



The Dimension of the Higher Order Thinking Cognitive Process in Indonesian Language Teaching Textbook for Senior High School Students

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<http://dx.doi.org/10.18415/ijmmu.v8i12.3161>

Abstract

An increasing advanced civilization requires educational institutions to be more adaptive. This challenge is realized by revising the 2013 curriculum, which integrates higher-order thinking skills. This study aims to describe the cognitive dimensions of higher-order thinking in textbooks on the aspects of analyzing (C4), evaluating (C5), and creating (C6). This study used descriptive qualitative method. The data source used in this study is the Indonesian language textbook for Class XI SMA published by Erlangga. Data collection techniques in this study are content analysis, reading and note-taking techniques. The data validity technique in this study used theoretical triangulation and expert judgement. The data analysis technique used an interactive data analysis model. The results of this study showed that in the Indonesian language textbook XI grade published by Erlangga, there were 170 questions that lead to the cognitive dimension of high-level thinking dominated by analyzing skills of 63 with a percentage of 37.06%, 55 questions evaluating with a percentage of 32.36%, and 52 questions of creating skill with a percentage of 30.59%. In general, the form of questions in the book is dominated by description questions and a few multiple choices. Even though it is presented with multiple choice questions, it does not eliminate the cognitive element of high-level thinking skills. Type of multiple choice questions can be used to assess low to high levels of cognition.

Keywords: *Cognitive Dimension; Higher Order Thinking; Textbook*

Introduction

An increasingly advanced civilization requires educational institutions to be more adaptive in creating graduates. This step can be done by updating the curriculum that is relevant to 21st century learning. Learning is not only interpreted as a process of memorizing theory, but rather on the analysis and application of knowledge. Students must be accustomed to problem solving and creative processes, finding new ideas that can be implemented in life (Slavin, 2006:255). In the 2013 curriculum revision, the challenge was realized by integrating higher-order thinking skills or in foreign terms called Higher Order Thinking Skills (HOTS). Yen & Halili (2015) state that higher-order thinking skills can be realized in the world of education through curriculum, teaching, and assessment. Therefore, these higher-order thinking skills have become a curriculum goal internationally (Tan & Halili, 2015).

According to Wang & Wang (2014) high-level thinking skills will shape students' character in career development, responsibility, creativity, hard work, learning achievement, problem solving, and being able to make the right decisions. These skills are formed through high-level cognitive processes at the levels of analyzing (C4), evaluating (C5), and creating (C5) along with the accompanying knowledge dimensions (Anderson & Krathwohl, 2001). Badgett & Christmann (2009: 17) explains that analyzing is the ability to determine causal relationships, understand analogies and metaphors, and determine classifications. Evaluating is defined as the process of compiling scores based on certain criteria or standards. This category includes the cognitive processes of checking and criticism (Mayer, 2002: 20). The process of creating consists of three separate areas: generating, planning, and producing (Hanna, 2010: 14).

According to Susanti et al (2014) the main factor that can improve students' higher order thinking skills is the textbook used in the learning process. Textbooks are designed as translations of policy ideas contained in the curriculum (Valverde et al, 2002). According to Haggarty and Pepin (in Yang & Sianturi, 2017) if the textbooks are different, students will get different learning opportunities as well. Thus, textbooks are the best indicator to measure the learning opportunities experienced by students (Özer, E., & Sezer, 2014).

According to this goal, every educator or teacher must take the right steps and strategies in selecting textbooks based on higher-order thinking skills. The role of the textbook itself is stated in the Regulation of the Minister of National Education Number 2 National Year 2008. The book contains a framework for thinking about what will be taught, to whom, when, and how (Nicol & Crespo, 2005).

The previous study, as done by Febriyani (2020) with the title "An Analysis on Higher Order Thinking Skills (HOTS) in Compulsory English Textbook for the Twelfth Grade of Indonesian Senior High Schools", showed that the composition of Higher Order Thinking Skills (HOTS) presented in the book is very little compared to the Lower Order Thinking Skill (LOTS) aspect. Aspect of remembering (C1) is the most component with a total of 41%. This confirms that not all textbooks contain a proper proportion of HOTS. Thus, efforts are needed to improve the quality of the textbooks used.

In 2019, Pratama also conducted research with the title "Higher Order Thinking Skills (HOTS) Content Analysis in Middle School Mathematics Textbooks (Comparison of Indonesian and Malaysian Books)". Pratama's research found that the HOTS content in the material, examples, and practice sections in the Indonesian language textbook was greater than that in the Malaysian book. The example section in the Malaysia book introduces the stages of problem solving, whereas in the Indonesian book it does not. This condition indirectly requires teachers to be more selective and critical in using textbooks.

In addition, research with the object of study of textbooks published by Erlangga was carried out by Imamah et al in 2019. The results of this study indicate that the *Cerdas Berbahasa Indonesia* textbook for SMA/MA grade XI published by Erlangga has good quality as a textbook. This textbook has appropriate content, presentation feasibility and language feasibility. The *Cerdas Berbahasa Indonesia* Textbook for SMA/MA grade XI published by Erlangga is suitable to be used as a supporting text book for Indonesian language subjects in class XI. However, the feasibility in terms of higher-order thinking skills still needs to be proven.

Based on the problems that occurred and reinforced by several previous research results, it can be concluded that the achievement of learning high-level thinking skills in each school is determined by the knowledge of the teacher and the quality of the books used. According to this explanation, this study will analyze the content of the cognitive dimensions of higher-order thinking in private textbooks. This research is important and interesting to follow up as a record of improving the quality of learning in the 2013 curriculum which integrates higher-order thinking skills, especially in the use of textbooks.

Research Method

This research is a type of qualitative descriptive research. The purpose of qualitative research is to obtain data from the construction of reality that occurs to be interpreted (Cropley, 2019). The data source of this study is in the form of Indonesian language textbook documents for grade XI students at the Senior High School level. The document is not only published, but also used (Prior, 2003). The document is an Indonesian language textbook published by Erlangga for grade XI SMA written by Engkos Kosasih (2016) with the title "*Cerdas Berbahasa Indonesia untuk SMA/MA Kelas XI*". Data collection techniques in this study used content analysis, reading and note-taking techniques. The data validity technique in this study uses theoretical triangulation and expert judgement. Data analysis techniques in this study use interactive data analysis techniques which include the stages of data collection, data reduction, data exposure, and conclusion drawing.

Results and Discussion

Bloom's taxonomy of cognitive domains is used as one of the basic reference frameworks for formulating the classification of educational goals, test preparation, and curricula around the world (Chung, 1994; Lewy & Bathory, 1994; Postlethwaite, 1994). In the cognitive domain, Bloom's taxonomic hierarchy describes the existence of 6 main classifications starting from the most basic order to the highest level. According to Malim (1994) these cognitive processes have control in the higher cortex centers of the brain. Anderson & Kratwohl's revised Bloom's taxonomic hierarchy and divides cognitive aspects into remembering (C1), understanding (C2), applying (C3), analyzing (C4), evaluating (C5), and creating (C6), the last three processes being considered as higher order thinking skills (Munzenmaier & Rubin, 2013; Fitzpatrick et al, 2015). The Indonesian language textbook published by Erlangga consists of 10 chapters, each of chapter is analyzed using Bloom's higher level cognitive theory of thinking which has been revised by Anderson & Kratwohl with the following results.

Table 1. Cognitive Dimensions in Textbook

No	Chapter	Cognitive Taxonomy of Higher Order Thinking		
		Analyzing	Evaluating	Creating
1	Procedure Text as a Guide	7	10	5
2.	Sharing Knowledge Explanatively	8	6	6
3.	Understanding Current Issues Through Lectures	6	5	6
4.	Appreciating and Creating Short Stories	13	6	4
5.	Analyzing Nonfiction Books	6	6	2
6.	Proposals for My Activities	6	6	8
7.	Studying Scientific Work	5	4	8
8.	Analyzing Review Text	6	4	4
9.	Let's Play Drama	5	5	3
10	Appreciating Fiction Books	1	3	6
Total Questions = 170		63	55	52
Percentage		37,06%	32,36%	30,59%

Based on these results, analytical skills were found dominantly rather than other skills. In textbooks published by Erlangga, there are 63 levels of analyzing questions, 55 evaluating questions, and 52 creating questions.

The Cognitive Dimension of Analyzing in High School Indonesian Language Textbook

Analyzing is the process of breaking down material into its constituent parts and determining how these parts are related. Analysis in the revised taxonomy involves the creation of new information that is not yet owned by individuals (Marzano & Kendall, 2007: 44). The following forms of questions are included in the cognitive dimension of analyzing aspects.

Table 2. Cognitive Process Analyzing

Data	List of questions
1	Read an explanatory text, either from newspapers, magazines, books/e-books, or from the internet and then analyze the structure of the text!
2	Discuss the reasons why the two books are classified as non-fiction books, based on their function, structure, and language!
3	Explain the differences and similarities between the two texts based on the content, presentation structure, and language!
4	Are the following titles appropriate to use in a scientific paper? explain the reasons in discussion!
5	what section the snippet, introduction, discussion, or conclusion are included? explain the reasons!

Table 2 is the distribution of questions included in the analytical thinking process. Analyzing skills occupy the highest position compared to other cognitive aspects with various forms of questions. All of these questions are categorized in the analysis level, because the answers are not stated explicitly in the text. Students are asked to carry out the stages of the thinking process to produce solutions to the problems given. They must understand the content of the reading presented at the beginning, then break the material into its constituent parts and determine the relationship, both between parts and as a whole. Like questions (1,3,5) students are asked to read the text and then are directed to analyze its structure. These stages are included in the process of organizing or also referred to as integrating, decomposing, and determining how an element can function in a structure (Anderson & Krathwohl, 2001).

Questions on the data (2,4), aim to ask students to provide an explanation regarding the reason the book is classified into non-fiction based on the function, structure of the book, and language. In addition, several types of scientific work titles are also given and students are asked to determine the accuracy of these titles. This thinking process involves the ability to distinguish by selecting or focusing irrelevant parts of the material presented. The distinction is made based on the level of relevance and importance of the parts in a structure (Nugroho, 2018).

The Cognitive Dimension of Evaluating in High School Indonesian Language Textbook

Evaluating is defined as the process of compiling scores based on certain criteria or standards. Kidwel et al (2013) explained that evaluation is a process of assessing a material or method by identifying errors through case studies. The following forms of questions are included in the cognitive dimension of evaluating aspects.

Table 3. Cognitive Process Evaluating

Data	List of questions
6	What efforts can you make in relation to the problems below?
7	Explain the causes of errors in writing words in the sentences below. After that, fix it
8	Explain the possibilities of applying these values to everyday life. Present it in the following table format!
9	Examine the content, structure, and linguistic rules used by your friend in the short story, then make suggestions for the errors you find related to this aspect.
10	What are your opinions/impressions about the book regarding its content, systematics, language, and illustrations? present it in the following format.

Table 3 is the distribution of questions included in the process of evaluating thinking. Evaluating skills occupy the second position compared to other high-level cognitive aspects of thinking. The whole question is categorized in the level of evaluating, because it includes the cognitive process of examining and criticizing. Such as questions on data (6.8) which are intended to ask students to make decisions based on the criteria requested, namely arguments in responding to a problem and internalizing the positive values of a work in everyday life. The question belongs to the checking category. The checking process is a series of detecting, monitoring, or testing how well the plan is working (Anderson & Krathwohl, 2001).

In addition to checking, in this question there are also critical skills, namely in questions (7, 9, 10) the purpose of the three questions is to assess the causes of writing errors and the form of correction, examine the structure and linguistic rules of the text, ask students' opinions on the systematics of the book. The list of questions has shown the character of evaluating, especially criticizing. The process of criticizing is the process of assessing an opinion or result based on a set of predetermined criteria (Nugroho, 2018). Criticizing is not just responding or criticizing, but is accompanied by arguments and considerations of good or bad values. According to Stobaugh (2013) the ability to make decisions is used to train students when faced with various choices.

The Cognitive Dimension of Creating in High School Indonesian Language Textbook

Creating is the ability to reorganize elements into new patterns or structures. Conklin (2005: 158) explains that creating is the highest form of thought and behavior. The following forms of questions are included in the cognitive dimension of the creative aspect.

Table 4. Cognitive Process of Creating

Data	List of questions
11	Discuss and express these efforts in a written form of procedure text!
12	Determine a topic in the form of an actual issue that you think is interesting to talk about. Break down the topic more specifically, section by section. Give the reason why you chose the topic!
13	Share your experience into the form of a mind map containing keywords with the steps that have been studied previously. The framework of the short story can also be poured into its standard structure, namely orientation, complication, and resolution.
14	As a group, observe the environment around your place of residence, either through direct observation or through interviews with local leaders, regarding health, security, morality, environmental sustainability, and other issues. Then formulate the form of activity that is relevant to the problem.
15	In groups, compose a drama script with the following steps!

Table 4 is a distribution of questions that are included in the creative thinking process. Creative skills occupy the second position compared to other high-level cognitive aspects of thinking with a total of 52 questions, 30.59%. The whole question is categorized in the level of creating, because it includes the cognitive processes of producing, planning, and producing. This skill becomes the highest cognitive dimension in Bloom's taxonomy which has been revised by Anderson & Krathwohl. All questions at this level ask students to come up with solutions, arrange steps, and generate different concepts. Question (12, 14) is a cognitive process that involves generating skills. It is said that because in question 12 students are asked to determine an actual topic to be lectured along with the reasons. Then question 14 is intended to train students' sensitivity to various existing problems, so that they can formulate an appropriate activity. Nugroho (2018) emphasized that this skill will train students to brainstorm or express various creative ideas (divergent) that support a goal.

Then question 13, students are asked to make a mind map according to the steps that have been learned by paying attention to the structure of the text. In answering these questions, students are required

to understand the concept of short stories as outlined in the form of a mind map. In question 15 students are assigned to compose a drama script by paying attention to several steps. In general, these two questions lead students to build coherent and systematic relationships between related pieces of information. Problem solving includes planning skills, namely the ability to design methods to complete several tasks (Anderson & Krathwohl, 2001).

In addition to planning, the distribution of the questions also includes production skills. Precisely in question 11, students are asked to reveal an implementation strategy in the form of procedural text. The completion process also goes through a long stage of thinking, students must have a clear and directed concept of topic development. Therefore, Nugroho (2018) explains that producing or constructing is a follow-up to planning. Various plans are translated into a new decision, conclusion, solution or product.

Proportion and Form of Questions in Textbooks Based on Higher Order Cognitive Thinking

After conducting research on Indonesian language textbooks for high school students published by Erlangga, this study found 170 questions that lead to higher-order thinking skills. All of these questions were categorized according to Anderson & Krathwohl's revised Bloom's taxonomy theory, especially in the aspects of analyzing (C4), evaluating (C5), and creating (C6). Based on table 1, the textbook published by Erlangga contains 63 analyzing questions with a percentage of 37.06%, 55 questions evaluating with a percentage of 32.36%, and 52 creating questions with a percentage of 30.59%. From these results, it can be seen that the grade XI Indonesian language textbook published by Erlangga is dominated by analyzing questions. As research conducted by Ilham & Korompot (2020), showed that the highest aspect of higher order thinking skills is analyzing.

In the study from Hidayat (2019) also revealed that the most common higher level thinking skill found in textbooks is analyzing (C4). Therefore, this shows that textbooks try to encourage students to get used to answering a question by combining a collection of information implicitly. Lazear (2004) suggests that activities at the analyzing level consist of describing the information that has been learned into key elements, analyzing the relationships between the key elements, and analyzing the structured principles of the information.

Creation skills are the skills with the least percentage when compared to the other two aspects, namely 30.59%. This result was also proven in the research of Fakhira & Iskandar (2020) that the category at the level of creating was the least. Then the research conducted by Syahida & Irwandi (2015) that from the two texts analyzed, there is not a single item that measures thinking skills in the categories of cognitive processes evaluating (C5) and creating (C6). Among the skills of analyzing and creating in Indonesian textbooks published by Erlangga, there are also evaluation skills with a total of 55 or 32.56% questions. In general, the form of questions in the book is dominated by description questions and a few multiple choices.

Even though it is presented with multiple choice questions, it does not eliminate the cognitive element of high-level thinking skills, especially in the analysis section. As Nugroho (2018) argues, multiple-choice questions can be used to assess low to high levels of cognition. For example, if a multiple choice question contains an order to identify the most appropriate solution to the problem presented, then the student is already in the analytical ability. However, care is needed in making questions. Wendt & Kenny (2009: 150) also emphasized that multiple choice questions can also be used as a tool for measuring higher-level thinking as long as the questions are not only related to understanding or memory but are associated with events that require analytical thinking or application. This can be realized if the items used in high-level learning are case studies or simulations (Billings & Kowalski, 2005).

Conclusion

As an effort to build 21st century skills in students, the 2013 curriculum was revised by integrating higher-order thinking skills. The main factor that can improve students' higher order thinking skills is the textbooks used in the learning process. If the textbooks are different, students will get different learning opportunities as well. Thus, textbooks are the best indicator to measure the learning opportunities experienced by students. In the Indonesian language textbook for grade XI Senior High School published by Erlangga, there are 170 questions that lead to the cognitive dimension of higher-order thinking dominated by analyzing skills of 63 with a percentage of 37.06%, 55 questions evaluating with a percentage of 32.36%, and 52 questions creating with a percentage of 30.59%. In general, the form of questions in the book is dominated by description questions and a few multiple choices. Even though it is presented with multiple choice questions, it does not eliminate the cognitive element of high-level thinking skills. Multiple-choice questions can be used to assess low to high levels of cognition.

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