-to-peer assessment instruments grids, test grids verbal, performance grid, observation assessment guidelines, peer-to-peer assessment guidelines, self-assessment assessment guidelines, oral test assessment guidelines, performance guidelines, assessment sheets for each type of assessment carried out and contains the stages of critical thinking assessment, namely observing, inquire, gather information, associate and communicate.

The first draft produced from the design stage is submitted to the validation team. The validation team in this study consisted of experts in State University of Medan and thematic teachers at state primary school number 107396 Paluh Merbau as practitioners. Validation of non-test instruments includes 3 components, namely the feasibility of material, construction, and language/culture. To assess and provide input on the validation sheet, revision of the instrument is carried out according to the input provided by the validation team during the expert validation stage. The input and suggestions received are used as guidelines for implementing the revision of draft I.

The product feasibility test is carried out by providing an assessment questionnaire to educators on thematic subjects in class V. The instrument grid and questionnaire can be seen in the attachment. The feasibility test of this product is carried out twice, namely the first the second assessment, where the product is revised according to the suggestions of educators.

The content feasibility instrument sheet is assessed the suitability of the material which covers three domains (cognitive, affective and cognitive). Construction feasibility aspects, namely assessment in terms of written clarity, assessment instruments that are in accordance with needs, and feasibility aspects of technical quality, namely ease of use of assessment instruments and systematic rating arrangement. The product feasibility trial views the response of educators to the product of this critical thinking assessment instrument. It can be used because after a revision of product feasibility, it is "very feasible" and get a score of 96.13%, this means that the product of the critical thinking assessment instrument has been developed by researchers have criteria that are very feasible to use as an alternative in the 2013 Curriculum assessment.

The improvements are made on the suggestion of validation team of adding one indicator to each indicator of religious belief and knowledge, namely the type of belief behavior with indicators of carrying out worship on time and on the type of religious knowledge behavior with indicators of thanksgiving when successfully doing something. The validation team for the addition of indicators in the assessment between friends is aspects of courtesy and mutual cooperation. The development of critical thinking

assessment instruments on the subject of events in life that is tested at state primary school number 107396 Paluh Merbau to see the response of educators to the quality of the critical thinking assessment instruments.

The development of critical thinking assessment products obtains very good response from educators as an alternative in the 2013 Curriculum assessment. After a revision is made to the educators' input on the critical thinking assessment instrument, the content feasibility aspect obtains a score of 95.68% with the criteria very feasible and in the construction feasibility aspect, the score is 96.43% with the criteria very feasible and finally on the aspect of feasibility. The feasibility of the quality of the technique obtains a score of 94.32% with the criteria very feasible.

Furthermore, the actual classroom field trials use revised instruments based on limited trials. The field testing phase in this study takes place at public elementary schools. The class is consisted of 1 class, class five. This study uses the subject matter of events in the life of state primary school number 107396 Paluh Merbau, it is directly conveyed by Mrs. Dra. Sri Lestari as a teacher, there are several obstacles that occur during the data collection process so that not all students could map their learning outcomes using the developed assessment instruments. The number of students of class V is 30 students. Data on the results of this field trial consisted of data on the assessment of critical thinking assessment learning outcomes.

## 4.2 Discussions

The response of educators to the product of the critical thinking assessment instrument is very helpful as an alternative in the assessment process which includes three domains, namely the affective domain, the cognitive domain and the cognitive domain which in its implementation uses critical thinking assessment. There are many obstacles that complicate the assessment process, one of which is in the process of implementing the assessment which cannot be separated from the paper and pencil test, so that with the assessment product, thinking about these criteria can be one way of assessing that is independent of the paper and pencil test. In K3S Region 3, District of Percut Sei Tuan, it has implemented the 2013 Curriculum. So this product is very much needed as an alternative in carrying out assessments in the 2013 Curriculum.

The development of alternative assessment instruments for the subject matter of events in life is carried out after the product has been completed and validated by the validation team. The critical thinking assessment instrument is carried out by 2 material experts as Thematic lecturers at state university of Medan and teacher who teaches thematic.

The appropriateness of the test instrument can be determined based on the validation team assessment. Arikunto (2006) states that good data is data obtained from data collection instruments which are also valid and reliable. Content validity is analyzed using the Aiken formula and reliability. This study uses Cohen's Kappa analysis. If the results of the validation team's assessment data analysis meet the valid and reliable criteria, the test instrument developed is declared feasible.

In line with the formulation of the problem, critical thinking assessment is effectively used by teachers in assessing students' critical thinking assessments. The effectiveness of the instrument is developed. Sudijono (2013) states that the indicators of effectiveness are in the sense of achieving predetermined goals or objectives, where a target has been achieved as planned.

In testing the product feasibility of this critical thinking assessment instrument, it can be used because after a revision of the product's feasibility it can be said to be very feasible



or valid. So it can be concluded that the critical thinking assessment instrument product can be used by class V thematic subject teachers to help them in assessment of students with the desired learning objectives, so that learning can run more practically.

## V. Conclusion

Based on the discussion and development results in the process developed by researchers in research and development research, it can be concluded that a critical thinking assessment instrument has been produced on the subject of events in the fifth grade elementary school life. The critical thinking assessment in question is the process of collecting information carried out by teachers on students where the process of collecting information is separated from paper and pencil tests using critical thinking assessments. In line with the formulation of the problem which states that critical thinking assessment-based test instruments for mapping learning outcomes of students, the assessment of critical thinking are effectively used by the teacher in assessing students' critical thinking. The effectiveness of the instrument can also be seen in the meaningful part of the use of the instrument, because the achievement of the results of the assessment illustrates the effectiveness of the developed instrument. In testing the product feasibility of this critical thinking assessment instrument can be used because after a revision is made. The product's feasibility can be said to be very feasible or valid. So it can be concluded that the product of critical thinking assessment instruments can be used by teachers at class five on thematic subject.

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