



Analysis on The Students' Comprehension of The Material of The Human and Animal's Musculoskeletal System Using YouTube Video and Zoom Cloud Meetings Application

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Abstract: Human and animal's musculoskeletal system is part of science that is included in the curriculum of the 5th Grade of Elementary School. This lesson requires a visual approach, either posters or a 3D anatomy kit, to describe the anatomy of the human and animal's musculoskeletal system such as bones of skeleton, muscles, and joints. COVID-19 pandemic has affected countries all over the world including Indonesia. Thus, since the beginning of 2020, this pandemic has shifted the student's learning method from the face-to-face meeting into the distance learning method by using supporting applications such as Whatsapp, Google Classroom, Zoom Cloud Meetings, and YouTube. Participated by 36 students of SD Bianglala consisting of two groups, this research was using a qualitative descriptive method. The instrument was using an essay test of 10 questions; each question represented a material comprehension indicator. The data processing technique was determining indicators of comprehension, scoring each question, categorizing the level of comprehension based on the indicators of each question, as well as analysis, and conclusions. The study results showed that the students' comprehension of the materials, including the most important part of the musculoskeletal system which allows motion, steps on how to keep the bones healthy, diseases that affect organs or organ abnormalities, animal's mobility organs, as well as their joints and muscle functions, was suggestively very well. It's showed in numbers 1, 4, 5, 6, 7, 9, and 10. While their comprehension of the function of human bones, parts of the bones based on their category, their names as well as their types, the motion directions, and the example of joints within the human's musculoskeletal system was rather well. It's showed in numbers 2, 3, and 8.

Keywords: Distance Learning, Comprehension, Human and Animal's Musculoskeletal System, Youtube, Zoom

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INTRODUCTION

Education is stated by law in UU No. 20 concerning the National Education System in 2003 as a planned effort in organizing learning to develop various potentials of students. Natural Science is a component of subjects that has an important role in realizing these educational goals. Natural science is not only a collection of knowledge about living things or creatures but also involves ways of thinking and solving problems (Sujana, 2014, 3). Natural science education at the elementary school level aims so that students can understand the scientific aspects of the surrounding environment and can have scientific characteristics (Harlen, 2000) and character-building (Khusniati, 2012). Natural science learning also has great benefits for the world of education in Indonesia because it is basic knowledge for

the development of science and technology, critical and independent personality development, and the development of the potential and personality of students as a whole (Abadi & Made, 2017).

Comprehension of the human and animal's musculoskeletal system as natural science material taught to 5th-grade elementary school students is one of the basic competencies that students must have because it is closely related to understanding the essence of humans as living things. In learning human and animal movement tools, teachers need to make efforts to be able to anatomically visualize how and what kind of motion system consisting of skeletons, muscles, and joints are owned by humans and animals through various teaching aids such as posters, three-dimensional models, and other learning kits. so that it is easily understood by students.



The Impact of The Covid-19 Pandemic and The Use of Information Technology in The Implementation of Online Learning

The COVID-19 pandemic that hit the world, including Indonesia in early 2020, has demanded a change in the way the learning was previously carried out in schools using the face-to-face method in classrooms. Based on a policy from the Ministry of Education and Culture of the Republic of Indonesia, educational institutions are asked to implement distance learning through online learning (Fitriyani, Febriyeni & Kamsi, 2020) as alternative learning that can be done during the pandemic period to avoid direct interaction in the context of avoiding the risk of transmission. The online learning policy requires teachers and students to be able to carry out teaching and learning activities by taking advantage of advances in information technology such as computers or devices (Astini, 2020). These electronic devices must be connected to the internet either via WiFi or internet quota provided by telecommunications providers to be able to connect online.

For it to run effectively, all parties, both schools, and parents of students need to work together to assist students in operating devices, especially when using various digital applications to support online learning such as virtual classroom services, teleconferencing, live chat, and group chat (Dewi, 2020). The most widely used teleconferencing application for online learning is Zoom Cloud Meetings (Zoom). This application allows virtual meetings with many people without the need to leave the house (Harun, 2020) and can be operated practically and efficiently (Haqien & Rahman, 2020). These applications can also be run through multi-platforms such as desktop devices, laptops, and mobile devices. Through Zoom, online PJJ can take place communicatively because it has an audio feature to be able to interact with each other as well as a share screen feature so that teachers can display learning materials through a device screen (Faisal, 2020).

Although it is reliable in implementing online learning, the Zoom application is considered

to have shortcomings because it is very dependent on the quality of the network or internet signal during online learning. If there are obstacles to the quality of the internet network, it will have an impact on the quality of learning received by students (Haqien & Rahman, 2020). Therefore, apart from using Zoom, teachers need to overcome this by preparing digital learning media that can be accessed independently by students outside of school hours. Digital learning media can be presented in various viewer formats such as PowerPoint, Word, and other digital formats such as video (Hadi, 2017).

Learning media with video format has advantages over others because it can display a combination of visual and audio (Warsita, 2011) with a moving image display (Rahman: 2018). Videos can be used as an alternative for teachers to deliver material with various views (Woottipong, 2014, 201). Videos can be in the form of recorded exposure from the teacher or illustrations in the form of dynamic graphics (animation). Through the creative editing process, videos can be produced that can accommodate learning needs. Learning videos can be stored in cyberspace, one of which is by using the YouTube application so that students can access the material anytime and anywhere.

With all the limitations of communication space with students due to the COVID-19 pandemic, science teachers are required to be able to adjust learning methods, especially on the material of the human and animal's musculoskeletal system by looking for alternatives to replace the props that are less likely to be done with online learning because it is less practical and constrained by the limited space that the camera can capture. This is imperative for teachers to be able to make the best use of available advances in information technology so that they can support the creation of an effective learning process because it is very closely related to achieving the level of understanding of students. In carrying out the learning process, teachers are required to be more sensitive and carefully measure and maximize the absorption of students,



because the low absorption of students is currently still a major problem in formal education in Indonesia (Fitria, Permanasari, Sudargo, Sopandi, 2013). Learning natural science in online learning, especially in the material of the human and animal's musculoskeletal system using YouTube video and the Zoom application is expected to achieve students' comprehension.

METHOD

This research was conducted using a qualitative descriptive method that intends to determine the comprehension of grade 5 students on the material of the musculoskeletal system in humans and animals using YouTube video and do learning interactions through Zoom. The study was conducted in two classes with 18 samples each. Class 5A consisted of 8 girls and 10 boys, while class 5B consisted of 9 girls and 9 boys. The instrument used was in the form of a test with descriptive questions of 10 items, each of which represented an indicator of material understanding. The data processing techniques used were determining indicators of comprehension, scoring each question, categorizing the level of student's comprehension based on the indicators of each question, as well as analyzing, and drawing conclusions.

Learning The Human And Animal's Musculoskeletal System Using Youtube Video And Zoom Applications

Learning the material of the human and animal's musculoskeletal system was carried out through the Zoom application for 10 minutes by forming perceptions and

providing motivation related to the material. Then, the researcher provides a video link that has been uploaded to YouTube via the WhatsApp application. Students are asked to watch the video and learn it independently for 30 minutes. Then, proceed with working on the student's worksheet. Learning was continued through Zoom for 20 minutes to be discussed together in the form of a discussion session on video and students' worksheets.

Written Comprehension Test

The material of the comprehension test was conducted online a week after online learning with Zoom and YouTube. The test consists of ten description questions. Each question represents an indicator of the achievement of the material of the human and the animal's musculoskeletal system (See Table 1). The test is carried out for 60 minutes. Questions are given in digital format (pdf) through Google Classroom for students to download and print. After confirming readiness to start the test, the researcher gave instructions to start working on the test questions. The test is closed book. During work, students must sit facing the screen of the device with the Zoom camera on, so that supervision can be carried out. Then, students document the test answer sheets by taking photos or scanning them and uploading them back to Google Classroom, to be examined by researchers.

Table 1. Comprehension Indicators and Ratings

Question	Question Type	Comprehension Indicators	Ratings
1	Descriptive question	Students can mention three important parts in the system of motion tools that allow humans to move	3
2	Descriptive question	Students can explain the four functions of the human skeleton	4
3	Descriptive question	Students can identify three parts of the human skeleton according to their group	3
4	Descriptive question	Students can explain how to maintain the health of the human skeleton in their respective languages	3



5	Descriptive question	Students can name at least 20 bones in the human musculoskeletal system	10
6	Descriptive question	Students can analyze the disease/disorders of the musculoskeletal system described in the questions	1
7	Descriptive question	Students can identify three types of animal musculoskeletal tools through explanations of the questions	3
8	Descriptive question	Students can explain the type, direction of motion, and examples of joints in human bones	10
9	Descriptive question	Students can mention the joint function of the musculoskeletal system	1
10	Descriptive question	Students can mention the function of muscles in the musculoskeletal system	1

RESULT AND DISCUSSION

After examining the answers of students in Class 5A and 5B SD Bianglala on the completed test question sheets, the results of the assessment are then presented in table form to be processed into research data. The test results showed that the average score was 88.86. The number of students who were able to get a score in the range of 89-100 was 21 students or 6%. The number of

students who got a score of 70-78 was 8 students or 22%. The number of students who got a score of 79-88 was 5 students or 14%. While the number of students who got a score below 70 was 2 people or 5.6%. From the indicators of student's comprehension represented by each test question, the results were shown in table 2. The results of the answers were concluded to be very good, good, adequate, insufficient, and very poor assessment categories.

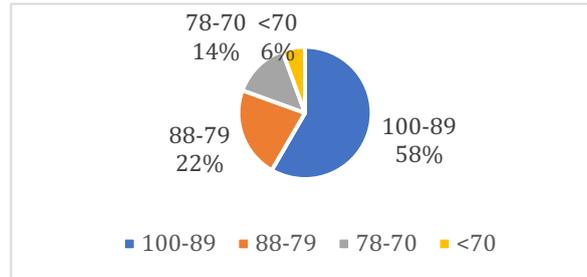


Figure 1. Percentage of Assessment of The Human and Animal's Musculoskeletal System Test Results

Table 2. The Average Score of The Human and Animal's Musculoskeletal System Test Results

Question Number	Comprehension Indicator	Answer Description	Score	Number of Students who answered	Avg. Score
1	Mention Three Important Parts In The Motion Tool System That Enables Humans To Move	Answered all right	4	34	3,94
		Answered two parts correctly	3	2	
		Answered one part correctly	2	0	
		Answered incorrectly	1	0	
		Not answered	0	0	
2	Describe The Four Functions Of The Human Skeleton	Answered all right	5	10	4,03
		Answered three parts correctly	4	17	
		Answered two parts correctly	3	9	
		Answered one part correctly	2	0	
		Answered incorrectly	1	0	
3		Not answered	0	0	3,28
		Answered all right	4	13	



	Identifying the Three Parts of the Human Skeleton according to the Group	Answered two parts correctly Answered one part correctly Answered incorrectly Not answered	3 2 1 0	20 3 0 0	
4	Doing Explanations on How to Maintain the Health of Human Skeletons in Their respective Languages	Described systematically related activities and nutritional consumption Described systematically related to one aspect of activity or nutrient consumption Described unsystematically related aspects of activity or nutrient consumption Not answered	3 2 1 0	30 6 0 0	2,83
5	Mention at least 20 names of bones in the human motion system	Answered all right Answered 19-14 correctly Answered 13-8 correctly Answered 7-4 correctly Answered 4-0 correctly Not answered	6 5 4 3 2 1	10 26 0 0 0 0	5,28
6	Analyzing Diseases / Disorders of the musculoskeletal system in the Problem	Answered the name of the disease/disorder correctly Answered the name of the disease/disorder incorrectly Not answered	2 1 0	32 4 0	1,89
7	Identifying three types of the animal musculoskeletal system through the explanation of the problem	Answered all right Answered two kinds of answers Answered one kind of answers Answered incorrectly Not answered	4 3 2 1 0	36 0 0 0 0	4,00
8	Describes the type, direction of motion, and examples of joints in the human musculoskeletal system	Answered all right Correctly answered the characteristics of the four joints Correctly answered the characteristics of the three joints Correctly answered the characteristics of the two joints Correctly answered the characteristics of the one joints Answered incorrectly Not answered	6 5 4 3 2 1 0	4 23 7 3 0 0 0	4,89
9	Mentioning the Function of the Joints in the musculoskeletal system	Answered joint function correctly Answered joint function incorrectly Not answered	2 1 0	34 2 0	1,94
10	Mentioning the function of the muscle in the musculoskeletal system	Answered muscle function correctly Answered muscle function incorrectly Not answered	2 1 0	32 4 0	1,89

Analysis

In question number 1, students were asked to mention three important parts of the musculoskeletal system that allow humans to move. All of the students, there were 34 students (94%) who could explain the

correct questions, while the rest, 2 students (6%), we're able to answer exactly two of the three parts of the question. Based on these results, almost all students were assessed to be able to understand three important parts of the system of motion as asked in the questions.



In question number 2, students were asked to explain the four functions of the human skeleton. Of all the test takers, 10 students (28%) were able to explain the correct questions, 17 students (47%) were able to answer three of the four questions correctly. The rest, as many as 9 students (25%) can answer exactly two of the four questions.

In question number 3, students were asked to identify three parts of the human skeleton according to their group. Of all the test takers, there were 10 students (28%) who could explain the correct questions, while 17 students (47%) could answer exactly two of the three parts of the question. The other 9 students (25%) can answer one of the three parts of the question.

In question number 4, students were asked to explain how to maintain the health of the human skeleton in their respective languages. As many as 30 students (83%) could systematically explain their activity and nutritional intake, while the remaining 6 students (17%) could systematically explain one aspect of their activity or nutrient consumption.

In question number 5, students were asked to name at least 20 bones in the human organ system. A total of 10 students (28%) answered correctly entirely, while the rest, as many as 26 students (72%) could answer 19-14 parts correctly.

In question number 6, students were asked to analyze the diseases/disorders described in the questions. A total of 32 students (89%) could answer the name of the disease/disorder correctly, while the rest, as many as 4 students (11%) answered the name of the disease/disorder incorrectly.

In question number 7, students were asked to analyze the disease/movement disorders described in the questions. In this question, all test takers (36 students) can answer correctly all of the three parts of the question.

In question number 8, students were asked to explain the type, direction of motion, and examples of joints in human motion. As many

as 4 students (11%) could answer correctly all of them, while 23 students (64%) could answer the characteristics of the four joints correctly, as many as 7 students (19%) could answer the characteristics of the three joints correctly. The rest, as many as 3 students (8%) can answer the characteristics of the two joints correctly.

In question number 9, students were asked to mention the function of the musculoskeletal joints. As many as 34 students (94%) could answer joint function correctly, while the remaining 2 students (6%) answered muscle function incorrectly.

In question number 10, students are asked to mention the function of the muscles in the musculoskeletal system. A total of 32 students (89%) could answer muscle function correctly, while the rest, as many as 4 students (11%) answered muscle function incorrectly.

CONCLUSION

Based on the analysis of the test results as a measuring tool for students' comprehension of the human and animal's musculoskeletal system materials carried out with online learning through YouTube video and Zoom Cloud Meetings, it can be concluded that the students of Class 5A and 5B SD Bianglala are considered to be able to understand the material well by referring to some indicators of each comprehension. Students' comprehension of the important parts in the motion system that allows humans to move, how to maintain the health of the human skeleton, disease/ disorders, types of animal movement, joint function in the bones, and muscle function in the musculoskeletal system is considered very good. This is concluded from the results of the average score of students' test answers on question number 1 (average score 3.94 out of maximum score 4), question number 4 (average score 3.28 out of maximum score 4), question number 5 (average score 5.28 out of 6), question number 6 (average score 1.89 out of maximum score 2), question number 7 (average score 4.00 out of maximum score 4), question number 9 (mean score 1.94 out of maximum score 2)



and question number 10 (mean score 1.89 out of maximum score 2). Meanwhile, students' comprehension of the function of the human skeleton, parts of the human skeleton according to the group, the name of the bones in the human musculoskeletal system and the type, direction of motion, and examples of joints in the human musculoskeletal system is considered good categories. This is concluded from the results of the average score of the students' test answers on question number 2 (average score 4.03 out of a maximum score of 5), question number 3 (average score 3.28 out of a maximum score of 4), and number question 8 (average score 4.89 out of a maximum score of 6), each of which represents an indicator of that comprehension skills. Based on the research results, several suggestions can be given as follows: In implementing online learning, teachers can prepare alternative learning media in the form of videos that are easily accessible via YouTube so that students can listen and learn outside of class hours. After allowing students to listen and learn YouTube videos, teachers need to follow up to communicate and interact intensively through the Zoom Application. This aims to accommodate discussion sessions as needed in conventional learning. This research needs to be continued with other research with different materials and samples to determine the effectiveness of online learning using YouTube videos and Zoom applications, especially in science learning.

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