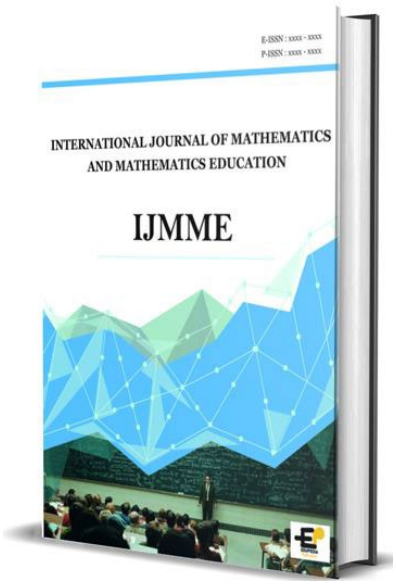

The Profile of High-order Thinking Skills of Junior High School Students

F.J. Susilo
Universitas Sebelas Maret, Indonesia

Usodo, B.
Universitas Sebelas Maret, Indonesia

Sari, DR.
Universitas Sebelas Maret, Indonesia

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The Profile of High-order Thinking Skills of Junior High School Students

Susilo, FJ., Usodo, B., Sari, DR.

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Abstract

Industrial revolution 4.0 requires various parties to develop their potentials, including in education. Students' thinking skills and abilities become one of the aspects that underpin the accomplishment of educational goals. One of the abilities that students must develop is the ability to think at a higher level. In learning Mathematics, higher-order thinking skills are pivotal in the teaching and learning process. This research aims to analyze the higher-order thinking skills of seventh-grade students at SMP Baitul Qur'an Boarding School. This research employed mixed methods, which involved 204 students from 6 classes as research subjects. The instruments used were a test developed by considering three cognitive domains, including analyzing, evaluating, creating, and an interview sheet. The results revealed that students' performances in the three cognitive domains were still in an inadequate category with the following results; 27% for analyzing, 24% for evaluating, and 20% for creating. The utilization of learning resources that did not meet the standards contributed to students' poor performance in higher-order thinking skills.

Introduction

The challenges of the 21st century and the development of science and technology during the 4th industrial revolution create a need for humans to continue honing their skills in a variety of areas, one of which is education. An excellent education is required for achieving prosperous growth [1]. Learning and education are closely linked, and one of the key components of learning is the study of mathematics, which is a subject that is taught in schools.

In Indonesia, mathematics is taught at every educational level, from childhood through high school and on to university. As students learn, arithmetic becomes one of the primary assessment factors used by instructors to gauge their students' aptitudes. Because pupils are essentially treated as a factor in the learning process in schools, which decides whether learning objectives are successfully attained [2], By performing an assessment to learn about the changes students have made, benchmarks of

student progress can be seen.

The different kinds of assessment include cognitive, emotional, and psychomotor studies [3]. The scholar will here concentrate on looking at pupils' cognitive understanding. The area that encompasses cerebral function (brain) is referred to as cognitive abilities [4]. The cognitive domain, which encompasses mental activity linked to comprehension, information processing, consideration, problem solving, conviction, and intentionality, is one of the areas of human psychology that is researched. [1].

Cognitive study has identified six stages of thinking processes, from the simplest to the most complex, including the capacities for recall, comprehension, application, analysis, synthesis, and creation. [5]. Lower Order Thinking Skills (LOTS) and High Order Thinking Skills are two cerebral elements that are prioritized in the cognitive realm. (HOTS). According to the updated Bloom's classification, LOTS contains the skills of remembering (C1), understanding (C2), and applying (C3), while HOTS is made up of three major skills: analysis (C4), synthesis (C5), and creation (C6).

The instructor must be able to accurately assess the nature and features of the content using their expertise when performing cognitive analysis of pupils [6]. The object depicted can also be used to evaluate cognitive complexity [7]. It is crucial to have a thorough understanding of children's cognitive growth in order to use it as a guide when conducting instruction and learning tasks [1]. Tests can be used to analyze cognitive skills, including multiple choice tests, short essays, and essays, but in this instance, essay questions are more suitable for carrying out high-level cognitive tests. [8]. It is essentially possible to analyze pupils' cognitive skills while they are learning [9]. It is anticipated that performing cognitive ability analysis will assist teachers in determining the degree of cognitive ability and the degree of pupil success. Additionally, by looking at cognitive skills, instructors may be able to help students develop a better mindset for problem-solving. According to this definition, study on students' cognitive capacities is required to ascertain how well they comprehend the content being taught.

Method

In this descriptive study, class VII pupils at SMP Baitul Qur'an Boarding School in Sambirejo had their cognitive aptitude traits analyzed to determine how well they learned arithmetic. Utilizing cognitive test tools that are only capable of measuring the three HOTS aspects of analysis, synthesis, and creation, students' cognitive skills are evaluated. A cognitive writing exam using learning material with 6 questions—two for each aspect—makes up the test instrument. 204 pupils from class VII at SMP Baitul Qur'an Boarding School in Sambirejo served as the study's participants. Purposive sampling was employed during the collection process. The information was gathered through the coding of each student's response and evaluation of each response using the scoring system that had been evaluated in accordance with the criteria. The pupils' scores for each component are then converted to percentages and tallied. Results of proportion study for categorizing. Table 1 shows the

percentage categorization group taken from [10].

No	Percentage	Category
1	81 – 100 %	Very Good
2	61 – 100 %	Good
3	41 – 60 %	Moderate
4	21 – 40 %	Low
5	0 – 20 %	Poor

Table 1 shows the cognitive ability categories of students

Results

Figure 1 shows the findings of a study on the thinking skills of class VII pupils at SMP Baitul Qur'an Boarding School Sambirejo.

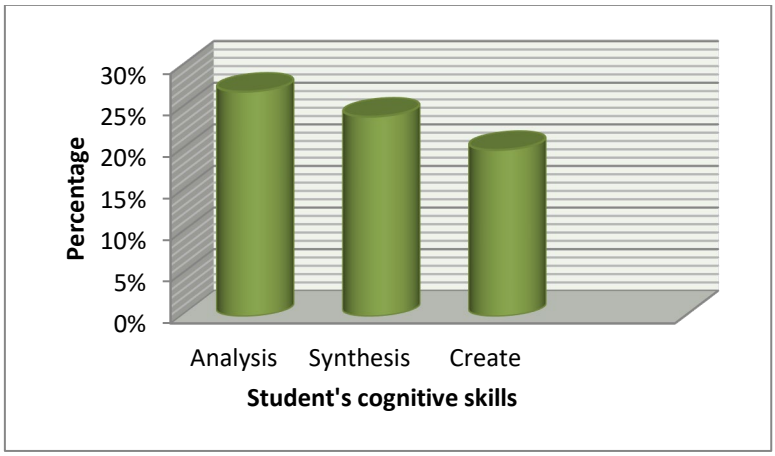

Figure 1: Students' thinking skills as a percentage

Every element has a distinct value, as shown in Figure 1. Skills in analysis and synthesis fall into the low group, whereas those in synthesis fall into the bad category. Given that students need cognitive skills to balance their thought processes with a variety of ideas, both abstract and tangible, these findings are undoubtedly not very good. [11]. According to the findings, 27% of the pupils' analytical abilities fall into the low group. This contradicts the Ministry of Education and Culture of Indonesia's declaration that pupils must possess strong critical abilities. Learning outcomes can be improved by students with strong analytical abilities, while learning outcomes can be hampered by students with weak analytical abilities [12]. Students are affected by low reasoning abilities in both the short and long terms. Long-term consequences include losing one's genius, while short-term effects include pupil learning results that continue to fall short of learning goals [13]. This is consistent with Albert Einstein's assertion that the human brain must be used for higher-order reasoning in addition to lower-level thinking.

With a percentage of 24%, synthesis aptitude is considered to be poor. This is consistent with Indonesian pupil synthetic ability statistics. Students from Indonesia were placed 36th out of 49 participants according to the 2007 TIMSS scores, scoring 405. The process of concurrently analyzing and judging different information sources by fusing freshly learned information with previously held knowledge is known as synthesis ability. to develop novel things [14]. The capacity for synthesis is crucial for students to possess because strong synthesis abilities can aid in problem-solving [15].

The ability to create is categorized as poor with a percentage of 20%. The capacity to create emphasizes the importance of analyzing, measuring, designing, and altering an issue in order to fix it [16]. The students' poor understanding of the provided topics contributes to their low level of creativity. According to [17], queries that are frequently used to gauge students' higher-order reasoning abilities tend to put more of a strain on memory. Due to the fact that they are accustomed to working on questions in the category of remembering, this will affect how well students are able to evaluate questions in the challenging category. Since divergent questions can improve students' flexibility in responding to high-level inquiries, they can be provided to students more frequently [18]. The amount of high-level question tasks can be increased, which will help pupils' HOTS skills. The PISA study findings [19] from 2009 to 2015 demonstrate how little higher order thinking was practiced by Indonesian pupils. This occurs because students are unprepared and unaccustomed to working on complex problems that meet the requirements of 21st-century abilities.

Students' high-order reasoning abilities must be instantly improved. It is necessary to raise the standard of education, both in terms of classroom instruction and the use of suitable learning materials and media. Innovation in education is required, particularly in terms of classroom infrastructure. Because using the proper learning resources will enable students to fully comprehend the subject matter. This is in line with [15], who holds the opinion that in order to maximize student learning outcomes, many other variables must also be taken into consideration, such as the position of the instructor and the environment in which the students are located.

Conclusion

According to the findings of the study, pupils still have poor levels of higher order thinking abilities, as evidenced by their 27% analytical ability, 24% synthesis ability, and 20% creation ability. the setting in which the pupils are.

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Author Information

Fery Susilo
Universitas Sebelas Maret, Indonesia
Jl. Ir Sutami No.36, Kentingan, Kec. Jebres,
Kota Surakarta, Jawa Tengah
Contact e-mail: *fery.sm4beqi@gmail.com*

Dewi Sari
Universitas Sebelas Maret, Indonesia
Jl. Ir Sutami No.36, Kentingan, Kec. Jebres,
Kota Surakarta, Jawa Tengah
Contact e-mail: *dewiretnoss@staff.uns.ac.id*

Budi Usodo
Universitas Sebelas Maret, Indonesia
Jl. Ir Sutami No.36, Kentingan, Kec. Jebres,
Kota Surakarta, Jawa Tengah
Contact e-mail: *budi_usodo@yahoo.com*