JURNAL EDUSCIENCE (JES)
p-ISSN : 2303 - 355X | e-ISSN : 2685 - 2217
PUBLISHED BY : LPPM of UNIVERSITAS LABUHANBATU

Jurnal Eduscience (JES)
Volume 10, No. 1
April 2023
Submit : 01 February 2023
Accepted : 5 April 2023

DESCRIPTION OF SCIENCE PROCESS SKILLS OF CLASS VIII STUDENTS OF SMPN IN MAKASSAR CITY

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Abstract

This study aims to describe how big the science process skills of students in class VIII SMPN Makassar city. This research is descriptive correlative with a population of all students of class VIII SMPN Makassar which amounted to 4178 students while the sample amounted to 364 students. The instrument used is a test of science process skills on the material of the human respiratory system in the form of multiple choice. The data collection technique is giving tests to students via google form on even semester VIII class material. The results obtained are the scientific process skills of students in class VIII SMPN Makassar in the human respiratory system material are in the low category.

Keywords: *science process skill*

Abstrak

Penelitian ini bertujuan untuk mendeskripsikan seberapa besar keterampilan proses sains peserta didik kelas VIII SMPN sekota Makassar. Penelitian ini adalah deskriptif korelatif dengan populasi seluruh peserta didik kelas VIII SMPN sekota Makassar yang berjumlah 4178 peserta didik sedangkan sampel berjumlah 364 peserta didik. Instrumen yang digunakan berupa tes keterampilan proses sains pada materi sistem pernapasan manusia dalam bentuk pilihan ganda. Teknik pengumpulan data yaitu pemberian tes kepada peserta didik melalui google form pada materi kelas VIII semester genap. Hasil penelitian yang diperoleh adalah keterampilan proses sains peserta didik kelas VIII SMPN sekota Makassar pada materi sistem pernapasan manusia berada dalam katagori rendah.

Kata Kunci: keterampilan proses sains

INTRODUCTION

The essence of science education involves students in scientific investigations consisting of attitudes, ways of thinking and various aspects procedure in scientific activities so as to obtain a product and knowledge of science. Students must be able to integrate skills, knowledge and attitudes to develop a better product and knowledge of science. This can be improved by developing science process skills. According to Mahmudah et al (2019), science process skills are a mandatory tool for students to produce and use scientific information in the process of investigation, solving problems, discovering concepts, principles, and developing theories on existing concepts.

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Science process skills are a part of thinking skills used by scientists, teachers or students in learning science. Delivery of teaching science facts needs to utilize science process skills effectively to train students in thought processes and scientific attitudes. This is because Natural Sciences (IPA) does not just discuss knowledge, but also learns how to systematically understand the environment so that scientific process skills are needed to encourage students to acquire knowledge and disseminate what has been obtained (Turiman et al, 2012).

The ability of students to apply various scientific methods to understand, develop science and find various scientific information is called science process skills (Lestari et al , 2020). Every student has basic abilities so that it is necessary to develop them through a learning approach that is oriented towards science processes or known as science process skills. Students can develop scientific attitudes and skills in solving problems through the science process skills approach, so that students can understand concepts and material well during the learning process.

Science process skills need to be developed to gain understanding that can last for a very long time so that students can think critically to obtain good solutions in dealing with all kinds of problems, especially in the 21st century. (Abungu et al, 2014). According to Rustaman (2015), if someone wants to develop scientific knowledge and methods, it is necessary to master a number of science process skills.

Based on this, it can be concluded that science process skills are a learning approach that requires students to be active in every learning process so that they can train self-confidence and provide opportunities to express their opinions in solving problems both individually and in groups so as to train critical and creative reasoning abilities. In addition, students are able to apply, develop and discover various methods and scientific knowledge with a science process skills approach.

Skills are divided into two groups, namely basic science process skills and skills integrated science process. Basic science process skills consist of observation, classifier, communication, measurement, inference, and forecasting (Hamadi et al, 2018). Skills the integrated science process consists of identifying variables, identifying tabulations, identifying graphs, describing variable relationships, acquiring and processing data, analyzing investigations, formulating hypotheses and conducting experiments or experiments (Toharuddin et al, 2011). The goals to be achieved from science process skills can be obtained from different types of skills. The higher the goal to be achieved, the more types of skills to be developed.

The condition of students' science process skills in several regions of Indonesia is quite varied. Elvanisi et al (2018) said that the KPS percentage of students in the Bukit Kecil Palembang sub-district was quite good, while the KPS percentage results for students in Ilir Barat 1 Palembang were also in the

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fairly good category. In line with the results of this study, Yunita and Nurita (2021) stated that the KPS at SMPN 58 Surabaya was quite good. In line with this, Aswar et al (2019) found that the KPS of students in Jeneponto Regency was in the sufficient category. Research on science process skills was also carried out by Lestari et al (2020) with the results of students' science process skills at SMPN 40 Makassar in the sufficient category. Based on this description, it can be concluded that KPS in Indonesia needs to be improved. This is because students need science process skills to construct knowledge and apply it to science problems in everyday life.

Science process skills are important for students to learn how to apply science rather than studying reality, concepts, generalizations, theories and laws in learning science. In addition, KPS provides meaningful learning by finding, interpreting, and assessing evidence in the different conditions they face. Students will have difficulty interpreting the knowledge they have if the KPS is not sufficiently developed. For example, students cannot understand an event that occurs if scientific evidence is not collected (Karamustafaoglu, 2011). In addition, students will not be able to apply various methods in understanding, developing and discovering knowledge if KPS is not sufficiently developed.

Science process skills are skills that are able to reflect a scientific attitude in a person and skills that can be used for various kinds of knowledge purposes. The learning process with the KPS approach is important to always be developed in every lesson because students need to gain new knowledge, not just learn about what already exists. This is in line with Yunita's opinion (2021), when students are given a problem, they are more active and more creative by associating lessons with every thing that happens in their daily life

RESEARCH METHODS

Type of research is descriptive research to collect information about the science process skills of class VIII SMPN Makassar city. The research was carried out at SMPN in the city of Makassar from July to August in the odd semester of the 2022/2023 academic year on the subject of the human respiratory system. The population of this study were all students of class VIII SMPN Makassar city of 4150 students. The sampling technique used was Statified Random Sampling and the determination of the sample size was determined proportionally based on the Yamane formula with a total sample of 364 students.

The research instrument consisted of science process skills tests which had been analyzed for the validity of the questions to produce valid questions using content validation tests and item validation tests. The content validation test taking into account the expert's assessment was declared valid with a

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very high category so that the instrument could be used. All items that were approved by the expert were then tested on class VIII students at other junior high schools which were not the research locations with the results obtained that 15 out of 20 questions were valid. Data on science process skills was obtained by administering a science process skills test in the form of *multiple choises* with 15 questions. The criteria for categorizing science process skills can be seen in table 1 below.

Table 1. Guidelines for categorizing science process skills

MASTERY LEVELS	CRITERIA
$13.5 \leq x$	Very high
$11.25 \leq x < 13.5$	Tall
$7.5 \leq x < 11.25$	Currently
$3.75 \leq x < 7.5$	Low
$0 \leq x < 3.75$	Very low

(Sugiyono, 2015)

Research data on students' science process skills tests were obtained from a research sample in the form of quantitative data which was processed using descriptive statistical analysis techniques aimed at describing the science process skills abilities of class VIII students of SMPN in Makassar city .

RESULTS AND DISCUSSION

Analysis of the test results on the material of the human respiratory system shows that the average score of science process skills is 7 as based on Table 1, which is included in the low category. Table 2 shows the results of descriptive statistics on science process skills at SMPNs in the city of Makassar.

Table 2. Analysis results descriptive science process skills

No	Statistics	Results
1	Number of Respondents	364
2	Highest Score	14
3	Lowest Score	2
4	Maximum Ideal Score	15
5	Minimum Ideal Score	0
6	Average	7
7	Standard Deviation (SD)	2.52

Table 3 shows the average results of the analysis for each indicator of the science process skills of class VIII students of SMPN in the city of Makassar.

Table 3. Analysis results indicators of science process skills

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Indicator	Question Number	Total Score	Number of Respondents	Average Score	Category
Observe	1,2,3	638	364	1,7	Currently
Grouping	5,12,6	481	364	1,3	Low
hypothesis	7,8,9	443	364	1,2	Low
Designing Experiments	10,11	363	364	1	Low
communicate	13	91	364	0.25	Low
Formulate Problems	14,15,4	516	364	1,4	Low

Based on Table 3, the percentage analysis results of science process skill indicators for class VIII students at SMPN in the city of Makassar, can be presented in the form of a bar chart in Figure 1.

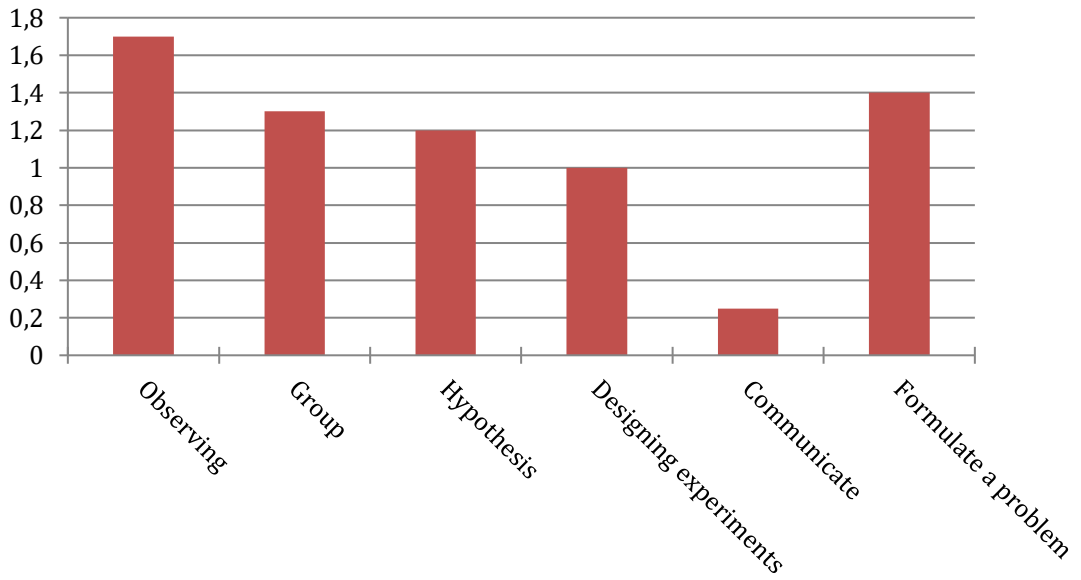

Figure 1 . Bar chart of the results of the analysis of the science process skill indicators for class VIII students at SMPN in the city of Makassar

Acquisition of research data related to science process skills on indicators of observing, classifying, making hypotheses, designing experiments, communicating and formulating problems obtained by calculating the average value of achievement of science process skills indicator test results can be seen in Table 3 Based on the results of science process skills data analysis shows that the science process skills of class VIII students of SMPN in the city of Makassar have an average that is included in the low category.

Based on Figure 1, the lowest students' science process skills are communication skills spread over number 13 which has an average value of 0.25 in the low category. The results of this analysis indicate that students are rarely involved to be skilled in communicating so that students are not yet able to

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explain a problem. This is in accordance with the statement of Nurhasanah et al (2019), that learning by applying communication indicators makes students trained to ask and answer questions and is always active in explaining a given problem. In line with this, Siswanto et al (2016), teachers never direct students to write experimental results in written form or reports which unknowingly lead to low students' communication skills.

Based on Figure 1, the second lowest science process skill is the skill of designing experiments which are spread over numbers 10 and 11 which have an average value of 1.0 with a low category. The results of the analysis show that students have not been able to design an experiment properly. Therefore, practicum activities are very important to do in order to improve the quality of skills in a scientific experiment. Siswanto et al (2016), stated that the low skill of designing experiments was due to the fact that teachers rarely invited students to carry out an experiment due to demands on concept mastery. In line with this, Mutmainnah et al (2019) stated that by carrying out practicum activities in a continuous and experimental manner, students could improve the quality of their skills in designing scientific experiments.

Based on Figure 1, the skill of formulating hypotheses is spread over numbers 7, 8 and 9 with an average value of 1, 2 in the low category. The results of the analysis show that In practicum activities, students are less involved. This is in accordance with the statement of Liandari et al (2017), that the practicum method with a science process skills approach can improve students' ability to formulate hypotheses. Hypothesized activities can support the achievement of one of the competencies that must be achieved in learning and improve scientific thinking skills. Rohmah and Andi (2022), students were trained to make hypotheses independently of the problems presented so as to foster curiosity and enthusiasm in obtaining data in experiments. In line with this, Mahmudah (2016), deductive reasoning based on theory or inductive reasoning based on observed data can assist in developing a hypothesis.

In Figure 1, information is obtained that the scattered grouping skills at numbers 5, 12 and 6 have an average value of 1, 3 with a low category. The results of this analysis indicate that students have not been able to find similarities, differences and mutual relations between objects, so it is necessary to improve quality in the classification process. This is in accordance with the statement of Nurhasanah et al (2019), that science process skills are seen if students are able to find similarities and differences from a given object, because grouping is a systematic way to organize objects into a series of certain groups. In line with this, Muthaminnah et al (2019) that students will find it difficult to acquire a concept in processing various data without grouping skills.

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In Figure 1, information is obtained that the problem formulating skills are spread over numbers 14, 15 and 4 have an average value of 1, 4 with a low category. The results of the analysis indicate that students are less involved in practicum activities. This is in accordance with the statement Yunita et al (2021), that by increasing the ability to find and solve problems students will gain knowledge that comes from an invention, so it is necessary to invite students to carry out practical activities to train skills in formulating problems.

In Figure 1, information is obtained that the observation skills are scattered in numbers 1, 2 and 3 have an average value of 1, 7 in the moderate category. The results of this analysis indicate that students have not been able to use all of their senses to observe a given problem. According to Yunita et al (2021), that in scientific investigation activities students need to have basic skills, namely skills in observing using all the senses they have. In line with this (2016), Mahmudah stated that observing is an activity of using a tool or material as a tool to observe objects in the context of collecting data or information, identifying the characteristics of certain objects with their senses carefully and using relevant and adequate facts from observations.

Based on this description, it can be concluded that the ability of students in each indicator of science process skills is different. The average ability of students on each KPS indicator is included in the low category, namely 7. The achievement of a low KPS score is due to the concept aspect of measuring the success of education in schools. So far, students have not trained students' skills because learning science at school tends to hone aspects of memory and understanding only. Yulianti (2016), that science process skills have not been optimally applied to science learning. In line with this, Sukarno (2013) stated that there were many factors that led to low science process skills, including teaching and learning activities that were still traditional and competency tests only focused on the use of scientific concepts, so that science process skills were not explored.

Each student already has aspects of science process skills within each individual, so that during the learning process it is necessary to train these skills so that students can apply them in everyday life (Aritonang & Safitri, 2021; Hariati et al., 2020; Mansah & Safitri, 2022; Romaito et al., 2021; Safitri et al., 2019). The science process skills approach in science learning makes students not only recipients of information, but also information seekers which requires them to be active and skilled in managing their experiences and learning outcomes with practicum activities. Hala et al (2015), the knowledge construction process occurs when in the data collection process students are actively involved in conducting experiments and observations and drawing conclusions from the results of the discussion.

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Learners are able to reflect on their own experiences and try to apply previous lessons because practicum activities are related to skills in learning science. Practicum activities support the implementation of a scientific approach, so as to provide experience for students in developing aspects of skills while following each stage of the practicum process. In addition, practicum activities familiarize students to follow the process and make observations that can develop science process skills (Satriani & Hardiyanti, 2020).

CONCLUSION

Based on the results of the research and discussion, it can be concluded that the science process skills of class VIII students of SMPN in Makassar city on the subject of the human respiratory system are in the low category, with an average score of 7.

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