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Trends in the Ability of Higher-Order Thinking Skills in Islamic Religious Education in Madrasahs: Case in Indonesia

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Abstract

The rapid development of science and technology in the 21st century requires humans to have high-level thinking skills. In the world of education, HOTS is the thinking ability of students who not only remember but are also expected to be able to develop ideas. This research aims to determine students' higher order thinking skills in solving HOTS-based daily assessment questions on Islamic religious education subjects. Quantitative research with descriptive content analysis approach aims to determine students' higher order thinking skills in solving HOTS-based daily assessment questions on Islamic religious education subjects. The data was collected by giving a description test through the MAN 1 Pekanbaru E-learning application version 4.5.1. The results of the PAP analysis show that the class XI students of MAN 1 Pekanbaru tend to have higher-order thinking skills in the "high" category in solving the C6 cognitive domain questions. The results of the interview show that the students of class XI MAN 1 Pekanbaru tend to have difficulty when making/forming sentences that lead to the completion of C6 cognitive domain questions. Students tend to have higher-order thinking skills in the "high" category even though they still have difficulty when making/forming sentences that lead to the completion of C6 cognitive domain questions.

Keywords: *Higher Order Thinking Skills, Daily Assessment Questions, HOTS, Islamic Education.*

Introduction

Higher Order Thinking Skills (HOTS) is currently a thinking requirement for Senior High School students in Indonesia in order to create reliable graduates in the 21st century. Various experts state that HOTS is a more complex thinking skill including critical thinking and creative thinking to solve various non-formal problems. -algorithmic which involves the ability to analyze, evaluate, and create (Brookhart, 2010a; Graham & Fennell, 2001; Kharismayuni et al., 2021; Pillay et al., 2016; Wikanta & Susilo, 2022). HOTS is very much needed by students in the educational environment: 1) useful in the learning process (Haleva et al., 2021); 2) assist students in solving problems better (Faraniza, 2021); 3) increasing students' self-confidence (Yilmaz & Sari, 2021); 4) improve student achievement (Goering et al., 2022); and 5) helping students to manipulate information and ideas in ways that change their meaning and implications (Kurup et al., 2021).

The education system in Indonesia generally targets the ability of students to reach an average level, which is a score of 60 to 80 so that students with good potential for higher-order thinking skills do not receive appropriate support, motivation, and education. Research by Schulz & FitzPatrick (2016) found teachers exhibited uncertainty about the HOTS concept and were not prepared to teach or conduct HOTS-based assessments. The results of the study by Suwarma & Apriyani (2022) show that teachers' knowledge of HOTS, the ability to improve students' HOTS, solve HOTS-based problems, and activities to measure students' HOTS are still low. Similar findings were obtained by Retnawati et al. (2018), elementary school teachers who participated in his research did not yet have a comprehensive understanding of HOTS so that there was a lack of training activities and measuring students' higher-order thinking skills.

At MAN Pekanbaru, the 2013 Curriculum applies which emphasizes more on the scientific direction which includes asking, observing, gathering information, associating and communicating the material

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being taught, especially student mastery in PAI subjects which are considered very low and far from the goals to be achieved in learning, so it requires implementation of the 2013 curriculum design in the form of HOTS learning. Teachers only know HOTS as the ability to solve difficult questions. According to the teacher, many students are not able to work on PAI questions in the HOTS category. The Head of Madrasah Aliyah Negeri (MAN) 1 Pekanbaru admitted that higher order thinking skills for the competitiveness of students are very urgent. This is in line with the statement that HOTS skills are very important in the educational process (Ginting, 2021; Mispani et al., 2021; Sulaiman et al., 2022). For this reason, teachers are included in workshops or seminars regarding the development of HOTS questions and assessments. In order for students' HOTS to develop well, students need to be accustomed to measuring through HOTS, otherwise it will cause the potential for HOTS in students not to develop.

Even though the teacher has attended workshops or seminars regarding the development of HOTS questions and assessments, however, the high-level thinking skills of MAN students in answering HOTS questions in PAI Subjects are in the sufficient category, and the low ability of students to answer questions in the C6 cognitive domain (creating) (Rahayu , 2018). This is because students are not used to working on higher-order thinking questions or other international study questions (Lai, 2020; Nguyen et al., 2020), students have difficulty understanding and translating the meaning of the questions (Çalışkan et al., 2020 ; Fenwick & Tennant, 2020), and the ability of teachers to make higher order thinking skills assessment instruments is still minimal (Subia et al., 2020; Wilson & Narasuman, 2020).

Therefore, it is necessary to explain the factors that cause students to solve higher order thinking skill (HOTS)-based questions in Islamic religious education subjects.

Method

The type of research that we apply is quantitative research with a descriptive content analysis approach. This research only has one independent variable, namely higher order thinking ability. The source of the data in this research is the students' ability to answer the daily assessment questions of Islamic Religious Education class XI MAN 1 Pekanbaru. The test instrument used was the HOTS question for the subject of Islamic Religious Education, which consisted of 15 questions. The results of the final score are then analyzed using the PAP analysis technique (Banner Reference Assessment), in accordance with the essence of the LAP is the passing standard (pass-fail limit) which has been set as a benchmark since the beginning the assessment will be carried out (Dubinsky et al., 2000). Before the questionnaire was distributed to students, the questionnaire was tested for its level of validity and reliability, so that the data obtained would later be accurate and consistent in measuring the desired variables (van Laar et al., 2018). According to (Hair et al., 2006) the instrument is declared reliable if Cronbach's alpha value is 0.70. Furthermore, according to (Daud et al., 2018) if Cronbach's alpha value is < 0.60. Data analysis techniques used: 1) the level of instrument validity was analyzed using Lawshe's content validity, namely CVR (Content Validity Ratio). CVR was proposed by Lawshe in 1975 using 3 rating scales (Divayana et al., 2020) and the level of instrument reliability was analyzed using SPSS Version 23 for windows. The instrument reliability index was obtained from the use of Cronbach Alpha. The criteria for determining the level of reliability are presented in table 2 (Berlian et al., 2021); and 2) analysis of students' higher-order thinking skills in solving HOTS-based daily assessment questions in Islamic Religious Education subjects using SPSS 23 both descriptively and inferentially to see the extent to which students' higher-order thinking skills in solving HOTS-based daily assessment questions in subjects Islamic Religious Education that has been implemented so far. Table 1 presents the interpretation of students' higher order thinking skills in solving HOTS-based daily assessment questions in Islamic Religious Education subjects (Riduwan, 2016).

Table 1. Ability Level Category

No	Value Interval	Category
1.	90 - 100	Very high
2.	80 - 89	Tall
3.	70 - 79	Currently
4.	60 - 69	Low
5.	0 – 59	Very low

Result and Discussion

Development of Students' Higher Order Thinking Ability Instruments in Solving HOTS-based Daily Assessment Questions on Islamic Religious Education Subjects

The requirements of a good instrument are valid and reliable. The instrument developed in the study consisted of 15 question items. The results of testing the validity of the instrument are presented in Table 2 below.

Table 2. Validity Test Results

No	Item	R Count	R Table	Conclussion
1	Item 1	0,867	0,553	Worth testing
2	Item 2	0,940	0,553	Worth testing
3	Item 3	0,887	0,553	Worth testing
4	Item 4	0,869	0,553	Worth testing
5	Item 5	0,882	0,553	Worth testing
6	Item 6	0,920	0,553	Not worth testing
7	Item 7	0,786	0,553	Worth testing
8	Item 8	0,914	0,553	Worth testing
9	Item 9	0,920	0,553	Worth testing
10	Item 10	0,870	0,553	Not worth testing
11	Item 11	0,903	0,553	Not worth testing
12	Item 12	0,860	0,553	Worth testing
13	Item 13	0,888	0,553	Worth testing
14	Item 14	0,886	0,553	Not worth testing
15	Item 15	0,913	0,553	Not worth testing

Based on Table 2, information is obtained that from the 15 question items, there are 10 items that are "appropriate to use" and 5 items that are declared "not suitable for use." The questionnaire has an rcount value greater than rtable = 0.553 so it can be said that all items are in the category " VALID" and can be used in research data collection. After getting 10 question items that were declared "fit for use".

Question items in an instrument are said to be valid if the value of the calculated person coefficient (r-count) is greater than the Pearson table coefficient (r-table) (Ermayenti & Heryanto, 2019); (Kurniawan et al., 2018). In addition, the correlation between items with a total score exceeding 0.25 is considered a high score (Nunnally, 1978). Furthermore, the reliability of 34 valid questions was calculated. The results of the calculation of the reliability of the items obtained a value of 0.969 with very high criteria. This indicates that the reliability value > from 0.60 for each construct studied. This result is reinforced by the opinion of Basuki and Haryanto that instruments that have a high or reliable correlation are in the range of $0.6 < X < 1$ (Meng et al., 2020); (Selby et al., 1984). Thus, the eight research constructs have met the reliable reliable requirements so that they can be used for further research needs. Table 2 provides information that the test instrument has met the empirical test, which is valid and reliable or reliable. This result is reinforced by the opinion that an assessment instrument that can be used is an instrument that has met the valid criteria (Almanasreh et al., 2019); (Ulfa Nurfillaili, M. Yusuf T., 2016); (Childa Kumala Azzahri, Dwi Widjanarko, 2017), the instrument must also meet high valid criteria (Yusuf Efendi, 2019); (Gabriela V. Wales, Silvya L. Mandey, 2017). The results of this study are also reinforced by the findings of Inteni, et al who said that one of the requirements of the instrument that was feasible to be used in research was valid (Aji & Winarno, 2016); (Wendy K. Adamsa, 2010). In addition to being valid, the instrument must also meet reliable criteria, if it has a Cronbach's alpha value greater than 0.6 (Khumaedi, 2012); if the Cronbach Alfa reliability coefficient is in the range 0.70-0.90 (Yusup, 2018). The results of this study are also reinforced by the opinion of Tang Keow, et al that the scale and criteria used to measure the test instrument must meet very reliable criteria (Ngang et al., 2014).

Thus, the research instrument that measures students' higher-order thinking skills in solving HOTS-based daily assessment questions in Islamic Religious Education subjects that have been tested is deemed worthy of use and is believed to be used in research that measures students' higher-order thinking skills in solving daily assessment questions. HOTS based on Islamic Religious Education subjects for users. This is reinforced by research which states that the instruments used are derived from the selection of valid and reliable tools (Souza et al., 2017); (Suratno et al., 2016); (Pinilih, Fitria Wahyu, Rini Budiharti, 2013). With the instrument for assessing students' higher-order thinking skills in

solving HOTS-based daily assessment questions in Islamic Religious Education subjects, users can prevent speculation from users in conducting assessments, especially in determining the final score after carrying out research on the achievement of students' higher-order thinking skills in completing HOTS-based daily assessment questions on Islamic Religious Education subjects for users.

Analysis of Students' Higher Order Thinking Skills in Solving Daily Assessment Questions based on HOTS on Islamic Religious Education Subjects

After the validity and reliability tests were carried out, we conducted daily assessments in class XI-ASC2 which was held on June 16, 2022. Student answer sheets were analyzed using an assessment rubric with the rater to obtain a final student score. The student's final score was analyzed using the Benchmark Reference Assessment (PAP) that had been made previously. Students' final scores were also analyzed using descriptive statistics. Therefore, students' higher-order thinking skills in solving HOTS-based daily assessment questions on Islamic Religious Education subjects can be expressed in Figure 1 below.

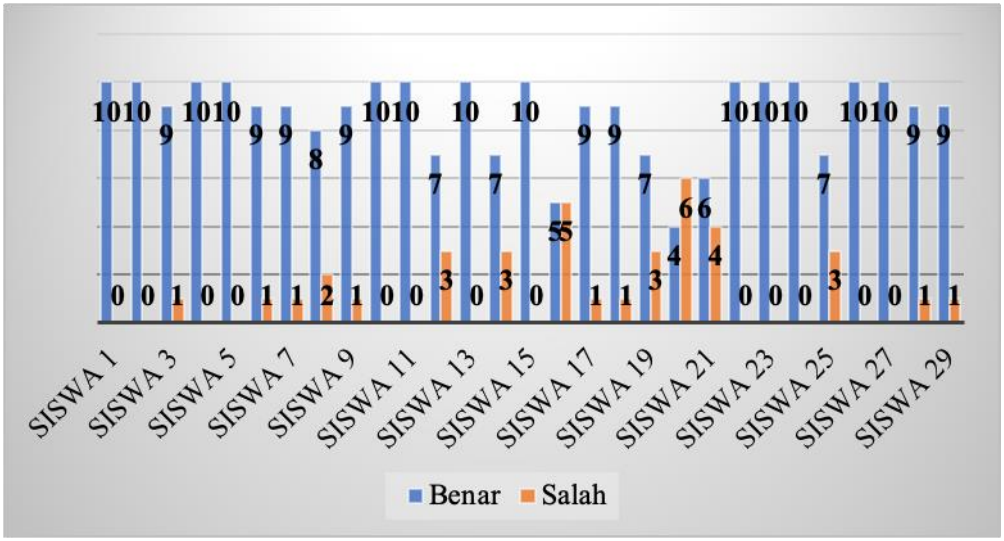

Figure 1. Analysis of Students' Higher Order Thinking Skills in Solving Daily Assessment Questions based on HOTS on Islamic Religious Education Subjects

Based on Figure 1 above, it is the result of the analysis of students' answers to the daily assessment questions totaling 10 questions with the HOTS category. Next we will analyze the students' incorrect answers based on the items tested. the following is the presentation:

First, in question number 1 there are 2 students who answered incorrectly. Question number 1 asks students to analyze the relationship between the story and Surah Thaha verse 132. Analysis Possible errors in student answers are that they are not thorough or seem rushed when reading the story or other possibilities, students do not master the content of Surah Thaha verse 132. Second, in question number 2 There are 2 students who answered incorrectly. Question number 2 is presented in the form of a picture of human behavior and the question is to determine the relationship between human behavior and the content of the verses about human responsibility towards family and society. Analysis of the possibility of student error is the lack of students' understanding of the content of the verses about human responsibility towards family and society. Third, in question number 3 there were 5 students who answered incorrectly. Problem number 3 presents an illustration of community routines in an area then students are asked to analyze the most appropriate relationship between the illustration and one of the letters of the Qur'an. Analysis of student errors in answering questions is the inability of students to analyze the meaning contained in the story and also the content of the verses of the Qur'an presented in the answer obsession.

Fourth, in question number 5 there were 4 students who answered incorrectly. Problem number 3 presents a hadith of the Prophet about human responsibility towards family and society then some Muslim attitudes are presented and the question is to analyze which behaviors are in accordance with the content of the hadith. Analysis of student errors in answering questions is the lack of students' understanding of the content of the hadith. Fifth, in question number 6 there were 8 students who answered incorrectly. Problem number 6 asks students to analyze the relationship between illustrations

about fraudulent trading activities and one of the arguments for human responsibility towards family and society. The analysis of student answers errors was caused by students not understanding the meaning contained in the postulates of human responsibility for the Qur'an. Sixth, in question number 7 there were 10 students who answered incorrectly. Question number 7 presents a story of friendship between 2 women of different religions, then students are asked to choose the most appropriate answer related to human responsibility towards society with an attitude of tolerance. Analysis of student errors is that students are stuck with distracting answers presented in the answer options.

The results of the daily assessment results of class XI ASC 2 students regarding human responsibility towards family and society can be seen in Table 3 below.

Table 3. Results of Daily Assessment for Class XI-ASC 2 MAN 1 Pekanbaru

No	Total Score	Frequency	Total
1.	100	13	1300
2.	90	8	720
3.	80	1	80
4.	70	4	280
5.	60	1	60
6.	50	1	50
7.	40	1	40
Total			**2530**
Percentage			**87,24% (Tinggi)**

From the results of the PAP analysis in Table 3, it shows that from 29 students, it was found that the students' higher-order thinking skills in solving HOTS-based daily assessment questions in Islamic Religious Education subjects had an average percentage of 87.24% in the "high" category. The table also shows that the student's score was able to achieve the highest score of 100, while the lowest score was at a value of 40. So based on the PAP analysis, it showed that class XI MAN 1 Pekanbaru tended to have students' high-level thinking skills in solving HOTS-based daily assessment questions on “high” Islamic Religious Education subjects.

Data on students' higher-order thinking skills in solving HOTS-based daily assessment questions on Islamic Religious Education subjects in class XI MAN 1 Pekanbaru were obtained from tests that were arranged based on three HOTS cognitive domains, namely analyzing, evaluating, and creating. Based on the results of the analysis, it shows that students tend to have higher-order thinking skills in solving HOTS-based daily assessment questions on “high” Islamic Religious Education subjects. The results of a relevant study by Pasani & Suryaningsih (2021) found that the high-order thinking skills of fifth grade students of SD Imam Bonjol were in the high category with an average score of 87.85. These results also show that students' abilities are high in the cognitive domain of C6 (creating). This is because students are accustomed to working on HOTS type questions. Considering that the daily test questions, or the assessment questions for grade promotion are still in the realm of C1 to C3 only (LOTS), there is C4 but not much like the Principal's statement during the observation activities. Not only giving HOTS type questions that are in the spotlight, but also the way students organize or design ways to answer questions starting from making known, being asked to being answered. The HOTS thinking ability is sufficient and the low ability to answer questions in the C6 cognitive domain is also a result of the lack of practice to design problem-solving steps on the questions. Constraints in designing the steps for solving the problem were also recognized by students in the interview session.

In carrying out the research on HOTS questions, the students consisted of 10 multiple questions, each of which represented the cognitive domain of HOTS. Questions with the cognitive domain of C4 (analyzing) are related to students' ability to parse and identify information on the questions into an organized structure, such as writing known, asked questions and the results of the answers. On questions with the cognitive domain of C5 (evaluating) it is related to the ability of students to make decisions or make judgments about a way to align with the target. On questions with the cognitive domain of C6 (creating) it is related to the ability of students to manage how to work on questions and make working steps so that they can get problem solving and create many solutions to problems on the problem.

According to Collins (2014) questions with cognitive domains of analysis, evaluation, and creation require more complex solutions, because they are the realm of higher-order thinking skills. In line with

the opinion of Siahaan et al. (2021) that higher order thinking skills are thought processes that are not just memorizing and relaying known information. Higher order thinking skills are the ability to connect, manipulate, and transform the knowledge and experience already possessed to think critically and creatively in an effort to make decisions and solve problems. HOTS according to Pacheco & Herrera (2021) is a complex thinking ability that involves all previous aspects to produce a solution. Therefore, if prior knowledge is strong, students will find it easier to climb the ladder of higher cognitive domains.

This means that to solve problems at a higher level it requires a unitary level of ability below it, such as to solve questions at the C6-creating level, it is also necessary to have C4-analyzing and C5-evaluating abilities (Ramadan, 2020). In the previous section, it was explained that HOTS is in the cognitive domain of Bloom's taxonomy, which was later refined by Anderson & Krathwohl (2001) into C1-memory, C2-understanding, C3-applying, C4-analysis, C5-evaluation, and C6-creation. Fensham & Bellocchi (2013) explains that levels one to three are low-level thinking skills or LOTS (Lower Order Thinking Skills) and levels four to six are HOTS (Higher Order Thinking Skills). LOTS according to the explanation of Narayanan & Adithan (2015) is a mechanical ability that is limited to routine things, such as memorizing and only repeating information that has been previously known without criticizing and developing new ideas.

In classroom learning, LOTS is reflected in one-way learning activities that are domains by the teacher and only provide few opportunities for students to think actively, but it is also reflected in measurement activities that only rely on memory questions (Boekaerts, 1997). In contrast, HOTS according to Halpern (2014), is an ability that does not just rely on memory, but is a complex thinking effort that involves thinking creatively and critically of a problem to find a solution. In HOTS class learning is reflected in two-way learning where, between teachers and students, students are given more opportunities to seek and find their way to solve problems, as well as in measurement activities prioritizing questions in the form of problems, information seeking, analytical, evaluative and decision making (Jailani et al., 2017). Referring to Brookhart's (2010) opinion, HOTS learning is divided into 3 namely HOTS as transfer, HOTS as critical thinking and HOTS as problem solver. When facing a problem, a person needs to have the skills to apply his knowledge, then make wise judgments and be able to criticize by providing logical and scientific reasons and finally solving problems using strategies that have been made previously.

Beesley (2004) also explains that HOTS is inseparable from the level of learning, each cognitive level is interdependent. What was learned earlier can help optimize higher order thinking skills. Solving HOTS questions is like climbing stairs. To answer questions at the level of C5 (evaluating) it is necessary to master the abilities of C4 (analyze), C3 (apply), C2 (understand) and C1 (remember) and so are other levels of questions. In response to this Sadler et al. (2000) explained the need to familiarize students with learning activities and measuring HOTS is important to develop ideas or solutions to complex problems. In accordance with the nature of humans created differently, each student also has different abilities to achieve the six cognitive levels. This study specifically discusses students' higher order thinking skills in solving HOTS-based daily assessment questions on each student's Islamic Religious Education subject. The results of this study indicate that class XI students of MAN 1 Pekanbaru in the 2020/2021 academic year tend to have high-order thinking skills in the "high" category although they still tend to be low in solving C6 cognitive problems.

Conclusion

Based on the results of the research and discussion, several conclusions can be made, first: the results of the PAP analysis show that the class XI students of MAN 1 Pekanbaru tend to have higher-order thinking skills with the "high" category in solving cognitive problems C6. Second, the results of the interviews showed that the students of class XI MAN 1 Pekanbaru tend to have difficulty when making/forming sentences that lead to the completion of C6 cognitive domain questions. The conclusions obtained have implications for increasing students' higher-order thinking skills in solving HOTS-based daily assessment questions in Islamic Religious Education subjects. There are several suggestions that can be given to students and teachers. Students are advised to practice working on Islamic Religious Education questions with HOTS type questions, especially questions with the creation level (C6) and in the form of contextual questions or questions related to everyday life. This is intended so that students are accustomed to being able to solve various Islamic Religious Education questions. Students are expected to get used to solving problems in a coherent manner from understanding the problem, planning a solution, implementing the plan, and looking back at the truth of solving the problem. For teachers, teachers are advised to know the students' abilities in solving Islamic Religious Education questions of HOTS type questions so that they can design and conduct lessons that can

improve these abilities. In addition, teachers should provide additional assignments or HOTS questions more often. Teachers are advised to inculcate the concept of the material properly and coherently, as well as in terms of planting the concept of a strategy for solving a problem of Islamic Education. Teachers are expected to familiarize students with working on HOTS-oriented Islamic Education subject questions in a coherent manner from understanding the questions, planning problem solving, implementing the plan, and reviewing the truth of problem solving. So that when students find various kinds of Islamic Religious Education questions, students can solve them properly and correctly.

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