

Analysis of Student's Science Process Skill on Respiration System Topic in Langsa City- Aceh

Ajeng Lola Prianti

Biology Department
Postgraduate Program of Universitas
Negeri Medan
Medan, Indonesia
ajenglolaprianti@gmail.com

Melva Silitonga

Biology Department
Postgraduate Program of Universitas
Negeri Medan
Medan, Indonesia
melvasilitonga@unimed.ac.id

Tumiur Gultom

Biology Department
Postgraduate Program of Universitas
Negeri Medan
Medan, Indonesia
Tumiurgultom@unimed.ac.id

Abstract— This research was conducted to find out 1) student's science process skills on human respiration system topic in Langsa city, 2) student's science process skills on human respiration system topic according to the school locations in Langsa city, 3) student's science process skills on human respiration system topic according to student's gender in Langsa city. This research was Ex Post Facto, where student's science process skills data was collected by using essay test. Result obtained was 1) student's science process skills in Langsa City was categorized as High (74,02). 2) Based on school locations, student's science process skills in rural regions of city (73,18) was lower compared to urbanized regions (75,28). 3). Further, there was no significant difference between male (71,59) and female students in science process skills (74,55).

Keywords— Analysis, Science Process Skills, Human Respiration System

I. INTRODUCTION

Science in essence is a product and process (Toharuddin, 2011). Science education has significant role in preparing students to overcome problems in real world. Biology learning as one of science education has goal to develop student's character, as human with tolerance with other people and with environment. Science process skills are overall directed scientific skills (both cognitive and psychomotor) that can be used to find a concept or principle or theory, to develop existing concepts, skill means the ability to use thoughts, reason, and actions efficiently to achieve a particular outcome, including creativity, (Dahar, 2011).

According to Karamustafaoglu (2011) science process skills are divided into two levels, namely basic science process skills and the integrated science process skills. Basic level process skills include: observation, classification, communication, measurement, prediction, and input (conclusion). In learning science, the best method is when

students actively participate in class and other relevant learning experiences, (Chebii, 2012).

Observations at 5 schools showed students have difficulty in answering questions provided by the teacher, it was seen from the results of learning which are mostly could not reach minimum standard score (score 80). This was proved by results of students daily test analysis, in which only 20% of students can answer teacher's questions. To gain better understanding of student's science process skills level, analysis of student's evaluation result needs to be done, include its difference in gender and school locations. Active involvement of all students in learning and improvement of student's science process skills are expected able to improve student learning outcomes.

In addition, the lack of science process skills is due to mechanistic learning in classroom (tend to be theoretical, teacher centered, transferring). Learning that tends to be theoretical, merely transferring knowledge to students and teacher-centered, resulting the lack of development on student's ideas which also resulting the lack of experience to fully understand concepts.

Gender differences might affect on various abilities of students. The characteristics of male students that commonly more lazy than female students will impact on their education, such as the lack of science process skills when learning at school. Female students usually more responsible in doing things and more diligent, therefore they are superior to male in this case. This gender difference also seems to affect the amount of student motivation for achievement.

The purpose of this study were to find out 1) twelve grader high school student's science process skills in human respiration system topic in Langsa city, 2) twelve grader high school student's science process skills in human respiration system topic according to the school locations in Langsa city, 3) twelve grader high school student's science process skills in

human respiration system topic according to student's gender in Langsa city.

II. METHODS

This research was considered as Expost Facto research. This research was held in June to November 2018 at five national senior high schools (SMA Negeri) in Langsa City (SMA Negeri 1 Langsa, SMA Negeri 2 Langsa, SMA Negeri 3 Langsa, SMA Negeri 4 Langsa and SMA Negeri 5 Langsa). Schools picked out were schools that has implemented K-13 curriculum in their curriculum.

The population of this study was all twelve grader senior high school students from national and private school in Langsa City, (1.938 students). By using *purposive sampling* method 30 students was picked out from one class in each school observed as sample of this study.

Research Instrument

Instrument used to gather data about student's science process skills was an essay test. The test consist of 10 questions, that was arranged based on 9 indicators of science process skills which are: observing, classifying, predicting, interpreting, asking questions, hypothesizing, planning experiment, applying concept and communicating. The test was developed according to Curriculum 2013 standard competence in human respiratory system topic, which covers several topics such as, structure, function and respiratory disorder.

Data analysis technique

Data was analyzed by using descriptive method with quantitative approach. Science process skills data was analyzed by using this formula:

$$S = \frac{R}{N} \times 100 \quad (\text{Purwanto, 2013})$$

Note:

S = student's science process skills score

R = score of student's correct answer

N = maximum score

The data of student's science process skills both based on gender and school locations then presented in descriptive analysis form.

III. RESULTS AND DISCUSSION

3.1 Result

1. Twelve Grader High School Student's Science Process Skills on Human Respiratory System Topic in Langsa City.

Based on data analysis of student's science process skills, it was found out that twelve grader student's science process skills in 5 schools in Langsa City was at high category, with mean scores 74,02. The result in five schools displayed in figure 1.

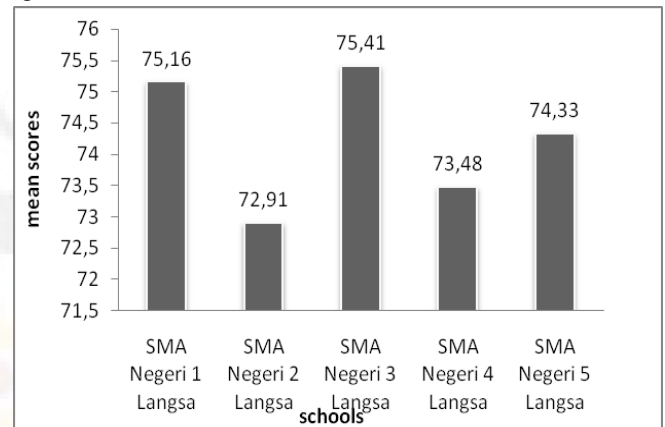


Fig. 1. Student's science process skills scores in 5 schools in Langsa City

The result shows the highest score in science process skills was obtained by students in SMA Negeri 3, and the lowest score obtained by students in SMA Negeri 2. Student's science process skills scores in SMA Negeri 3, SMA Negeri 1 and SMA Negeri 5 were at high category. However, student's science process skills scores in SMA Negeri 1 and SMA Negeri 5 was at moderate level.

2. Science Process Skills based on School Locations

Student's science process skills based on school locations in Langsa City displayed in Figure 2. Data analysis shows there was significant difference in science process skills between students whom school in rural part and urbanized part of Langsa City. It show schools in urbanized regions of Langsa City has students with higher science process skills compared to schools in rural regions of Langsa City. For the details, SMA Negeri 1 and SMA Negeri 3 which had high science process skills, are schools that located in urbanized regions of Langsa City. However, SMA Negeri 2, SMA Negeri 4 and SMA Negeri 5 which had moderate level of science process skills are schools that located in rural regions of Langsa City.

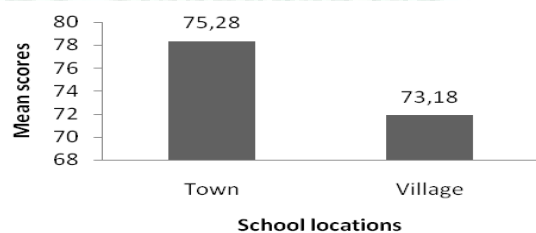


Fig.2. Student’s science process skills difference based on school locations in Langsa City

3. Science Process Skills based on Gender

Total sample of students in five schools observed was 101 female students and 49 male students. Data analysis (Figure 3) shows science process skills of female students was in very high category (74,55), while male students in high category (71,59). Further analysis shows there was no significant difference of science process skills between male and female students in Langsa City.



Figure 3. Student’s science process skills difference based gender in five schools of Langsa City

Data analysis of student science process skills based on gender also done in each school observed (Table 1). Female students in SMA Negeri 3 and SMA Negeri 5 obtained higher scores in science process skills, while in SMA Negeri 1, male students were more superior.

TABLE 1. STUDENT’S SCIENCE PROCESS SKILLS DIFFERENCES IN 5 SCHOOLS IN LANGSA CITY BASED ON GENDER

	Gender	Total student	KPS score	Note
SMA Negeri 1 Langsa	Female	20	73,12	High
	Male	10	79,25	High
SMA Negeri 2 Langsa	Female	15	77	High
	Male	15	70,66	High
SMA Negeri 3 Langsa	Female	30	75,41	High
SMA Negeri 4 Langsa	Female	18	71,11	High
	Male	12	64,79	Moderate
SMA Negeri 5 Langsa	Female	18	76,11	High
	Male	12	71,66	High

3.2 Discussion

Research result shows out 5 schools observed, the highest mean scores found in SMA Negeri 3 with mean scores 75,41 and the lowest scores found in SMA Negeri 2, with mean scores 72,91. This situation happened because students still unfamiliar with science process skills test. Therefore, attempts to applying science process skills in classroom in learning process are necessary.

The result was in line with Damapolii (2018), which state teacher’s contribution in managing student’s learning outcome especially about student’s science process skills have not been measured. Therefore, applying this in school could habituate teacher to arrange/create science process skills test and how to measure it. Malik (2016) also agree teacher need to initiate learning with science process skills approach to help develop student’s knowledge. In Biology learning, it is necessary to design programs, activities, and exercises to help increase student’s science process skills (Rabacal, 2016). Teacher could gain opportunities to use and develop science process skills in study project learning process (Yakar, 2014). Teachers also need to take a part in science process skills training to have understanding, comprehensive knowledge, development and ability to assess science process skills (Widdina S, 2018; Ozgelen,S 2012). Quite the same with Akani, O (2015), student’s science process skills could be improved if teachers, especially N.C.E teachers that teach Biology well trained in science process skills.

Overall results of science process skills in 5 schools observed, shows schools in urbanized regions in Langsa city has higher science process skills compared to rural regions. Statistically, according to Ongowo, R (2017), difference in school locations affected student’s science process skills. City or urbanized regions of city usually was better because it was more benefited. Learning process in city or urbanized regions of city usually more varied compared to rural regions because most teachers in city have understand teaching and learning strategy that suitable with student’s character. One of learning model that used in urbanized school such as in SMA Negeri 1 was *Problem Based Learning (PBL)*. *Problem Based Learning (PBL)* according to Munir (2017) could help improve science process skills of student’s in PGRI High School (SMA PGRI). Biology learning using *Guided Discovery* method also proved could improve science process skills of ninth grader students in junior high school Advent Palu (Susanti,2016). Further, guided inquiry with mind map method gave significant positive influence on student’s science process skills and science learning outcome (Hairani, 2016). In the end, to improve student’s science process skills, teachers are expected to be able to perform varied learning method and models whether they teaching location in city or in rural regions of the city.

Result of science process skills based on gender shows higher scores in science process skills were dominated by female students (74,55). Analysis shows female students have higher way of thinking, therefore they have more experience in daily life. Gender difference is one of many differences that exist in classroom learning. In physical aspects, male usually more built and strong compare to female and also better in spatial skills (Fatimah, 2017). Wacanga (2014) said teaching approach by science process skills can improve achievement both in male and female, but in different level. Ukoh (2013) also agree that male and female students can work better if in right learning situations.

IV. CONCLUSION

Based on research results it could be concluded that :

- 1) twelve grader student's science process skills in human respiration topic was at high category with mean scores 75.41,
- 2) Based on school locations, student's science process skills in rural regions of city (73,18) was lower compared to urbanized regions (75,28),
- 3) there was no significant difference between male (71,59) and female students in science process skills (74,55), both in high category.

ACKNOWLEDGMENT

This research will not be finished without assistance by Dr. Melva Silitonga M.S and Dr. Tumiur Gultom M.P as the supervisors, Prof. Dr. Herbert Sipahutar M.Sc and Dr. Anggi Tias Pratama M.Pd as Instrument validators.

REFERENCES

- [1] Akani, O (2015). Levels of Possession of Science Process Skills by Final Year Students of Colleges of Education in South-Eastern States of Nigeria. (IISTE). *Journal of Education and Practice*.6 (27) : 96-101.
- [2] Chebii, R. (2012), Effects of Science Process Skills Mastery Learning Approach on Students' Acquisition of Selected Chemistry Practical Skills in School. *Journal Scientific Research*. 3 (8):1291-1296.
- [3] Dahar, R. W. (2011). *Teori-Teori Belajar dan pembelajaran*. Jakarta: Erlangga.
- [4] Damapolii, I., Yohanita, A.M., Muertijani, M. (2018). Meningkatkan Keterampilan Proses Sains dan hasil belajar siswa melalui pembelajaran berbasis inkuiri. *Jurnal BIOEDUKATIKA*. 6 (2): 22-30.
- [5] Fatimah, S. (2017). Analisis Pemahaman Konsep Ipa Berdasarkan Motivasi Belajar, Keterampilan Proses Sains, Kemampuan Multirepresentasi, Jenis Kelamin, Dan Latar Belakang Sekolah Mahasiswa Calon Guru Sd. *Jurnal Inovasi Pendidikan Dan Pembelajaran Sekolah Dasar (JIPPSD)*. 1(1).
- [6] Hairani, (2016). Pengaruh Model Pembelajaran Inkuiri Terbimbing Berbantuan Mind Mapping terhadap Keterampilan Proses Sains dan Prestasi Belajar IPA Siswa SMP Kelas VII Pada Pengetahuan Awal Berbeda. *Jurnal Pendidikan Dan Pembelajaran*. 23 (2):46-53.
- [7] Karamustafaoglu, S. (2011). Improving the Science Process Skills Ability of Science Student Teachers Using I Diagrams. *Eurasian Journal of Physics and Chemistry Education (EJPCE)*, 3 (1): 26-38.
- [8] Malik A. Kurnia E.Y, Robiatus S. (2016). Peningkatan Keterampilan Proses Sains Siswa melalui Context Based Learning. *Jurnal Penelitian & Pengembangan Pendidikan Fisika*. 2 (1).
- [9] Munir., Agusta, E., Arisandy, B.D. (2017). Pengaruh Model Problem Based Learning Terhadap Keterampilan Proses Sains Pada Materi Sistem Pernapasan Di Kelas Xi Sma PGRI Prabumulih. *Jurnal Bioilmi* 3(2).
- [10] Ongowo, R.O (2017). Secondary School Students' Mastery of Integrated Science Process Skills in Siaya County, Kenya. *Journal Creative Education*. 8(1): 1941-1956.
- [11] Ozgelen,S (2012). Students' Science Process Skills within a Cognitive Domain Framework. *Eurasia Journal of Mathematics, Science & Technology Education*, 8(4): 283-292.
- [12] Purwanto, (2013). *Evaluasi Hasil Belajar*, Yogyakarta, Pustaka Pelajar.
- [13] Rabacal J.S. (2016). Test of Science Process Skill of Biology Students towards Developing of Learning Exercises. *Asia Pacific Journal of Multidisciplinary Research*.(APJMR), 4(4): 9-16.
- [14] Roviati E. Yuliani. Dewi C. (2016). Penerapan Pembelajaran Ipa Berbasis Keterampilan Proses Sains Untuk Meningkatkan Literasi Sains Pada Mata Pelajaran Ipa Di Kelas Vii Materi Pokok Pencemaran Lingkungan Di Smpn 1 Cikijing: *Jurnal Scientiae Educatia*: 5 (2): 122-135.
- [15] Susanti, E., Jamhari, M., Suleman, S.M. (2016). Pengaruh Model Pembelajaran Discovery Learning Terhadap Keterampilan Sains Dan Hasil Belajar Siswa Kelas Viii Tentang Ipa Smp Advent Palu. *Jurnal Sains dan Teknologi Tadulako*, 5(3): 36-41.
- [16] Toharuddin, Uus, (2011). *Membangun Literasi Sains Peserta Didik*. Bandung : Humaniora.
- [17] Ukoh., Enyeneokpon, E. (2013). Determining the Effect of Interactive Invention Instructional Strategy and Gender on NCE Pre-Service Teachers' Acquisition of Science Process Skills. *An International Multidisciplinary Journal, Ethiopia*. 7 (30): 143-155.
- [18] Wacanga., Samuel W. O.I., Mark., Hesbon, E.O. (2014). Effect of Science Process Skills Teaching Strategy on Boys and Girls' Achievement in Chemistry in Nyando District, Kenya. *Journal of Education and Practice (IISTE)*,5 (15).
- [19] Widdina S, Rochintaniawati, D, Rusyati, L. (2018). The Profile of Students' Science Process Skill in Learning Human Muscle Tissue Experiment at Secondary School. *Journal of science Learning* 1 (2): 53-59.
- [20] Yakar, Z. (2014). Effect Of Teacher Education Program On Science Process Skills Of Pre-Service Science Teachers. *Academic Journal (ERR)*, Vol. 9(1) pp 17-23.