

The Development of Test Instrument Based On Hots (Higher Order Thinking Skills) Using Edmodo

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Abstract:

Background: The test instrument can be interpreted as a number of questions that must be responded in order to measure the level of students' ability. This research aimed to produce a test instrument based on HOTS questions on social studies subjects that are valid, reliable, have a good difficulty index and differentiation power. The valid HOTS question-based test instrument is then uploaded to Edmodo so that students can access it from anywhere.

Materials and Methods: This research used the R&D (Research and Development) method which consisted of three steps, namely define, design, and develop. At the define stage, the researcher determined the basic competencies to be developed into question indicators. Then, at design stage, the researcher created HOTS items according to the question grid. At the develop stage, the researcher examined and analyzed each item.

Results: This research produced a HOTS question-based test instrument consisting of 3 essay questions with item 1 has very high validity, high reliability, moderate difficulty index, and good difference index. Item 2 has high validity, high reliability, medium difficulty index, and good difference index. Item 3 has high validity, high reliability, medium difficulty index, and medium difference index.

Conclusion: This research implies that the three questions are suitable to be used and can be saved into a question bank so that it can be used by the teacher later on.

Key Word: Development, Test, Question, HOTS, Social Studies Education, Edmodo.

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I. Introduction

Education plays an important role that is inseparable from the life, both in family life, society and in the life of the nation and state¹. To achieve educational goals, a curriculum is created. The curriculum is understood as a set of plans and arrangements regarding the objectives, content, and learning materials and methods that used as guidelines for implementing learning activities to achieve certain educational goals².

In order to the curriculum can be achieved according to its objectives so that the educational institution is formed. To achieve the goals of educational institutions in the school environment, definitely, educational institution needs a tool as a means to objectify it, namely a teacher, where the teacher is the second parent of a child, as well as a means of educating after the family with the role of parents in it³. The role of the teacher is very essential in carrying out this very noble task⁴.

In the 21st century, students are expected to have the ability to think critically so that they can become provisions in their social life in the society. However, the reality in the field shows that not all students have critical thinking skills. To measure students' critical thinking skills, a test that contains HOTS questions is needed.

The ability to think critically is necessary for the student life, so that the student is able to filter information, chooses whether or not a need is appropriate, asks the truth which is sometimes covered in lies, and anything that can endanger student life⁵.

The test is a task or a series of tasks given to an individual or group of individuals, with it is conducted to compare their skills with one another⁶. In the world of educational evaluation, the test is the method taken in the context of measurement and assessment.

Cronbach (1960) defines test as a systematic procedure for comparing the behavior of two or more people. The point is as a measuring tool for students⁷. The test has function to measure the level of development or progress that students have achieved after they take the learning process within a certain period of time.

Further, Anastasi (1977) in its book entitled "Psychological Testing" points out that the test is a measuring tool that has objective standards so that it can be used widely, and can actually be used to measure and compare the psychological state or behavior of an individual⁸.

Sax (1980) defines a test as a task or series of tasks used to gain systematic feedback that is considered to reflect educational or psychological traits or attributes. Furthermore, Sax also emphasizes that the test contains of the tasks that are structured to produce systematic observations dealing with the trait⁹.

The term of test will be used to refer to every procedure or activity that designed to collect information about the knowledge, attitudes, or skills of students or groups of students. The test is a tool or procedure used for measurement and assessment activities¹⁰.

Test is a measuring instrument to collect the data in which in providing responses to questions in the instrument, participants are encouraged to show their maximum performance. The maximum appearance that is shown, it provides a conclusion regarding the ability or mastery that is owned¹¹.

The test can also be called assessment, assessment is a general term that includes procedures used to obtain information about student learning (observation, the average of written test) and learning progress assessment format¹².

Test is the narrowest part of the assessment. The assessment is: (1) a series of procedures; (2) it is designed to provide information about the development, growth and achievement of students; (3) As a standard comparison. Assessment must be sustainable, it indicates that it must be carried out when a process is running every day, to gather information about proficiency, success, learning abilities, and learning motivation¹³.

Test is a number of questions that require an answer or a number of statements that must be given a response or response with the aim of measuring the level of individual's ability or revealing certain aspects of the person being tested¹⁴.

Test is a general term that is defined as a process taken to obtain information used in order to make decisions dealing with students, curricula, programs and educational policies, methods or other educational instruments by an agency, institution, an official organization or institution that carries out a certain activity¹⁵.

The test is a tool to gain data about individual behavior¹⁶. A test based on HOTS (Higher Order Thinking Skills) questions is a test that can stimulate the higher order (critical) and creative thinking skills of students. HOTS questions do not only test the ability of students to remember, understand, and apply, but also test the ability of students to analyze, evaluate, and create.

Solving HOTS (Higher Order Thinking Skills) questions involves the thinking processes of students in the realm of analyzing (analyzing-C4), evaluating (evaluating-C5), and creating (creating-C6) on Bloom's taxonomy¹⁷. In this research, the skills being measured are thinking skills in the realm of analyzing.

One of the benefits of giving HOTS question-based tests is it can increase students' motivation to learn¹⁸. It is in accordance with, the Ministry of Education and Culture (2017) explains that in addition to preparing students' competencies for the 21st century, the role of HOTS questions is they can increase students' learning motivation¹⁹. Likewise, with Kusuma, et al. (2017) who conducted research on developing HOTS questions and it was found that giving HOTS questions could improve students' higher thinking skills²⁰.

In the pandemic nowadays, learning activities are carried out online, as well as during the assessment process. There are many platforms that provide online assessment features, one of which is Edmodo. Edmodo is a site that teachers and students can use when conducting the assessment. Edmodo itself, apart from being accessible using a mobile or laptop browser, it can also be accessed by downloading the application. Edmodo has the advantage that students can see whether the answer to their choice is right or wrong when the test is finished and the teacher can analyze the students' answers.

Edmodo has function as a place for exams or quizzes²¹. Edmodo is a personal microblogging platform that developed for teachers and students, it also prioritizes the privacy of students. Teachers and students can share notes, links and documents.

The social studies teacher at ArRaihan Islamic School has used HOTS questions in conducting assessments. Most of the HOTS questions that used by the teacher are self-composed questions and questions taken from question banks from other social studies teachers.

Due to the HOTS questions that are made, it has been tested for their validity level and some have never been tested. If a question has never been analyzed for its validity, the teacher will not know whether the question is appropriate or not to be used as an item in the test instrument. And if the level of feasibility of a question is not known, the validity of the measurement results of the question can be doubted.

In this regard, the researcher wants to develop a test instrument containing HOTS questions that are valid, reliable, have a moderate level of difficulty, and have good distinguishing power. Researcher will develop appropriate instruments that can later become a question bank for teachers so that they can be used again when conducting assessments someday. After the HOTS question-based test instrument has tested its validity, the researcher will upload the questions to Edmodo. Not only that, this research aims to measure the higher order thinking skills of students.

II. Material And Methods

According to Arsita, et al. (2014) the research method as a way to solve a problem or problem dealt with, plays an important role in scientific research²². This research used the Research & Development method. The development of a HOTS question-based test instrument consists of three steps, namely define, design, and develop²³.

The first step is define, at this stage, the researcher formulated a needs analysis analysis, curriculum analysis, and analyzed the characteristics of students. Needs analysis was carried out previously by analyzing the HOTS questions as an assessment instrument. At this stage, the researcher will determine the test instrument that needs to be developed to measure the abilities that have been achieved by students. The next analysis is curriculum analysis. Curriculum analysis was carried out by paying attention to the characteristics of the curriculum that was being used in a school. This was intended so that the development carried out can be in accordance with the demands of the applicable curriculum. The next analysis stage is potential analysis. A potential analysis was carried out to discover the opportunities for using Edmodo as a medium for teachers to upload questions and as a medium for students to work on questions. HOTS questions, which are still rarely made by social studies subject teachers, it has potential to be developed.

The second step is design, at this stage the researcher established the test objectives and also the indicators for each item. Furthermore, the researcher made a grid of questions based on the predetermined test objectives. Then, the researcher arranged the question cards based on the grid that had been designed.

The third step, the researcher developed a HOTS question-based test instrument in accordance with the design that had been made previously. After the HOTS questions were successfully created, the researcher would test them in Class VIII D at ArRaihan Islamic School and the level of validity of each item would be analyzed.

Procedure methodology

Data collection techniques in this research used documentation techniques in the form of data record files of students' answer sheets. Students answered the questions using Edmodo because learning was still being undertaken through online during the research was ongoing at the time.

This research was conducted at ArRaihan Islamic School in July 2020 on the Odd Semester, Academic Year 2020/2021. The research subjects were 21 male students of Class VIII D at ArRaihan Islamic School who had a moderate daily average value.

Statistical analysis

The data analysis technique used the item analysis technique which consisted of validity tests, reliability tests, difficulty index tests, and difference power tests. The validity test of the questions is carried out to determine whether or not an item is good. A reliability test is conducted to find out that a test can be declared reliable if the results of measurements made using the test repeatedly on the same subject always show the same results²⁴. Difficulty index test to determine the quality or not the items. The difference power test is carried out to see the differentiation of items, namely the ability of a learning outcome test item to be able to distinguish between students with high abilities and students with low abilities so that most students who have high ability to answer these items are more likely to answer correctly, while students who have low ability to answer these items mostly cannot answer the items correctly. All of the test item analysis used the "Simpel PAS application".

Students' high-order thinking skills are assessed through the acquisition of HOTS-based questions, presented in the following formula:

$$\text{Students' score} = \frac{\text{Acquisition Score}}{\text{Maximum Score}} \times 100$$

Interpretation criteria for scores based on the formula above if students with a score of 81-100 have "excellent" criteria, scores of 61-80 have a "good" criterion, scores of 41-60 have "fair" criteria, scores of 21-40 have "poor criteria", And the scores of <20 have the criterion of "very poor"²⁵.

III. Result

The result of the development in this research was a test instrument based on HOTS questions in the form of essays. The form of essay questions is expected to measure students' higher order thinking abilities deeply. HOTS questions that are tested on students, it should be presented in the form of descriptions or essays to find out the process of students solving problems on the questions and students are able to think critically²⁶.

A good test instrument is a valid, reliable, objective, and practical test. To find out the validity and reliability of the test, the researcher will analyze each item that has been given. The objectivity of a test can be

seen whether the test is in accordance with the material that has been given in the learning process, and to see the practicality of a test can be discovered from the easy test implementation and it does not require many tools²⁴.

The test instrument developed is in the form of a posttest or a test that is carried out after the learning ends. Post-test which aims to discover whether all the subject matter which is classified as important can be mastered as well as possible by students²⁴.

After the test instrument was tested on students, the students' answers were then analyzed to discover the feasibility of the test instrument. There are four test item analysis, namely validity, reliability, difficulty index, and distinguishing power. From the four tests, it is known that the HOTS question-based test instrument that developed is valid, reliable, has a moderate difficulty index, and has good differentiation power.

The development of a test instrument based on HOTS questions will certainly increase the teacher's insight and ability in designing the following HOTS questions. The development of HOTS questions can assist to improve teachers' understanding about writing of HOTS question and to improve the skill of the teacher in compiling HOTS assessment instruments²⁷.

With the improvement in the skills of teachers in developing HOTS questions, it is expected that the quality of the questions will also increase. Improving the quality of HOTS questions will certainly have a big impact on students and also for education in Indonesia. Education plays an important role in educating the nation's next generation. Education is a very important pioneer for preparing reliable human resources, while teachers are the stakeholder of the education²⁸.

This research can facilitate for teachers to measure the thinking skills of students after they are given HOTS questions. The development of HOTS questions can assist teachers in assessing authentically how high order thinking skills are possessed by students²⁹.

IV. Discussion

The results of students' higher order thinking skills can be seen after students are given HOTS questions. An analysis of students' high-order thinking skills can be obtained through processing on the HOTS assessment instrument³⁰.

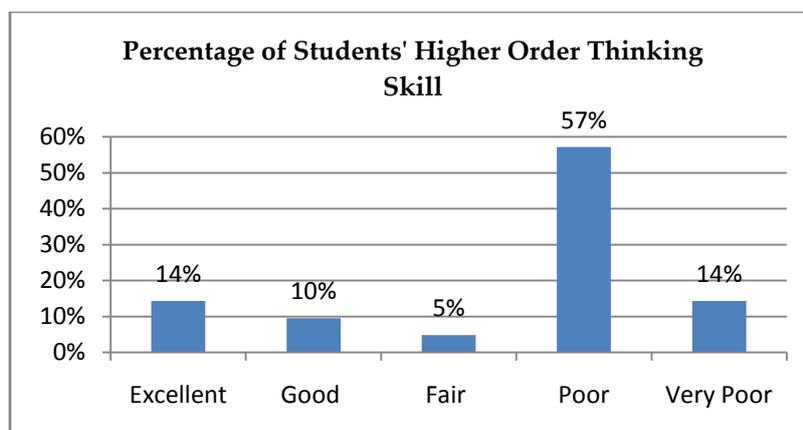


Figure 1. Percentage of Students' Higher Order Thinking Skills.

Based on Figure 1. The percentage of students' level of high-order thinking skills, it indicates that 14% of students with "excellent" criteria, 10% with "good" criteria, 5% with "fair" criteria, 57% with "poor" criteria, and 14% with the criterion "very poor". From the overall score, it was obtained that the average score was 41 including the "fair" category.

By knowing the percentage of students' high-order thinking skills, the teacher can adjust what kind of learning, what kind of treatment, and what kind of questions will be given to students so that students can continue to train their thinking skills. Teachers should develop HOTS questions in order to help students for having the high-order thinking skill and they can be familiar with high-level questions²⁹.

Providing HOTS questions can activate and train students' high-order thinking skills. Higher order thinking skills are not only useful for the student life currently but also in the future. Teachers who are able to provide encouragement to higher-order thinking, students will have higher order thinking skills that are able to compete in an increasingly tight world of work³¹.

V. Conclusion

The final product in this research produced a test instrument based on HOTS questions in the form of essays with a high level of validity, very high reliability, moderate difficulty index, and good differentiation, it indicates that these questions are suitable to be used as an assessment instrument and can be saved in a question bank so that the teacher can use it later on. The test instrument that has been developed successfully, it measures students' higher order thinking skills. Students can use the final product of the HOTS question-based test instrument as a material to practice higher order thinking skills especially in social studies education.

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