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Learning Difficulties of 5th Grade Elementary School Students in Human and Animal Body Organ Learning Material

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ABSTRACT

Natural Science is a subject in elementary schools in order to students have organized ideas and concepts about the natural world, which is gained from experience through a series of scientific processes such as investigating, composing, and presenting ideas.The high complexity causes many cases of learning difficulties. This study aims to diagnose the learning difficulties that occur in 5th-grade elementary school students. The research was done in Muhammadiyah Pakem Elementary School, Sleman, Yogyakarta Special Regency. The subject are 5th-grade elementary students which are 29 respondents. Data collection techniques are interviews, tests, and documentation. Data analysis technique used descriptive statistic as a quantitative analysis and interactive model as a qualitative analysis. Learning difficulties are diagnosed by describing students who are identified having learning difficulties, localizing the difficulties, and determining factors that cause learning difficulties problem. The results showed the difficulties experienced by students in basic competency 1.1 - 1.5 (human blood circulation organs). The mean percentage of students' learning difficulties in Basic Competence 1.1 was 48%; Basic Competence 1.2 was 51.1%; Basic Competence 1.3 was 57.6%; Basic Competence. 1.4 is 64.7%; and Basic Competence 1.5 is 53.7%. The highest percentage of learning difficulties is in Basic Competence 1.4 (identifying human circulatory organs). It was caused by the students' low attention to natural science learning, the low motivation to learn natural science, teaching methods which are imprecise, the parents' attention, and the negative influence of mass media.

Keywords: learning difficulties, natural science, blood circulation system.

INTRODUCTION

Learning difficulties can hamper students in reaching the maximum achievement. The disorder is one of the psychological disorders that include hearing loss, thinking, speaking, reading, writing, spelling, or performing mathematical calculations (Cortiella & Horowitz, 2014). In Indonesia, learning difficulties allegedly become the main reason for students' low achievement. PISA 2012 measured the understanding of 15-year-old students in the field of mathematics, reading, and science, Indonesia ranked relatively low of 65 participating countries. Indonesia was ranked 64 in mathematics (score: 375), ranked 61 in reading (score: 396), and ranked 64 in science (score: 382) (OECD 2012).

NAEP (National Assessment of Educational Progress) (2013) stated that in reading and mathematics literacy in the United States, 4th-grade students who have trouble reading is 69%, while in 8th grade is 60%. Mathematics learning difficulties in 4th-grade students are 45% and in 8th-grade is 65%. These data suggest that learning difficulties in 4th to 8th-grade students show relatively high numbers (Cortiella & Horowitz, 2014). Students' learning difficulties affect the learning process(Cavendish, 2013). Especially for elementary school students, learning success at this

level will be the determinant in learning success in the next level (high school).

At the elementary school level, learning difficulties problem often arise in the exact subjects and rote learning subjects, one of them is natural science. Due to the fact, the characteristics of natural science subject is definitely scientific. Natural science is a knowledge branch that originated from natural phenomena. Natural Science defined as a collection of knowledge about the objects and natural phenomena which are the result of scientists' thought and investigation that done through experiments by scientific methods. Experiment activity have been purported to provide principal science education goals including the enrichment of students' perception of concepts in science and its products; scientific-practical competencies and problem solving skills; scientific 'habits of mind'; understanding of how science and scientists work; awareness and motivation (Duschl, 2008; Hofstein & Mamlok-Naaman, 2007). Teaching natural science in elementary schools should using fun methods and concrete media or media that relate to the students' daily life.

Learning characteristic of elementary school students is that they learn through concrete things (Riggs & Enochs, 1990). Children can be given science basics such as reading, writing, and arithmetic. Elementary school children can be given basic knowledge related to human life, animal, natural environment, socio-cultural environment, and religion. Natural science learning characteristic in elementary school is that learning emphasizes on finding out process, the initial knowledge determines the knowledge construction to be built. Therefore teaching natural science to elementary school students needs high tenacity and patience.

Natural science is a very important lesson for students (Chiappetta & Koballa Jr, 2014). It is important because natural science is necessary for everyday life. However, students found difficulties in learning natural science. Learning difficulties in studying natural science in elementary school usually happened to upper-class students, especially 5th-grade students. Natural science lesson in grade 5 elementary school already needing high reasoning because learning material is difficult, also discuss real object that students cannot see and feel directly. Difficulties in learning natural science in 5th-grade students also happen in Muhammadiyah Pakem Elementary School, Yogyakarta, Indonesia. This is evident from the results of teacher interviews in this school on 13 September 2016 conducted by the researchers, therefore, from the 5th grade students found difficulties to understand natural science subjects taught by teachers, especially on absorbed and channeled to all parts of the body

learning natural science which is limited on the subject of human and animals' organs in 5th grade students in Muhammadiyah Pakem elementary school, Sleman, Yogyakarta regency using tests as the instrument. Researchers also explain the factors causing learning difficulties in natural science learning. In this research, we used purposive sampling method with the sample of 29 respondents of 5th-grade students from Muhammadiyah Pakem elementary school and a teacher. Data analysis techniques are descriptive statistics for quantitative data and interactive models from Miles and Huberman for qualitative data.

RESULT AND DISCUSSION

Identify students who have difficulties in learning natural science

Based on the test results that have been done by 5th grade students of Muhammadiyah Pakem elementary school with the number of respondents are 29 students obtained the test results in Figure 1. The value is obtained by benchmark reference with a scale of 0-100 and the passing grade is 80 in accordance with the minimum criteria of mastery learning in the school.

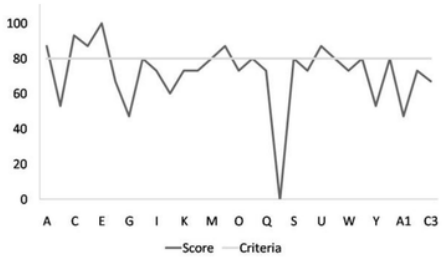

Figure 1. Criteria for Student Achievement.

Figure 1 shows that 55.1% of students in 5th grade have learning difficulties categorized in incomplete criteria in learning outcomes. The percentage of students experiencing learning difficulties illustrates that most of the students in 5th grade have difficulties in studying the subject matter of human and animal organs. Learning difficulties can also be seen from the analysis of test done by students, where the test questions have been mapped in the indicators, so it can be known which indicators are perceived difficult by students and cause difficulties in learning natural science subject of human and animal organs.

Test results of human and animal organs subject

Based on the test results that have been done by 5th-grade students of MuhammadiyahPakem elementary school with the number of respondents are 29 students, researcher classify the question in , moderate, and high difficult level. The result can be seen in Table 1.

Table 1. Level Difficulties of Question

Question Item	Percentage of True answer	Percentage of False answer	Level difficulties
1	51,1%	48,9%	Moderate
2	62,2%	37,8%	Moderate
3	48,9%	51,1%	Moderate
4	48,9%	51,1%	Moderate
5	48,9%	51,1%	Moderate

Question Item	Percentage of True answer	Percentage of False answer	Level difficulties
6	62,2%	37,8%	Moderate
7	41,8%	58,2%	Moderate
8	48,9%	51,1%	Moderate
9	41,8%	58,2%	Moderate
10	44,9%	55,1%	Moderate
11	62,2%	37,8%	Moderate
12	27,6%	72,4%	**High**
13	41,8%	58,2%	Moderate
14	34,7%	65,3%	Moderate
15	37,8%	62,2%	Moderate
16	37,8%	62,2%	Moderate
17	41,8%	58,2%	Moderate
18	37,8%	62,2%	Moderate
19	24,5%	75,5%	**High**
20	44,9%	55,1%	Moderate
21	34,7%	65,3%	Moderate
22	48,9%	51,1%	Moderate
23	58,2%	41,8%	Moderate
24	65,3%	34,7%	Moderate
25	41,8%	58,2%	Moderate

From table 1, it can be seen that some 5th-grade students of Muhammadiyah Pakem Elementary School have difficulties in studying natural science subject of human and animal organs on certain basic competencies. It can be seen from the percentage of students' error in answering the test questions that have been mapped based on basic competencies and learning indicators. From the percentage of Table 1, it can be seen that students have learning difficulties in the easy category as much as 0%, students have moderate category learning difficulties as much as 92%, students have the high category of learning difficulties as much as 8%.

3. Difficulties in Learning Natural Science

From the analysis of student errors in solving the test questions of human and animals organs, most students have learning difficulties on certain basic competencies.

a. The learning difficulties of basic competency 1.1 (identifying the function of the human respiratory organs).

Data on learning difficulties in indicator "identifying the functions of human respiratory organs include the number of students errors in answering questions relating to the mechanisms of the human respiratory system, and the completeness of the human respirator" can be shown in Table 2.

Table 2. The Learning Difficulties of Basic Competency 1.1

Question number		Percentage of True answer	Percentage of False answer
1.	The branch of the throat is called....	51,1%	48,9%
2.	When we take a breath, air will enter through the nose, then go to....	62,2%	37,8%
3.	When the air exchanges in the respiratory process, there is occur....	48,9%	51,1%
4.	The inspiration for human respiration occurs because of the diaphragm....	48,9%	51,1%
5.	Completeness of the respiratory system in humans are....	48,9%	51,1%
Mean		52%	48%

From table 2 it can be seen that 48% of 5th-grade students have difficulty in studying basic competency 1.1 which is identifying respiratory organs in human body. Based on the item analysis, students' learning difficulties on basic competency 1.1 are caused by the following factors:

1) The choices on test have a good deceiver power so that requires students' good understanding of the learning material.
2) The teacher needs to use media in explaining concepts so as to avoid multiple interpretations and misconceptions so that students can truly understand the learning material rather than simply memorize it.
3) Students' understanding of the abstract concept is so low that it takes teacher's skill in using appropriate media and methods based on learning material characteristics.

b. Difficulties in learning basic competency 1.2 (identifying the functions of the respiratory organs).

Assessment aspects of learning difficulties in identifying the function of the respiratory organs including students' errors in answering questions related to the respiratory mechanism in animals and the animals respiratory organs functions.

Table 3. The Learning Difficulties of Basic Competency 1.2

Question number		Percentage of True answer	Percentage of False answer
6.	The bird breathing apparatus at flight is called...	62,2%	37,8%
7.	Gas exchange respiration in a fish is located on...	41,8%	58,2%
8.	On the fish respiration, water enters the mouth when....	48,9%	51,1%
9.	In the bird's respiratory system there are two air sacs. When the bird breathes, the air will flow through the....	41,8%	58,2%
Mean		48,5%	51,5%

From table 3 it can be seen that 51.5% of 5th-grade students have difficulties in studying basic competency 1.2 which is identifying the function of respiratory organs. Based on the item analysis, students' learning difficulties on the basic competency 1.2 are caused by the following factors:

1) Students' understanding of the function of the respiratory organs is still low. This is due to the lack of student participation in learning

2) The choices on test have a good deceiver power so that requires students' good understanding of the learning material.
3) The teacher needs to use media in explaining concepts so as to avoid multiple interpretations and misconceptions so that students can truly understand the learning material rather than simply memorize it.
4) Students' understanding of the abstract concept is so low that it takes teacher's skill in using appropriate media and methods based on learning material characteristics.

c. Difficulties in learning basic competencies 1.3 (identifying the function of human digestive organs and the relation to food and health).

Assessment Aspects of learning difficulties to identifying the function of human digestive organs including students' errors in answering questions related to human digestive mechanisms, the functions of digestive organs in the human body, obstruction in the digestive system, and nutritional content in food.

Table 4The Learning Difficulties of Basic Competency 1.3

Question number	Percentage of True answer	Percentage of False answer
10. A deficiency of vitamin B6 can cause …	44,9%	55,1%
11. Appendicitis is inflammation of the appendix, it is caused by....	62,2%	37,8%
12. The sprouts of mung bean contain high nutrition if it is eaten by...	27,6%	72,4%
13. The combination of foods containing balanced nutrition consists of....	41,8%	58,2%
14. Food from the stomach will be absorbed and channeled to all parts of the body. The absorption of food is held in...	34,7%	65,3%
Mean	42,4%	57,6%

From table 4 it can be seen that 57.6% of 5th-grade students have difficulties in studying basic competency 1.3 which is identifying the function of human digestive organs and its relation to food and health. Based on the item analysis, students' learning difficulties on basic competency 1.3 are caused by the following factors:

1) Teacher in delivering the lesson material is uninteresting, or not using media so that students feel bored with the lessons so that it has an impact on motivation in learning natural science.
2) The choices on test have a good deceiver power so that requires students' good understanding of the learning material.
3) Inadequate understanding of past material that causes disruption on the process of understanding the next material.
4) The teacher needs to use media in explaining the concept, especially abstract concept. This is necessary so as not to lead to multiple interpretations and misconceptions so that students can truly understand the material rather than simply memorize it.

d. Difficulties in learning basic competency 1.4 (identifying human blood circulatory organs).

Assessment aspects of learning difficulties in identifying human blood circulatory organs include students' errors in answering questions relating to the mechanisms of human blood vessel system and the function of human blood vessels.

Table5. The Learning Difficulties of Basic Competency 1.4

Question number	Percentage of True answer	Percentage of False answer
15. Blood vessels that stream the blood outside the heart are called...	37,8%	62,2%
16. The blood vessels that stream the blood from the heart to the entire body are called....	37,8%	62,2%
17.  When the heart part 1 and 2 are contracting, what happens is....	41,8%	58,2%
18. One function of capillary vessels is....	37,8%	62,2%
19. The blood vessels in charge of carrying oxygenated blood from the lungs to the left atrium of the heart is called...	24,5%	75,5%
Mean	35,4%	64,6%

From table 5 it can be seen that 64.6% of 5th-grade students have difficulties in studying basic competency 1.4 which is identifying human blood circulatory organs. Based on the items analysis, students' learning difficulties on basic competency 1.4 are due to the following factors:

1) The choices on test have a good deceiver power so that requires students' good understanding of the learning material.
2) Teacher in delivering the lesson material is uninteresting, or not using media so that students feel bored with the lessons so that it has an impact on motivation in learning natural science
3) Inadequate understanding of past material that causes disruption on the process of understanding the next material.
4) The teacher needs to use media or visual prop in explaining the concept, especially abstract concept. This is necessary so as not to lead to multiple interpretations and misconceptions so that students can truly understand the learning material.
5) Students motivation is low so it affects the understanding process.

e. Difficulties in learning basic competency 1.5 (identifying disorders of the human blood circulatory organ)

Assessment aspects of learning difficulties in identifying disorders in human blood circulatory organs include students' errors in answering disease-related problems caused by abnormalities in the human circulatory system.

Table 6. The Learning Difficulties of Basic Competency 1.5

Question number	Percentage of True answer	Percentage of False answer
20. The disease of the circulatory system that is associated with blood pressure is...	44,9%	55,1%
21. The disease of the circulatory system that increases the number of leukocytes cells uncontrollably can eat erythrocyte cells and blood preservation is....	34,7%	65,3%
22. The best way to maintain the health of blood circulation system is....	48,9%	51,1%
23. The fat that attaches to the walls of blood vessels can cause ...	58,2%	41,8%
24. The veins on Mr. Herlambang's right calf are prominent. It is very different from the left ones. It is possible that Mr. Herlambang may have....	65,3%	34,7%
25. Stroke can occur due to....	41,8%	58,2%
Mean	48,7%	51,3%

From table 6 it can be seen that 51.3% of 5th-grade students have difficulties in studying basic competency 1.5 that is identifying disorders of the human blood circulatory organs. Based on the item analysis, students' learning difficulties on basic competency 1.5 are due to the following factors:

1) The choices on test have a good deceiver power so that requires students' good understanding of the learning material.
6) Teacher in delivering the lesson material is uninteresting, or not using media so that students feel bored with the lessons so that it has an impact on motivation in learning natural science
2) The teacher needs to use media or visual prop in explaining the concept, especially abstract concept. This is necessary so as not to lead to multiple interpretations and misconceptions so that students can truly understand the learning material.

Based on research result data, it is found that 55,1% of elementary school students of MuhammadiyahPakem have difficulties in studying natural science subject of human and animal organs. Learning difficulties is the difficulties experienced by students so that the person did not manage to reach a certain level of learning qualifications (Hale, J., et al, 2010; McLeskey & Waldron., 2011; Cavendish, 2013). The results of test analysis show that students have difficulties and solve the problem of certain basic competencies. The level of learning difficulties experienced by students in each basic competency is different.

The results obtained can be analyzed thoroughly that students have difficulty on basic competencies 1.1 is 48%, 1.2 is 51.5%, 1.3 is 57.6%, 1.4 is 64.6%, and 1.5 is 53.7%, while the learning difficulties are very significant in the basic competency1.4 which identify the human blood circulatory organs. The learning difficulties of basic competency 1.4 lie in the lack of students' ability in understanding indicators of identifying the functions of the human blood circulatory organs, explaining the human blood circulatory process, analyzing the works of human blood circulatory organs.

Learning difficulties experienced by students can be seen from the percentage level of students error in answering the questions. The students' mistake in answering the questions can be interpreted that the deceiver power of the answer choices is effective. Students are fooled by the choices of the answers because students have not mastered the learning material concept and learning material is still abstract. As students have not been able to distinguish between bronchus (throat branch) and bronchioles (bronchus branch), throat (digestion organ) and esophagus (respiratory organ), the students assume that it is same, but actually, it has different functions although located in the same place.

Referring to relevant studies which are researches conducted by (Geary, 2013; Kaldenberg, et al, 2015; Schoenfeld, 2016) the result shows that the students usually have learning difficulties due to lack of learning material concept mastery. Learning material concept is the base or foundation of science learned by students, when students do not understand the concept there will be misconceptions that will impact on learning difficulties experienced by students(Cakir, 2008). Lack of learning material concept mastery can be caused by several factors. According to (Cooper, S. A. et al., 2009)"the factors that cause learning difficulties can be classified into two groups: internal factors (physical, psychological, fatigue) and external factors (family, school, community)". It is known that there are several factors causing students learning difficulties in accordance with the results of interviews and documentation conducted by students and teacher. Internal factors include students' low attention toward natural science lessons and low motivation to learn natural science. External factors include teacher teaching methods, parental attention, and mass media.

Low of understanding of learning material concept is caused by internal factors which are lack of students' attention in learning natural science

that can be seen from low participation in natural science lessons, students feel bored when learning natural science and students' attitudes in following science lessons, where students prefer to chat and play among themselves when lessons take place then pay attention to the lessons that taught by the teacher. The students' low motivation in learning can be seen from students' inactiveness while studying natural science, students' low spirit in learning natural science. This can be seen from students low study time in learning natural science at home.

Students' low of attention, low learning motivation and low of understanding of learning material concept result in misconception which can occur due to teacher uninteresting teaching methods. Based on students and teacher interviews, teaching methods are one of the factors causing students' difficulties in learning natural science. Teacher teaching methods are only lectured and without using media that support learning materials. The teacher only uses the textbook, when the facilities provided by the school are complete.

The natural science learning material of human and animals' organs cannot use only textbooks to teach. Because students need to see in real human body organs, because human blood circulatory system, human respiratory system, and the human digestive system cannot be seen directly by students even though every human being has it. The characteristics of elementary school children who are in the concrete operational phase are they think on the basis of concrete experience/real. They have not been able to think abstractly, such as imagining how the process of blood circulation events(Fedewa, et al., 2017).When the teacher is aware of the students thinking development, the teacher should be able to choose the learning method appropriate to the students'state so that students do not have learning difficulties. The teacher can apply various learning methods to students and students will be able to receive knowledge properly when teacher master the pedagogic and professional ability. The teacher must understand the basic concept of the learning material so that there is not any mistake in teaching learning material to students in order to students not have learning difficulties about leaning material concepts. Teacher performance, an experience of teaching her pupils with special needs, behaviors from disables people, and teachers' role all influence on teacher attributions, however support with lessons were identified. Effects of teacher training and development, and for pupil success and pupil self-perception are ascribed (Brady & Woolfson, 2008). In addition, students become more interested in learning so that their motivation will be higher (Maryani & Martaningsih, 2015).

Parents of students with special needs have extra barriers to parental attention than parents of students commonly education.Their attention is also a contributing factor in learning difficulties experienced by some students(Fishman & Nickerson, 2015). It can be known from the interviews results with some students that parents mostly are an entrepreneur who usually works out of town. Students' time to meet with parents is also very minimal. Parents are busy with their own work and students' learning achievements are passed on to schools and tutoring institutions.

Mass media and internet using are factors causing learning difficulties experienced by students(Chu, 2014; Takahashi & Tandoc, Jr., 2016). This can be seen from the student's activities, they prefer to play games, to use mobile phones, and to watch television, then doing activities that support learning such as setting out tutoring or study groups. Based on the interviews data from students, interaction with friends are not factors causing the difficulties in learning natural science experienced by students.

CONCLUSION

The learning difficulties in the 5th-grade students of the elementary school on the subject of the human and animal organs are based on the following basic competencies: 1.1. identifying the functions of human respiratory organs include the number of students errors in answering questions relating to the mechanisms of the human respiratory system, and the completeness of the human respirator(48%), 1.2 identifying the functions of the respiratory organs (51.1%), 1.3 identifying the functions of human digestive organs and their relation to food and health (57.6%), 1.4 identifying human blood circulatory organs (64.7%), and 1.5 identifying disturbances in human circulatory organs (53.7%).

Based on the discussion results of qualitative data states that factors causing difficulties in learning natural science experienced by the 5th-grade students of elementary school is the students' low attention to the natural science lesson, the low motivation to learn natural science, teacher teaching methods, the parent's attention and mass media.

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