PENSA E-JURNAL : PENDIDIKAN SAINS
https://ejournal.unesa.ac.id/index.php/pensa

Vol. 9, No. 3
Hal. 429-432
Desember 2021

HIGH ORDER THINKING SKILL OF MUHAMMADIYAH JUNIOR HIGH SCHOOL STUDENT IN SCIENCE LEARNING

Hasna Muhandisah[1], Dhita Ayu Permata Sari[2], Erman[3]*

[1,2,3] Undergraduate Program in Science Education, Faculty of Mathematics and Natural Science, Universitas Negeri Surabaya
*E-mail: erman@unesa.ac.id

Abstract

High Order Thinking Skills (HOTS) is a student's thinking process at a higher cognitive level from various concepts and methods in the learning taxonomy. HOTS learning can improve student thinking skills at a higher level. Teachers have a very important role in making students skilled in solving problems so that they are required to be able to apply learning that can train students to think at higher levels (HOTS). This study aims to know high order thinking skills of Muhammdiyah Junior High School student in science learning. Participants in this study were 58 students from Muhammadiyah Junior High Schools in Jombang Regency. This study used a descriptive qualitative research with test of LOTS and HOTS. The results of the data show that students are able to work on HOTS questions only up to the analysis, namely C4. However, students are already good at working on C1, C2 and C4 questions with a percentage above 70%, it is high. Students have not been able to think at high levels at stages C5 and C6 because the teacher rarely teaches and asks questions at the application and development.

Keywords: *HOTS, student, science learning*.

How to cite: Muhandisah, H., Sari, D. A. P., & Erman. (2021). High order thinking skill of Muhammadiyah Junior Highschool student in science learning. *Pensa E-Jurnal: Pendidikan Sains*, *9*(3). pp. 429-432.

INTRODUCTION

Education is the most important aspect in improving quality human resources. Education guides people to think critically, creatively, innovatively and productively. Therefore, Curriculum 2013 requires students to think critically. In the 21st century, learning is oriented towards Higher Order Thinking Skills (HOTS). Higher order thinking skills is needed by educators, in order to measure and determine the readiness and student ability in higher order thinking activities. One part of HOTS is the ability to think critically (Arifin, 2017). Curriculum 2013 develops critical thinking skills, creative, communicative, collaborative and wise in choosing decisions in the face of problems.

The government hopes that learners will be able to improve their skills in high order thinking skills with the 2013 curriculum. Thinking skills can be classified into lower level thinking skills (LOTS) and higher order thinking skills (HOTS). LOTS are the first three aspects of taxonomic development, namely knowledge, comprehension, and application, while HOTS are three highest levels of taxonomic development (Stanley, T., Moore, 2010).

HOTS learning directs students to think independently, critically and be able to answer problems and problems around them (Sofyan, 2019). High order thinking skills ability is not only improved in cognitive aspects but also in improving students' skills and affective aspects (Fanani & Kusmaharti, 2014). Learning high order thinking skills is usually applied with maps concept, charts or HOTS questions given to students in order to find out how great the ability of students in solving problems and understand the questions given (Armiati, 2018).

Based on the results of PISA survey in 2018, students in Indonesia ranked the lowest scores on the measurement of reading, mathematics, and science (Tohir, 2019). The teacher's role in HOTS learning in schools is to change the learning mindset that is applied to a new pattern that optimally activates the potential and abilities of students by applying HOTS thinking skills (Kristiyono, 2018). Through strengthening the HOTS-oriented learning process it can improve students in critical thinking if the teacher always implements learning that makes students motivated to think at higher levels. Wahyuningsih (2018), adds HOTS-oriented learning processes input to produce the desired output, so it can be said that teachers play a major role in creating higher-order thinking in students. According to Fauziah (2020), teachers become an important aspect of learning in order to increase high

order thinking skills (HOTS) in students. If the teacher is not familiar with HOTS, then students are also unable to think at high levels (HOTS).

However, the fact is that the teaching carried out by the teacher is still lacking in developing students high order thinking skills, so that students not accustomed to understanding high-level questions. According to Narayan's research (2018) teachers have difficulty overcoming students 'different abilities, and lack understanding of certain ways of learning that support the development of students' higher thinking skills. So that's student are less capable of higher order thinking skills. In general, teachers expect students to be able to achieve and operate higher order thinking skills during class. Unfortunately, many students have difficulty reaching and operating HOTS (Santoso et al., 2018). So that's teacher must be accustomed to teaching using High Order Thinking Skills (HOTS).

Muhammadiyah Schools are private schools that have integrity and excel in the field of education in Jombang. According to Aly (2019), Muhammadiyah schools follow a curriculum that is in accordance with the government and adds an additional curriculum in the form of religion

Based on the background of the problem, then researchers are interested in conducting a study entitled "High Order Thinking Skill of Muhammadiyah Middle School Student in Science Learning" to find out how far students in high level thinking.

METHOD

This study uses qualitative descriptive research method with data collection. Descriptive qualitative is a research that intends to understand the phenomena experienced of the subject by analizyng the various conditions and situasion from variouse data collected and will be described trought sentences (Tohirin, 2012). Researchers want describes something to find or explain the relationship between variables.

The Participants in this study were 58 students from 8th grade at Muhammadiyah Junior High School in all Jombang regency, with an average age of 14 years old. The students are randomly selected from 6 Muhammadiyah Junior High School in Jombang so that there is no data imbalance in the study. Data collection technique used test and interview with the teacher. The test consists of a LOTS and HOTS question. The question consisted of question C1, C2, C3, C4, C5 and C6 according to the Taxonomy Bloom. The test material included question of biology and physics. The test carried out via GoogleForms due to Covid-19 pandemic.

To find out the average value of category at each level use the formula as follows;

$$X = \frac{\sum x}{\sum n} \times 100\% \quad (1)$$

Exp:
X = Percentage
x = Score
n = Total Student

Tabel 1 Criteria Score (%)

Score	Category
80-100	Very High
61-80	High
41-60	Standard
21-40	Low
0-20	Very Low

Resource: Modification Likert (Riduwan, 2008)

RESULT AND DISCUSSION

This research was conducted in 6 school 58 student as participant at Table 2.

Table 2 Demographic Data of Participant

School	Total Student	Class	Male	Female
SMP M 1	10	VII	4	6
SMP M 2	9	VII	3	6
SMP M 3	10	VII	5	5
SMP M 4	10	VII	3	7
SMP M 5	9	VII	4	5
Muhammadiyah Boarding School	10	VII		10

From the data in table 2, it is known that participant at Muhammadiyah Junior High School 1 were 10 students with 4 male and 6 female, while at Muhammadiyah Junior High School 2 there were 9 students with 3 male and 6 female students. Participating in Muhammadiyah Junior High School 3 were 10 students with 5 male and 5 female students, while at SMP Muhammadiyah 4 there are 9 students with 3 male and 7 female students. Muhammadiyah Junior High School 3 had 9 participants with 4 male and 5 female students, and the last school is Muhammadiyah Boarding School which has 10 female students as participants.

The results of the LOTS and HOTS questions were in accordance with the bloom taxonomy of 58 students shown in the Table 3.

Table 3 The Percentage of Student Correct Answer

Category	Correct Answer	Percentage
C1	45	77.6 %
C2	42	72.4 %
C3	31	53.4 %
C4	45	77.6 %
C5	23	39.7 %
C6	24	41.4 %

From Table 3 above, it can be seen how many students answered correctly at the bloom taxonomy levels. At level C1, it is known that 45 out of 58 students answered correctly. While at Level C1 42 student answered correctly, Level C3 31 Student answered correctly, Level C4 there are 45 students. Furthermore, at levels C5 and C6 there were 23 and 24 student who answered correctly. Therefore, student can answered Low Order Thinking Skills LOTS question

very well.

Results of student answers show high category cause more than 70% of students can work on questions at levels C1, C2 and C4. But they still have difficulty answering questions at levels C5 and C6. According to Putri (2019), students thinking ability is mostly at C2 level. The C3 level questions, students have difficulty working on questions because during the pandemic learning, applications (C3) in learning are rarely applied. At levels C5 and C6 students were not able to answer questions to evaluate and create. On the other hand, according to Astuti (2019) most of the student difficulties in solving High Order Thinking Skills (HOTS) questions lies in indicators C5 and C6, students have difficulty in concepts and problem solving.

According to the information of several teachers, learning during the pandemic the teacher rarely teach and provide questions at levels C5 and C6, only up to C4, namely analyzing. Because of the limitations of media and communication due to face-to-face learning. According to Mastura (2020), learning without face to face causes students to be slow to absorb learning, especially when viewed from the absorption of different learners. From Table 3. We knew the students were not maximal in high-level thinking, but students have been already very good at analyzing and working on questions up to stage C4.

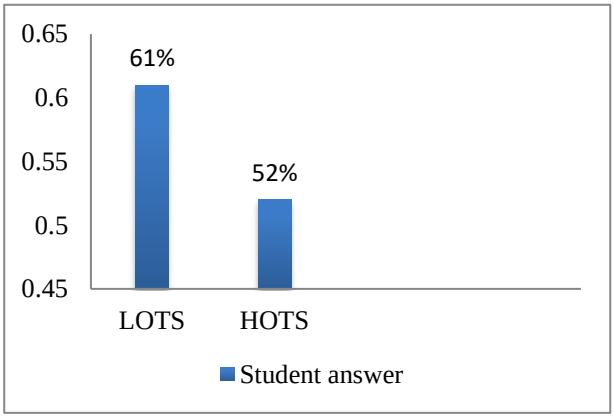

Figure 1 Percentage HOTS and LOTS

From the Figure 1, it can be concluded that students are better able to work on LOTS questions so that a high percentage is obtained, on HOTS questions, students got a moderate percentage or a standard percentage. Students already know and are able to work on HOTS questions but not in a good percentage. This is because teachers rarely do activities that increase student HOTS due to limited learning facilities during the pandemic and the teaching media that are made. In addition, students sometimes do not follow some of the material being taught due to limited electronic devices and the internet.

High Order Thinking Skill is the capability to think critically, logically, reflectively, metacognitive and think creatively. HOTS is an important aspect in the learning process. According to Hidayati (2017), thinking skills are main aspect in the educational process, one's thinking ability can affect the speed and effectiveness of learning. Therefore, thinking skills depend on the learning process (Tanujaya et al., 2017).

The purpose of HOTS is to improve students thinking ability, especially critical thinking skills when receiving various types of information, so that students use knowledge to solve problems and think creatively when making decisions in complex situations (Saputra, 2016). However, HOTS will not be achieved directly without intensive implementation (Woolley et al., 2018). Teachers have a very important role in encouraging students to acquire higher order thinking skills (HOTS) through learning. If the teacher cannot master HOTS, then it is certain that students cannot think HOTS. Therefore, the teacher must be able to teach and apply higher order thinking learning so that students can solve the problems.

CONCLUSION

Students are able to work on HOTS questions only up to the analysis, namely C4. However, students are already good at working on questions C1, C2 and C4 with a percentage above 70%, it is high. Students have not been able to think at high levels in stages C5 and C6 because the teacher rarely teaches and gives questions at the application and creation stages.

It is better if the teacher often applies and presents high-order thinking questions so that students get used to thinking critically

REFERENCE

Akdon & Riduwan. (2008). *Rumus dan Data Dalam Analisis Statiska*. Bandung : Alfabeta

Aly, A. (2019). Model Pengembangan Sekolah Muhammadiyah Berkualitas Melalui Transformasi Kurikulum Aik (Al-Islam dan Kemuhammadiyahan). *Profetika: Jurnal Studi Islam*, *20*(1), 41–53. https://doi.org/10.23917/profetika.v20i1.8947

Arifin, Z. (2017). Mengembangkan Instrumen Pengukur Critical Thinking Skills Siswa pada Pembelajaran Matematika Abad 21. *The Original Research of Mathematic*, I(2), 92–100. https://doi.org/10.31949/th.v1i2.383

Armiati, A. (2018). Mengembangkan Higher Order of Thinking Skill Melalui Pembelajaran Matematika pada Siswa Sekolah Menengah Kejuruan. *Jurnal LEMMA*, *4*(2), 7–19. https://doi.org/10.22202/jl.2018.v4i2.2729

Astuti, N., & Adirakasiwi, A. G. (2019). Analisis Kesulitan Siswa SMP dalam Menyelesaikan Soal HOTS (Higher Order Thinking Skill). *Prosiding Seminar Nasional Matematika Dan Pendidikan Matematika Sesiomadika* , 415–426. http://doi.org/10.32493/jsmu.v3i2.8674

Fanani, A., & Kusmaharti. (2014). Pengembangan pembelajaran berbasis HOTS (Higher Order Thinking Skill) di Sekolah Dasar Kelas V. *Jurnal Pendidikan Dasar*, *1*(9), 1–11. https://doi.org/10.21009/10.21009/JPD.081

Fauziah, U., & Fitria, Y. (2020). Increasing Higher-Order

Thinking Skill Of Elementary School Students Through Problem-Based Learning Peningkatan Kemampuan Berpikir Tingkat Tinggi Siswa Sekolah Dasar Melalui Proble. *Primary Jurnal Pendidikan Dasar*, *9*(2), 202–212. http://dx.doi.org/10.33578/jpfkip.v9i2.7881

Hidayati, A. U. (2017). Melatih Keterampilan Berpikir Tingkat Tinggi Dalam Pembelajaran Matematika Pada Siswa Sekolah Dasar. *Jurnal Pendidikan Dan Pembelajaran Dasar*, *4*(20), 143–156. https://doi.org/10.24042/terampil.v4i2.2222

Kristiyono, A. (2018). Urgensi dan Penerapan Higher Order Thingking Skills di Sekolah. *Jurnal Pendidikan Penabur*, 17(31), 36–46. https://bpkpenabur.or.id/jurnal

Mastura, & Santaria, R. (2020). Dampak Pandemi Covid-19 terhadap Proses Pengajaran bagi Guru dan Siswa. *Jurnal Studi Guru Dan Pembelajaran*, I(2), 634. https://doi.org/10.30605/jsgp.3.2.2020.293

Nurhayani, N., Syamsudduha, S., & Afiif, A. (2018). Kesulitan Guru Dalam Pengembangan Keterampilan Berpikir Tingkat Tinggi Siswa Dalam Pembelajaran Biologi Kelas XII di SMA Negeri 2 Gowa. *Jurnal Biotek*, *6*(1), 93. https://doi.org/10.24252/jb.v6i1.5153

Putri, I., & Ramadhani, K. (2019). Kemampuan Berpikir Abstrak Siswa Setelah Mengikuti Pembelajaran Saintifik *PENSA E-JURNAL : PENDIDIKAN SAINS*, *7*(3), 373–376. https://jurnalmahasiswa.unesa.ac.id/index.php/pensa

Santoso, T., Yuanita, L., & Erman, E. (2018). The role of student's critical asking question in developing student's critical thinking skills. *Journal of Physics: Conference Series*, 953. https://doi.org/10.1088/1742-6596/953/1/012042.

Saputra, H. (2016). *Pengembangan Mutu Pendidikan Menuju Era Global: Penguatan Mutu Pembelajaran dengan Penerapan HOTS (High Order Thinking Skills)*, SMILE"s Publishing.

Sofyan, F. A. (2019). Implementasi Hots Pada Kurikulum 2013. *Jurnal Inventa*, *3*(1), 1–9. https://doi.org/10.36456/inventa.3.1.a1803

Stanley, T., Moore, B. (2010). *Critical Thinking and Formative Assessments*. New York : Eye On Education Inc

Tanujaya, B., Mumu, J., & Margono, G. (2017). The Relationship between Higher Order Thinking Skills and Academic Performance of Student in Mathematics Instruction. *International Education Studies*, *10*(11), 78. https://doi.org/10.5539/ies.v10n11p78

Tohir, M. (2019). Hasil PISA Indonesia Tahun 2018 Turun Dibanding Tahun 2015, *Journal Ibrahimy* 10–12. https://doi.org/10.17605/osf.io/8q9vy

Tohirin. (2012). *Metode penelitian Kualitatif dalam Pendidikan dan Bimbingan Konseling*. Surabaya : PT Raja Grafindo Persada.

Wahyuningsih, Y., Rchmawati, I., Setiawan, A., & Ngazizah, N. (2018). HOTS (Higher Order Thinking Skills) dan Kaitannya dengan Keterampilan Generik SAINS dalam Pembelajaran IPA SD. *Prosiding Seminar Nasional Pendidikan Dasar*, 227–234. http://hdl.handle.net/11617/11203.

Woolley, J. S., Deal, A. M., Green, J., Hathenbruck, F., Kurtz, S. A., Park, T. K. H., Pollock, S. V. S., Transtrum, M. B., & Jensen, J. L. (2018). Undergraduate students demonstrate common false scientific reasoning strategies. *Journal Thinking Skills and Creativity*, 101–113. http://doi.org/10.1016/j.tsc.2017.12.004