

Analysis Of The Absorption Of Science Learning In National Examinations In 2019 At The Junior High School Level In Sleman District

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Abstract: This study aims to describe the ability of students in national examinations in science learning in terms of their absorption. The method used in this study was a survey with a quantitative approach. The object of research is 146 junior high schools with a total of 14,983 students in the Sleman district. The data used were the national exam's absorption of science learning provided by the education assessment center of the ministry of education and culture. The results showed that the highest mean of absorption is in the material aspects of mechanics and the solar system of 71.60 which is classified as good category, while the lowest average is in the material aspects of waves, electricity and magnetism at 45.56 which is classified as fewer categories. In addition, the lowest mean on the indicator question about waves, electricity and magnetism is "presenting an illustration of two people with eye defects wearing glasses and then determining the ratio of reading distance between the two people" amounted to 28.39, which is classified as very poor category. From these results it can be concluded that the indicator questions about optical material in the ability to analysis are still very poor.

Keyword: Science Learning, National Examination.

1. INTRODUCTION

Education and progress of a nation are two related things [1]. To measure the quality of education in Indonesia, one of them is by conducting a national examination which is held every year at the end of the education period both from elementary school, junior high school and senior high school. Therefore, the school plays an important role in providing quality education services for the community and the nation [2], [3]. Student assessment through the national exam serves to measure the achievement of competencies possessed by students in accordance with graduate competency standards [4]. The assessment is carried out by providing tests in the form of multiple-choice questions divided into question composition based on cognitive level, 10% -15% for reasoning, 50% -60% for applications, and 25% -30% for knowledge and understanding [5]. Test results and assessments from national exams can be used as cognitive benchmarks of individual progress in the classroom [6], school curriculum reform tools [7], and a barometer of national education conditions [8]. As for teachers, the results of the national exam can be used In addition, for students, with the national exam can motivate to study harder [9], [10] and also measures the achievement of his knowledge and thinking skills [11] as a means of reflection towards the achievement of learning objectives more broadly [10], which can then create a number of methods and strategies and allocate a variety of learning resources needed to support the improvement of learning in the future. In this way the teacher can know the strengths and weaknesses of each student [12].

As for nationally it is used as a mapping of the quality of education unit programs [13]. However, this mapping function cannot be carried out optimally, so teachers do not objectively know the strengths and weaknesses of their students. This results in the non-optimal efforts to improve learning conducted by teachers and schools. Science material is one that is tested in national examinations at the junior high school level. Science is one of the subjects that occupies an important role in education [14], [15], because it can be equipped in facing various challenges in the global era [16]–[18]. Therefore, it is necessary to do an analysis of the absorption of national examination results, especially in science material at the junior high school level in Sleman district.

2. METHOD

2.1 Review Stage

This research is a survey research with quantitative approach [19]. The object of research is 146 public and private junior high schools in Sleman district with a total of 14,983 students. The data used are the results of the absorption of science subjects from the 2019 national exam sourced from the assessment and education center, the Ministry of Education and culture. Analysis of absorption data with descriptive techniques that refer to the criteria, as shown in Table 1 [20].

TABLE 1

CRITERIA FOR THE ABSORPTION RANGE OF NATIONAL EXAMINATION

Absorption range	Criteria
Average National Examination >75.0	Very good
65.0 < Average National Examination ≤ 75.0	Good
55.0 < Average National Examination ≤ 65.0	Medium
45.0 < Average National Examination ≤ 55.0	Less
Average National Examination ≤ 45.0	Very less

Furthermore, students' scores on the 2019 national science exams in Sleman district are grouped into three groups: high, medium and low ability groups. Grouping is done using the rules of value conversion with Norm Reference Reference [21] as shown in Table 2.

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TABLE 2

CRITERIA FOR THE ABSORPTION RANGE OF NATIONAL EXAMINATION

Ability Level	Average Score
High Ability: Average Value $> \mu + 0.5\sigma$	Average Value > 70.00
Medium ability: $\mu - 0.5\sigma \leq$ Average Value $\leq \mu + 0.5\sigma$	$55.01 \leq$ Average Value ≤ 70.00
Low Ability: Average Value $< \mu - 0.5\sigma$	Average Value < 55.00

3. RESULT AND DISUSSION

Based on 146 junior high schools which are the object of research, it can be classified according to the type of educational unit, as shown in Table 3.

TABLE 3

RESEARCH OBJECT DATA BY TYPE OF EDUCATION UNIT

Type of school	Count of Schools	Number of participants	Average value	Criteria
SMP Negeri	54	7,693	69.76	Good
SMP Swasta	62	4,575	53.43	Less
MTs Negeri	10	1,555	59.31	Medium
MTs Swasta	18	1,142	57.35	Medium
SMP Terbuka	1	17	46.03	Less
Total	146	14,983	62.72	Medium

Based on Table 3, information is obtained that the scientific average of the national examination results is obtained by the Public Middle School group and the lowest from the Open Public Middle School. In addition, there are still differences in learning outcomes between public and private schools both under the Ministry of Education and Culture or under the Ministry religion [22]. Therefore it is the responsibility of the government to be able to provide equal educational services both public and private so that student learning outcomes are not much different, because schools are institutions that have an important role in advancing the quality of human resources and the nation [2]. From these results it also makes the community still tends to put their children into public schools compared to private schools [23], [24], because they still think that they are more qualified in public schools, one of which is the indicator seen from the results of the national exam scores. The results of the national examinations of science subjects at the junior high school level in 2019 in Sleman district can be statistically descriptive shown in Table 4.

TABLE 4

DESCRIPTIVE STATISTICS OF THE NATIONAL SCIENCE TEST SCORES IN SLEMAN DISTRICT IN 2019

Statistic	Value
Average	62.72
Minumum	15.00
Maximum	100.00
Standard deviation	17.17

In detail the results in table 4, can be seen through the distribution of the national science student test scores presented in Table 5.

TABLE 5

DISTRIBUTION OF SCIENCE SCORES IN THE NATIONAL SCIENCE EXAM IN 2019 IN SLEMAN DISTRICT

Value Range	Count	Percentage (%)	Ability level
0.00-5.00	-	-	-
5.01-10.00	-	-	-
10.01-15.00	1	0.01	Low
15.01-20.00	7	0.05	Low
20.01-25.00	59	0.39	Low
25.01-30.00	231	1.54	Low
30.01-35.00	500	3.34	Low
35.01-40.00	833	5.56	Low
40.01-45.00	1,221	8.15	Low
45.01-50.00	1,418	9.46	Low
50.01-55.00	1,505	10.04	Low
55.01-60.00	1,506	10.05	Medium
60.01-65.00	1,500	10.01	Medium
65.01-70.00	1,375	9.18	Medium
70.01-75.00	1,243	8.30	High
75.01-80.00	1,098	7.33	High
80.01-85.00	906	6.05	High
85.01-90.00	723	4.83	High
90.01-95.00	442	2.95	High
95.01-100.00	415	2.77	High

Table 5 shows that the number of students with low ability totaled 5775 or (38.54%), students with moderate ability totaled 4381 or (29.23%) and students with high ability amounted to 4827 or (32.21%), based on grouping criteria student abilities according to Table 2. Furthermore, in the aspect of science material students' absorption capacity in the 2019 national exam is shown in Table 6

TABLE 6

ABSORPTION OF SCIENCE MATERIAL IN THE 2019 NATIONAL EXAM

Material tested	Districts	Province	National
Measurements, Substances, and Their Properties	63.26%	61.13%	47.47%
Mechanics and Solar System	71.60%	69.79%	53.04%
Waves, Electricity and Magnetism	45.56%	44.52%	32.19%
Living things and Their Environment	71.38%	69.93%	56.39%
Structure and Function of Living Things	63.57%	62.29%	50.41%

Table 6. Table 6 shows that in each of the materials tested, it was seen that the percentage at the district level was higher than the provincial level, and the national level. Related to the scientific material being tested, the material Waves, electricity, and Magnetism is the material that is answered lowest among other materials both at district, provincial and national levels. At the district level, it only reached 45.56%, at the provincial level it only reached 44.52% and at the national level it only reached 32.19%. More deeply, the level of absorption based on indicators tested at all levels of public/private SMP/MTs in Sleman district in 2019 in science subjects is shown in Table 7. Table 7 shows that for each of the indicators tested, it was seen that the percentage at the district level was higher than at the provincial level, and at the national level. In relation to the science indicators tested, the indicators in sequence number 19 are the lowest answered indicators among other indicators

TABLE 7
ABSORPTION INDICATORS OF THE 2019 NATIONAL EXAMINATION IN SCIENCE SUBJECTS

S.N.	Tested Indicator	District	Province	National
1	Determining the principal quantities that make up the amount of the derivative	59.66%	56.88%	45.07%
2	Identifying the properties of objects based on the table	78.14%	75.89%	59.32%
3	Presenting several events changing form. Determining two changes in form that release/require heat	71.21%	67.77%	48.47%
4	An illustration of the results of temperature measurements using a certain scale thermometer is presented. Converting temperature to another scale thermometer	63.16%	58.49%	44.58%
5	Presenting table of test results of the test solution with litmus paper. Indicating acid, base or salt solutions precisely	67.78%	66.02%	46.87%
6	Expressing statement. Identifying physical or chemical changes correctly	67.37%	67.16%	53.67%
7	Expressing atomic image. Sorting protons, neutrons and electrons precisely	74.92%	70.80%	53.71%
8	Presenting examples of substances/drugs. Classifying the content of addictive-psychotropic substances appropriately	63.32%	62.39%	56.27%
9	Presenting illustration, Determining the method of separation of the mixture appropriately	43.75%	43.57%	31.98%
10	An illustration about a ship sailing while loading goods is presented. Determining the maximum amount that can be transported	43.30%	42.32%	34.72%
11	Presenting images of toy cars moving on three tracks down, flat, up. Determining the appropriate velocity graph (v) of time (t)	70.79%	68.63%	42.94%
12	Presenting four beam images, each subject to three styles with a certain value. Determining the biggest and smallest acceleration	79,22%	76,61%	49.46%
13	Determining people who can help push objects to move a certain distance	85.14%	83.65%	73.99%
14	Expressing a picture of a hanging bar and four weights are placed depending on the road. Determining the action so that the state of the rod is balanced	41.22%	39.46%	31.15%
15	Determining the characteristics of the two planets presented in the table	78.94%	77.28%	60.07%
16	Presenting a diagram of the earth's circulation to the sun. Explaining the conditions of day and night in the northern and southern hemisphere	74.30%	73.08%	60.63%
17	Presenting illustration of objects that are above the waves of sea water. Calculating one of the quantities	47.31%	46.32%	31.74%
18	Presenting a diagram of an object located between two mirrors that form an angle. Determining the number of shadows produced	49.78%	49.45%	26.76%
19	Presenting illustration two people with eye defects using glasses. Determining the reading distance comparison between the two people	28.39%	28.35%	26.91%
20	Presenting illustrations of electric loading events. Determining the process of losing/receiving electrons which are presented in tabular form	60.25%	58.76%	40.29%
21	Presenting a series of drawings consisting of 3 obstacles arranged in series, parallel, and combined. Determining the amount of strong current in the circuit	54.12%	51.18%	38.76%
22	Being able to calculate the power tool if it is connected to a certain electrical voltage value.	32.08%	31.75%	26.50%
23	Presenting transformer diagram. Determining the value of one of the quantities and types of the transformer	47.01%	45.79%	34.37%
24	Determining images that show three (3) characteristics of living things.	86.73%	85.49%	71.21%
25	Mentioning the biotechnology process in processing certain foodstuffs	62.21%	61.16%	50.07%
26	Determining the type of interaction of the two components in the ecosystem	59.99%	58.60%	43.23%
27	Explaining the strengths/weaknesses of the efforts made to overcome environmental damage.	70.37%	69.67%	66.41%
28	Explaining the natural selection process in a given case	62.48%	59.73%	45.86%
29	Analyzing a more stable ecosystem if one and the same organism in both ecosystems becomes extinct with reasons	86.48%	84.93%	61.52%
30	Explaining the characteristics of blood vessels	56.14%	54.70%	45.66%
31	Identifying the excretion system that plays a role in the process of secretion of metabolic substances	80.81%	80.16%	70.79%
32	Identifying reproductive organs that undergo a particular process.	81.78%	80.79%	63.72%
33	Explaining how the bones / muscles / joints that support certain movements work	67.68%	66.15%	52.89%
34	Explaining the process of digestion that is disturbed due to certain diseases	54.60%	53.50%	41.47%
35	Explaining the purpose of human breathing experiments	62.58%	63.32%	48.02%
36	Analyzing data from photosynthetic experiments based on certain variables	70.77%	69.12%	57.56%
37	Identifying the relationship between cells, tissue, and tissue function	69.17%	66.24%	53.39%
38	Explain the factors that drive the transportation process in transport experiments on plant stems	52.91%	51.97%	42.80%
39	Identify the type of gamete that forms in crosses with 2 different properties	42.09%	39.97%	31.86%

S.N.	Tested Indicator	District	Province	National
40	Explain the relationship between organ systems in humans	60.74%	59.26%	46.35%

28.36% and at the national level it only reached at the district, provincial and national levels. At the district level it only reached 28.39%, at the provincial level it only reached 26.91%. More deeply if it is noted that the indicator is included in the realm of reasoning ability in the aspect of thinking analysis of a contextual problem and requires problem solving. The indicators tested in the 2013 curriculum are found in optical material in eighth grade junior high schools. This shows that optical material is still considered difficult by most students in Sleman compared to other material [25] and also because it is calculating and applying mathematical formulas [26]. Students also experience difficulties when dealing with problems that are equipped with tables, pictures, diagrams, and graphs, because they are not yet skilled in processing information from various visual displays. This is seen as in the achievement of the indicator absorption capacity of problem number 14th with the indicator "presented a picture of a hanging bar and four loads placed depending on the stem, Determine the action so that the state of the rod is balanced", the stem problem as shown in Figure 1.

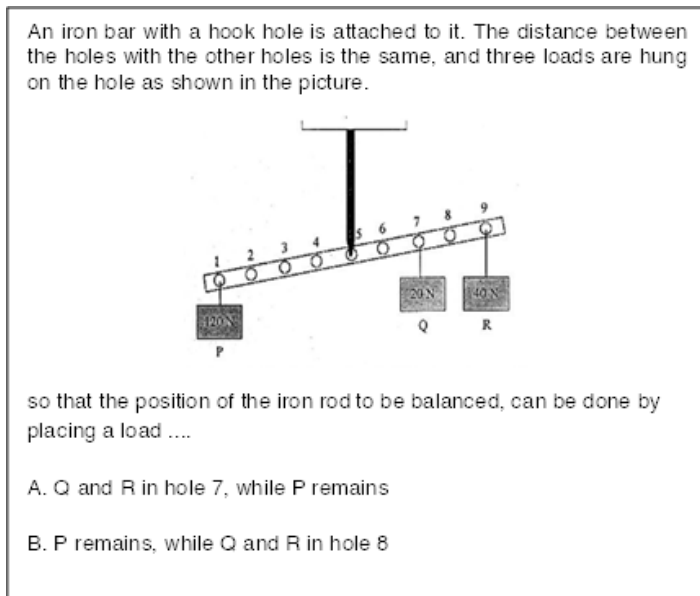


Fig. 1. Examples of science questions at the 2019 national exam followed by one space. It is good practice to briefly explain the significance of the figure in the caption.

From table 7, it is known that the absorption of students who answered correctly to the question at the district level was only 41.22%, at the provincial level at 39.46% and at the national level at 31.15%. Students also have difficulty when solving reasoning problems in the form of comparisons involving a number of physical quantities, because they are more likely to solve problems with numerical/ mathematical analysis (directly doing calculations) than physical conceptual analysis [27]. Even though the mathematical calculation can actually be a source of complexity in solving problems.

4. CONCLUSION

Successful analysis of the absorption of science subjects through the 2019 national exam in Sleman district reveals the mapping of the achievements of public and private schools, the distribution of students' abilities in the low, medium and high categories as well as topics or competencies mastered and not yet mastered by students. Consequently, in learning science, students need to be trained in multi-representation skills, including verbal, visual, symbolic, and mathematical, through learning models that are activity-based, both hands-on activities and minds-on activities. In addition, students need to be facilitated to conduct simple investigations, collect and organize information; make interpretations and inferences, formulate conclusions, and make data-based decisions.

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