



## Higher-Order Thinking Skill (HOTS) Questions in English National Examination in Indonesia

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### Abstract

The using of HOTS questions to stimulate the learners' thinking skills is essential to meet the challenge of 21<sup>st</sup> century. However, we know little about to what extent and what particular aspects of HOTS implemented in Indonesia English National Examination. Therefore, in order to fulfil the gap, the present study attempts to identify the use of HOTS-based questions and what particular skills appearing under HOTS category in English National Examination. We examine one package of each English National Examination from 2013 until 2018. We analyse 210 multiple-choice items in which each examination contain 35 items of reading comprehension. The items are analyzed quantitatively through content analysis based on the aspects of HOTS in Revised Bloom's Taxonomy. The researchers find that there is insufficient amount of HOTS questions in English National Examination. 157 items classified into the LOTS and only 53 (25.23%) items are classified into HOTS. The second finding is that the level of HOTS included in English National Examination 2013-2018 is only the level of Analyze. The Differentiating and Organizing are the subskills of the aspect of Analyze that are mostly included in all examinations. There is strong evidence for encouraging the test developers to provide adequate portions of HOTS-based items in English National Examination.

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## INTRODUCTION

In recent decades, teaching Higher-Order Thinking Skills (hereafter HOTS) is considered as a crucial part in Education around the globe (Lewis & Smith, 1993; Mainali, 2012; Schulz & FitzPatrick, 2016). HOTS are needed by an individual to meet the challenge of 21<sup>st</sup> century (Brookhart, 2010; Ganapathy & Kaur, 2014; Tan & Siti Hajar, 2015; Widana, 2017). HOTS is considered as the important skills to make innovative and creative individuals (Ganapathy & Kaur, 2014) so that they can cope with global economic growth, rapid development of technology, and a fast-paced world (Tan & Siti Hajar, 2015).

Bloom's Taxonomy is the most broadly recognized classification in assessing thinking skills in Education (Valdev Singh & Shaari, 2019). The taxonomy is believed to be useful for test developers to match their question items with syllabus and objectives of learning (Krathwohl, 2002). Bloom's Taxonomy consists of thinking skills that are ordered from simple to complex or to concrete to abstract mental processing abilities. It originally comprises of six levels of cognitive domains which are Knowledge, Comprehension, Application, Analysis, Synthesis and Evaluation. Anderson and Krathwohl published a revision of Bloom's Taxonomy in 2001. The major difference between old version and new version of Bloom's taxonomy is that the 2001 version has two dimensions which are knowledge and cognitive dimension. However, this present study focused only on the cognitive dimension since it is highly related to the reading comprehension skills and assessment (Valdev Singh & Shaari, 2019)

A study conducted by Programme for International Student Assessment (PISA) in 2015 showed that, out of 72 countries, Indonesia was one that has the lowest level of reading performance. The result demonstrated that the score of Indonesian students (397) is lower than the means of all countries (493). It might happened due to the fact that Indonesian students are poorly trained to cope with situation that require contextual problems, reasoning, argumentation and creativity which are the characteristics of HOTS-based questions (Fanani, 2018). In line with Fanani (2018), The

Government (2017) also mentioned that Indonesian students have poor ability to (1) understand complex information; (2) understand theories, analyze, and solve problems; (3) use of tools, do procedures and solve problems; and (4) conduct an investigation.

In response to this issue, Indonesian Ministry of Education and Culture tried to integrate HOTS in the existing curriculum which is 2013 curriculum (Kemendikbud, 2017). In line with the Bloom's Taxonomy, the Government established Regulation of Ministry of Education Number 22 Year 2016 about Standard Process of Elementary as well as secondary level of education (Kemendikbud, 2016). The regulation stated that the aspect of knowledge is acquired by activities of Remembering, Understanding, Applying, Analysing, Evaluating and Creating.

As the implication of this policy, the assessments in education, especially National Examination, are encouraged to be based on the concept of HOTS. Until now on, the implementation of National Examination in Indonesia still causes controversies. National Examination is often seen unnecessary as a standardized test in the entire country. Despite its controversies, Saukah & Cahyono (2015) argued that National Examination is still considered important as basis to (1) give a clear picture of the quality of education of instructional program, (2) consider selection purposes for the higher levels of education, and (3) plan some corrective action and funding schemes to support the improvement of the quality of education at schools and district levels.

However, a study reported that instead of concerning on developing HOTS-Based items, Lower Order Thinking Skill (LOTS) are the main concern on English National Examination in 2013 (Ahmad, 2016). The study revealed that English National Examination in Senior High level consisted of 87.4% for LOTS items and only 10.6% for HOTS. Such condition was considered not effective in stimulating learners to optimize their critical thinking. There was a need for the test developers to decrease the quantity of LOTS questions and increase the questions requiring comprehension levels which belong to HOTS.

Although there are many studies that have showed the use of HOTS in the English teaching

and learning, we still know little about the infusing of HOTS in the English National Examination and education assessment. Based on our knowledge, the latest study of such case was conducted by Ahmad (2016) which the findings have been explained above. Therefore, it is a need to add literature with up-to-date study that shows the progress of implementing HOTS-based items in the National Examination. In order to fulfill the gap, we attempt to (1) assess the use of HOTS-based items in the English National Examination in Indonesia from 2013 until 2019; (2) detect the particular skills appeared under HOTS category in English National Examination in Indonesia from 2013 until 2019.

### **The Concept of Bloom's Taxonomy**

Bloom's taxonomy is a tool to measure the certain cognitive skills and ability within the test papers based on the specific criteria. Established in 1956, Bloom's taxonomy is aimed to give a clear purpose in each item test. It consists of three parts; cognitive domain, effective domain, and psychomotor domain. The cognitive domain is believed as the most important domain among other domains since its ability to actualize the knowledge from the transferred information. Since it has a strong relationship with the reading comprehension skills and assessment, the present study concentrates on the cognitive domain.

Cognitive domain can be referred to the process of information along with the development of thinking skills and abilities. In order to stimulate the development of one's abilities and skills, cognitive domain is also works to recognize the latter's evidences and concepts. Cognitive domain consists of six levels which are: LOTS and HOTS. LOTS refer to the retaining of information and the ability to recall knowledge. It is represented by the first three levels; knowledge, comprehension and application. HOTS refer to the process of thinking that is operated at the highest levels of cognitive processing. It is represented by analysis, synthesis and evaluation.

As the most widely accepted categorization, Bloom's taxonomy can be seen as a range of thinking skills which is started with the lower knowledge-level thinking to the evaluation-level of thinking. It is a set of thinking skills which is arranged systematically. For instance, the learner

who wants to gain the analysis level, he or she has to fulfill the lower levels of knowledge, comprehension and application. Bloom's taxonomy helps teacher to create the design of student's activity according to their cognitive abilities (Narayanan, Nadu, Adithan, & Nadu, 2015). It is the ability to help teachers in contextualizing the level of thinking skills accommodate them to harmonize those level within each lesson and assessment, since it is important to ensure that the students have already understood and mastered the skills before they are assessed. In order to motivate the students to implement the application, analysis, synthesis and evaluation of new knowledge, teachers should actively encourage the application of LOTS and HOTS within their teaching and approaches.

The association with some aspects such as multiple intelligences, critical thinking, problem solving skills and more recently language integration skills is done when the learning activities based on Bloom's taxonomy are implemented within the English language teaching. The exam items – therefore – should be constructed from the lower order thinking in the beginning to the higher-order ones. The cycle is started with the knowledge to the comprehension level before arriving to the evaluation as the highest level. Thus, the questions within the exam should be arranged according to their level of difficulty. As the matter of the whole process of teaching, the questions should be directed to measure student's multiple skills and levels of understanding (Luang Peng & Leng, 2006).

Both lessons and assessments can be integrated with HOTS. It has been proved by some previous studies such as (Luebke & Lorie, 2013) who examined the specifications within reading comprehension that employed both lower and higher-order thinking skills using the LSAT Reading Comprehension Categories. The LSAT-RCC classifies reading comprehension questions (or items) into four categories: (1) Recognition, (2) Understanding and Analysis, (3) Inference, and (4) Application. The study proved that the cognitive level which has been measured using LSAT Reading Comprehension can be useful on general level which is contrary on an individual one.

However, the Bloom's taxonomy has also been revised. It is presented with the Bloom's definition about the aspects of thinking both in LOTS and HOTS. The following is the revised version of Bloom's taxonomy. In the Revised Bloom's Taxonomy, Cognitive dimension looks very similar with the original Bloom's taxonomy, except that the order of the last two levels is reversed. Furthermore, since Knowledge dimension uses the word knowledge, the first level of the Cognitive dimension is called "Remember."

So the Revised Bloom's Taxonomy comprises the level of Remember, Understand, Apply, Analyze, Evaluate, and Create (Krathwohl, 2002). The first three levels which are Remember, Understand and Apply are categorized as Lower-Order Thinking Skill. Meanwhile, HOTS consists of the last three levels which are Analyze, Evaluate, and Create (Moore & Stanley, 2013). The basic keywords that mostly appear within questions, based on the Revised Bloom's Taxonomy were illustrated in Table 1.

**Table 1.** Revised Bloom's Taxonomy Action Verbs

Definition	I. Remember	II. Understand	III. Apply	IV. Analyzing	V. Evaluate	VI. Create
Bloom's Definition	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	Choose Define Find How Label List Match Name Omit Recall Relate Select Show Spell Tell What When Where Which Who Why	Classify Compare Contrast Demonstrate Explain Extend Illustrate Infer Interpret Outline Relate Rephrase Show Summarize Translate	Apply Build Choose Construct Develop Experiment with Identify Interview Make use of Modal Organize Plan Select Solve Utilize	Analyze Assume Categorize Classify Compare Conclusion Contrast Discover Dissect Distinguish Divide Examine Function Inference Inspect List Motive Relationships Simplify Survey Take part in Test for Theme	Agree Appraise Assess Award Choose Compare Conclude Criteria Criticize Decide Deduct Defend Determine Disprove Estimate Evaluate Explain Importance Influence Interpret Judge Justify Mark Measure Opinion	Adapt Build Change Choose Combine Compile Compose Construct Create Delete Design Develop Discuss Elaborate Estimate Formulate Happen Imagine Improve Invent Make up Maximize Minimize

Anderson, L. W., Krathwohl, D. R., Airasian, P. W., Cruikshank, K. A., Mayer, R. E., Pintrich, P. R., ... Wittrock, M. C. (2001). *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives* (Abridged E). New York: Longman

## METHODOLOGY

This present study tried to answer the research questions through quantitative approach. We examined one package of each English National Examination from 2013 until 2018.

There were 210 multiple-choice items in which each examination contained 35 items of reading comprehension. The items were analyzed quantitatively through content analysis based on the aspects of HOTS in Bloom's Taxonomy. The data analysis in this study was adapted from the

study by Valdev Singh & Shaari (2019) which attempted to evaluate and identify specific aspect of HOTS in the National Examination for Standard 6 students in Malaysia. The study categorized the selected items into three parts. Firstly, evaluating the items based on the two major categories of Bloom’s Taxonomy which are LOTS and HOTS. Secondly, the items, then, are classified into the levels of HOTS which consist of the level of analysis, synthesis, and evaluation. Thirdly, attempting to discover the subskills under each main skill; analysis, synthesis, and evaluation. After all is done, we tried to compare all of English National Examination from 2013 to 2018 so that we would have a clear picture of the improvement of the use of HOTS-based items.

**RESULTS**

The first finding delivered is related to the proportion of the two major levels of Bloom’s Taxonomy which Lower-Order Thinking Skills (LOTS) and Higher-Order Thinking Skills (HOTS). Out of 210 English National Examination items from 2013 until 2018, we found that there were 157 items classified into LOTS and 53 were classified into HOTS. In other words, the total amount of HOTS item included in English National Examination items from 2013 until 2018 was 25.23%. The sample of items in the examination that were evaluated and categorized under LOTS and HOTS are shown in Table 2.

**Table 2.** Samples of LOTS items and HOTS items

Level	Question
LOTS	When the type writer was first invented. It keys were arranged alphabetically. This made the key easy to find. However, this arrangement also caused the bars of the machine to jam, or get stuck.
To understand basic story line of literal meaning of a text	To solve this problem, a new letter arrangement was introduced by Christopher Latham Scholes in 1872. His system,... (quoted from: Longman Introductory Course, 2014) 31. In Scholes’ system, the order of the letters... is in the alphabetical order enables more bars to hit the ribbon from opposite direction caused the bars of the machine to jam was the same as original typewriter was the same as that introduced in 1872 (English National Examination 2015/2016)
HOTS	Dear Oakley Barnett, You have been selected to attend a Focus Group as part of the consultation period Northampton Borough Council is running on proposed changes to Housing Allocation and Tenancy Strategy. It is very important that you attend and give your views on the proposals as they could... 19. “It is very important that you attend and give your <u>views</u> on the p proposals..” The underlined word has closest in meaning to ... .. sceneries convictions Ideas opinions beliefs (English National Examination 2016/2017)

Based on our analysis, the number of HOTS items in the English National Examination was insufficient. The highest amount of HOTS can be found in the examinations 2014 which has 11 items (31.42 %). Besides, the examinations 2013 and 2015 have the lowest which was 6 items (17.14 %). Furthermore, the examinations 2016, 2017 as well as 2018 have 10 HOTS-based items

(28.58%). The illustration of the number of HOTS items in English National Examination from 2013-2018.

The second finding is about the specific skills of the aspects of HOTS. According to our analysis, we found that the level of HOTS included in English National Examination 2013-2018 was only the level of Analyze. We did not

found any items that were categorized as the level of Evaluate and Create. The findings showed that Differentiating and Organizing were the subskill of the aspect of Analyze that were mostly included in all examinations. The number of items that were categorized as Differentiating was 23 or 43.40 % of the all HOTS items. Like Differentiating, the subskill Organizing that also took a big amount in all examination has 24 items

or 45.28%. Furthermore, the highest level of HOTS that can be found in English National Examination 2013-2018 was the aspect of Attributing. There only 6 items (11.32%) which can only be found in the last three examinations (2016, 2017, and 2018) that were classified into Attributing. The distribution of the subskill of every level of HOTS is shown in Table 3.

**Table 3.** the distribution of the subskill of every level of HOTS

Analyze			Frequency	
Break material into its constituent parts and determine how the parts relate to one another and to an overall structure or purpose				
Differentiating	Discriminating, distinguishing, focusing, selecting	Distinguishing relevant from irrelevant parts or important from unimportant parts of presented material.	2013	2
			2014	6
			2015	1
			2016	3
			2017	5
			2018	6
			Total	23
Organizing	Finding, coherence, integrating, outlining, parsing, structuring	Determining how elements fit or function within a structure.	2013	4
			2014	5
			2015	5
			2016	6
			2017	2
			2018	2
			Total	24
Attributing	Deconstructing	Determining a point of view, bias, values, or intent underlying presented material.	2013	
			2014	
			2015	
			2016	1
			2017	3
			2018	2
Total	6			
Evaluate			Frequency	
Make judgments base on criteria and standards				
Checking	Coordinating, detecting, monitoring, testing	Detecting inconsistencies or fallacies within a process or product; determining whether a process or product has internal consistency; detecting the effectiveness of a procedure as it is being implemented	0	
Critiquing	Judging	Detecting inconsistencies between a product and external criteria, determining whether a product has external consistency; detecting the appropriateness of a procedure for a given problem.	0	
Create			Frequency	
Put elements together to form a coherent or functional whole: reorganize elements into a new pattern or structure				
Generating	Hypothesizing	Coming up with alternative hypotheses based on criteria	0	
Planning	Designing	Devising a procedure for accomplishing some task	0	
Producing	Constructing	Inventing a product	0	

## DISCUSSION

Firstly, the findings exposed an insufficient amount of HOTS-based questions in the English National Examination in reading session for Senior-High School students in Indonesia. Out of 210 items in the English National Examination from 2013 until 2018, only 53 items fall under the classification of HOTS item. It means that the percentage of HOTS item was only 25.23 % of all 210 items. Secondly, the subskills of HOTS in all Examinations were monotonous and lack of variation. The subskill of each level of HOTS that can be found in all examinations was only Analyze. We did not see the two higher levels (Evaluate and Create) existed. There are three subskills of Analyze which are Differentiating, Organizing, and Attributing. There are 23 of 53 HOTS questions required Differentiating skill. The sample of questions that requires the skill of differentiating can be seen in Examination 2014 no. 35 which questioned, "The underlined word is a closest meaning to..." This kind of question requires the students to Differentiate relevant from irrelevant parts or important from unimportant parts of presented material. It means that the question encouraged the students to get involved in organizing the structure and, specifically, to analyze how the parts fit into the overall structure or whole (Anderson et al., 2001). In subskill Organizing, the question sample was represented in the form of asking students to arrange jumbled sentences in the correct order which stated, "Rearrange the following jumbled sentences into the correct and meaningful paragraph." (National Examination 2016 no. 6) This type of question needed students to activate the skill to identify the elements of a paragraph and recognize how they fit together into coherent structure (Anderson et al., 2001). While in subskill Attributing, the students are required to be able to determine the point of view, biases, values, or intention underlying communications. In the process of Attributing, students do the process of deconstruction, in which they determine the intentions of the author of the given material. The example of Attributing is represented in a question stem like, "Why does the writer write the text?" (National Examination 2017 no. 20)

These findings are considered bit better than the findings from the study conducted by Ahmed, Aziz-un-Nisa, & Zarif (2013). In this study, they tried to analyze final examination questions in high schools in Iran through Bloom's Taxonomy. Their findings revealed that all the questions provided are at the first three levels of the taxonomy, which are the levels of LOTS. In addition, Ahmad (2016) also found that English National Examination in Indonesia was lack of items concerning on HOTS. After analyzing 1000 test items accumulated from 20 test packages, she found only 10.6% of HOTS items. Meanwhile, Valdev Singh & Shaari (2019) showed that there was only 16 HOTS item out of 80 items in the English reading comprehension assessment for Standard 6 students in Malaysia. Considering the previous findings from the previous studies, we believed that our findings showed that there was a promising improvement in implementing HOTS in high-stake examination in Indonesia, in particular, English National Examination. However, test developers are suggested to take more thoughtful consideration in implementing all the necessary skills when preparing National Examination so that a comprehensive and balanced assessment system can be achieved. Furthermore, It is decisive to create the right structure and assessment components in identifying the effectiveness of a design of teaching and learning (Valdev Singh & Shaari, 2019). Also, the test developers of English National Examination are encouraged to give more attention to evaluative questions in order to lead students to have the opportunity to independently express their opinions, feelings, and attitudes which stimulates their way to be creative and innovative thinkers (Ahmad, 2016). On the other hand, if there are insufficient amount of questions that are not embedded with thinking, the test highly possible to impede the students in improving their critical thinking. In order to meet the needs of implementing HOTS in multiple-choice assessment, (Scully, 2017) provided some strategies, namely (1) Manipulation of Target Verbs Specific verbs; (2) Item Flipping; (3) Use of High Quality Distractors; and (4) Tapping 'Multiple Neurons.'

## CONCLUSION

The importance of assessing order thinking is well recognized in recent educational assessment. Therefore, assessment, especially in English National Examination, should contain sufficient items that are based on the concept of HOTS. However, in the present study, we found that multiple choice items in the English National Examination in Indonesia from 2013-2018 was insufficient. Out of 210 analyzed items, there were only 53 categorized as HOTS. Besides, the 53 HOTS items lack of variation of the sub aspect of HOTS. All of them are classified into the level of Analyze. Therefore, it is important for the test developers to provide adequate portions of HOTS-based items in order to help students to have good thinking skill to meet the challenge of 21<sup>st</sup> century

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