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The replica of human respiration system to improve student's interpretation skill

Rikha Zulia, Siti Alimah*

Biology Education, Faculty of Mathematics and Natural Science, Universitas Negeri Semarang, Indonesia

Corresponding author: sitialimah@mail.unnes.ac.id

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ABSTRACT

Visual media are tools used to deliver information to students, especially on material that cannot be sensed directly by humans. One of them is the material of the human respiratory system. The purpose of this study is to analyze the improvment of the replica of human respiration system in improving student's interpretation skills. This research is an experimental study with a quasy experimental design with a sample size of 78 students. The method of collecting data on interpretation skills uses a multiplechoice test instrument with a total of 20 questions. The data were analyzed quantitatively using the independent sample t-test. The improvment of this study is determined by the following indicators: 1) classical completeness class 50%, 2) N-gain value is in the moderate category, and 3) there is a significant average difference between the control and the experimental class. The results of this study indicate that the classical completeness in the experimental class is higher than the control class. The N-gain value of the experimental class is in the medium category and the control class is in the low category. The results of the average difference test of the two groups showed a significant difference between the average learning outcomes of the experimental class and the control class. Based on these results, it can be concluded that the replica of human respiratory system is improving students' interpretation skills.

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INTRODUCTION

Biological subjects are closely related to the process of understanding and finding out which is carried out systematically. Biology is not only a subject that requires students to master knowledge of concepts and principles but encourages students to carry out a process of discovery (Sundari, 2018). This is because biology is not only about theory or memorization skills, but more than that. Learning biology is about how students can understand and apply what they have learned in their lives. Especially on materials that include processes that occur in the human body itself, which cannot be observed directly. One of these biological materials is the material of the human respiratory system. Experiential learning sustained a gateway to the learners' outside lives, where the concepts came alive in common areas of their daily lives (Geyser et al., 2020).

The material of the human respiratory system has the characteristics of learning objects that cannot be directly sensed by the five senses. Teachers need to choose learning resources that can provide real objects to provide maximum learning experience to students. Learning by providing direct experience can provide meaningful learning for students. Real objects in the form of replicas (artificial models) of human respiratory system organs can be the main choice as a student learning resource. Studying the human respiratory system with organ system replicas has the potential to explore students' potential interpretation abilities. Interpretation ability is based on the ability to observe, describe, and explain objects of the human respiratory system in accordance with the results of observations and student descriptions of these objects.

Results Based on a preliminary study conducted on the learning process of the human respiratory system, it is known that the learning process of the human respiratory system is currently still carried out using lecture and question and answer methods. This lecture method is not appropriate to be applied to the material of the human respiratory system because it has not been able to visualize the human respiratory system in real to students. Students also tend to be passive in the learning process. Students pay more attention to listening to information without interpreting the data or observations. This results in a low level of student understanding of the material being studied. The success of the learning process is also closely related to the completeness of facilities and infrastructure. Limited facilities and infrastructure can hinder the teaching and learning process on the material of the human respiratory system. This is as found in the preliminary study. Learning support facilities and infrastructure in the form of learning media which are generally used in the learning process of the human respiratory system material are still limited. The media that are generally used are pictures and videos. However, the fact is that the selection methods, models and media have not been effective in learning this material on the human respiratory system. This is shown from the analysis of student learning outcomes, namely the score of the Mid-Semester Examination. Mastery learning obtained only reached 33%, namely 26 students. This percentage is relatively low, considering the number of students taking the mid-semester exam is 79 students. This shows that the learning objectives have not been maximally achieved.

One of the efforts that can be made to address these conditions is to increase students' skill to interpret the data or information obtained. Interpretive skills are included in the integrated Science Process Skills. The science process skills possessed by students in Indonesia are low and generally in the lowest position or what is called a low international benchmark, which is below the average score (500) (Nugraha et al., 2017).

This interpretation skill can help students to interpret data or information. Information or data obtained by students will be more meaningful if it is processed properly, namely by being presented, analyzed and concluded. Students who have high interpretation skills are considered easier to understand a material. This interpretation capability is in line with the national assessment program launched by the Indonesian Ministry of Education and Culture (Kemendikbud). This national assessment is divided into three main aspects, namely: Minimum Ability Assessment (AKM), character survey and learning environment survey. This AKM has been designed to measure student achievement from learning outcomes in the form of literacy and numeracy abilities. Literacy and numeracy skills are the ability to think and interpret information in written form and in the form of numbers or quantitative calculations. This AKM is applied to students in grades V, VIII and IX. These literacy and numeracy abilities are closely related to students' interpretation abilities. The ability to interpret (interpret) high data or information can help students to practice thinking skills and digest information for students in written form. This is because through the ability to interpret data (interpret), students will train their

thinking skills. Not only that, but the results of students' thinking will also then be interpreted both in written and oral form. The writing of students' thinking results is not only in qualitative form, but also in numerical or quantitative form. Students can finally formulate conclusions from what has been interpreted. This shows that interpretation ability has a positive contribution in building students' literacy and numeracy skills.

Students' interpretation ability can be improved through the use of three-dimensional visual media integrated discovery learning model on the material of the human respiratory system. Visual media are everything that is used to communicate as a channel for messages so that it can be observed through the five senses to achieve predetermined goals. Visual media are able to clarify abstract concepts so that students are able to understand the true meaning of the concept (Nasaruddin, 2015). Simple visual media that are often used by teachers in this material are generally in the form of a balloon in a plastic bottle which shows the rising and falling of a balloon that represents respiration in the lungs. The structure, arrangement, shape and location of organs cannot be realized in this simple teaching aid, so students cannot understand this material in depth.

The human respiratory system media is very important to support the teaching and learning process in the classroom. The replica of human respiratory system is made to resemble the original. It aims to visualize the human respiratory system that is similar to what actually exists in humans. Includes the shape, color, arrangement / location, size, and the working process of the human respiratory system. It aims to provide a real picture, so that students can more easily understand and analyze the human respiratory system. Replica of the human respiratory system is integrated with discovery learning (DL). Through the DL model, it is expected that students will be able to follow the learning process by finding real important concepts and understandings of the human respiratory system material. The main thing in the DL learning model is how students make discoveries. It does not stop at the discovery process, but the findings in the form of data are then interpreted so that they become a complete understanding. This can be achieved because through the replica of the human respiratory system, students will find it easier to get information from the visualization of the human respiratory system. Supported by a DL model that emphasizes the discovery process, so that it will be more supportive in improving students' interpretation skills. The solution to the problems that have been described, namely the replica of human respiration system needs to be tested for improvement of students' interpretation skills. This study aims to analyze the improvment of the replica of human respiration system in improving students' interpretation skills.

METHOD

Research Design

This research uses a quantitative experimental approach with a quasi-experimental design . The research design follows Figure 1.

Choosing the control group	Pre-test	No treatment	Post-test
Selecting the experimental group	Pre-test	Treatment	Post-test

Figure 1. The research design of Quasy Experimental

This study used two groups class. The experimental group class was given the treatment of learning the human respiratory system using a replica of the human respiratory system. The control group class was given a learning treatment of the human respiratory system with the media of powerpoint slides and videos of the mechanism of the human respiratory system.

Population and Samples

The population in this study were students of class XI IPA MA Al-Anwar Sarang, Rembang Regency. The number of classes in the population of this study were 5 classes with a total of 198 students. This sample was taken by using cluster random sampling technique. The number of classes in the sample of this study were 2 classes with a total of 78 students. one class as the experimental class and the other class as the control class. The experimental class has better initial abilities than the control

class. This is because there is a grouping of characteristics based on the level of academic ability to facilitate class management in the study population.

Instrument

The instrument used in this research is a test instrument. The test instrument used in this study is multiple choice questions integrated with aspects of interpretation ability, totaling 20 questions as pretest and posttest questions. The test instrument in this study was empirically validated in class XII with a total of 40 multiple choice questions. The results of the analysis with ANATES obtained questions with valid criteria; difficulty level easy, medium, and difficult; and good discriminating power of 20 questions. Sola that was selected according to these criteria was then used to retrieve data on students' interpretation abilities before and after treatmentThe pretest questions were given to the control class and the experimental class before the learning of the human respiratory system material was carried out. It aims to measure the initial interpretation ability and knowledge of students on the material of the human respiratory system.

Procedure

This research begins with a preliminary study in class XI at the high school level. The next procedure is to do learning in four meetings (4 x 60 minutes). Every week, one meeting is held with a learning time of 60 minutes. Learning in the experimental class uses repica of human respiratory system with model of discovery learning. The first meeting in the experimental and control classes was conducted pretest to determine the students' initial interpretation skill.

The learning in the experimental class uses the replica human respiratory system and Student Discussion Sheets with discovery learning model. The replica of the human respiratory system consists of two media parts. The first is a simulation board for the mechanism of the human respiratory system, the second is an imitation model of the human alveolus. Both are equipped with lights to show bioprocess simulations that occur in the human respiratory organ system. The replica of human respiratori system. The replica of the human respiratory system is a 3-dimensional model capable of visualizing a simulation of the bioprocess of respiration in humans to be able to visualize knowledge that cannot be directly sensed by the eye. Student Discussion Sheets is used during learning to train students' interpretation skills in

Learning in the control class uses PPT and video learning of the human respiratory system, with lecture and discussion methods. At the fourth meeting, a posttest was conducted both in the experimental class and in the control class to measure the students' final interpretation ability.

Data Analysis Techniques

The students' data interpretation ability was analyzed using quantitative descriptive methods. The students' initial interpretation ability was assessed through a pretest. The students' final interpretation skill was again measured through a posttest using twenty multiple choice questions. Multiple choice questions contain seven aspects of interpretive skill, namely: 1) Describing the problem. 2) Record the results of observations. 3) Connecting the observations. 4) Explain the meaning of the data. 5) Classify or classify. 6) Find the pattern of the relationship between the observations. 7) Summing up.

The score of the pretest and posttest in the form of multiple-choice questions is determined by the maximum score for each item. The score for each item is then accumulated and then calculated by the formula:

$$\text{Pretest/ posttest scores} = \frac{total\ score\ obtained}{maximum\ total\ score} \text{ x } 100$$

The pretest and posttest scores are then compared with the predetermined KKM, which is 70. Students who get a score of 70 means that they have achieved mastery learning. Individual mastery that has been known is then used to calculate the average score ($\bar{x}$) of student learning outcomes and mastery of classical learning outcomes. The formula for calculating the average score ($\bar{x}$) of student learning outcomes is:

$$\bar{X} = \frac{\Sigma\, x}{N}$$

Information:
$\bar{X}$ = average score ($\bar{x}$) student learning outcomes
Σx = total student score
N = many students

Mastery of classical learning outcomes is used to measure class completeness. Next, N-gain analysis was conducted to determine the increase in the average pretest and posttest of students' interpretation skill. The analytical technique used to determine whether the independent variable (free) has an impact on the dependent variable is using the t-test. This t-test was used to distinguish the effect of differences in treatment between the experimental class and the control class on students' interpretation skill. The t-test used in this study is the independent sample t-test which was analyzed using SPSS software.

RESULTS AND DISCUSSION

Data from the research results of students' interpretation skill on the material of the human respiratory system were measured using pretest and posttest questions. Pretest and posttest data were obtained from the experimental class and the control class. The experimental class, namely class of XI IPA C, uses the replica of human respiratory system integrated with discovery learning, while the control class of XI IPA D uses media of slide powerpoint and videos of the human respiratory system. Aspects of interpretive skill that are measured are describing problems, recording observations, connecting observations, explaining the meaning of data, classifying or grouping, finding patterns of interrelationships between observations and concluding.

The students' initial interpretation skill on the material of the human respiratory system was measured through a pretest. The pretest questions used were twenty multiple choice questions with four answer options which were done using a print out question sheet and done on the answer sheet provided. The number of students in the experimental class who took the pretest was 38 students, while the control class who took the pretest was 40 students. The total number of students who took the pretest was 78 students.

The data on the comparison of students' initial interpretation skill in the experimental and control classes can be seen in Figure 2.

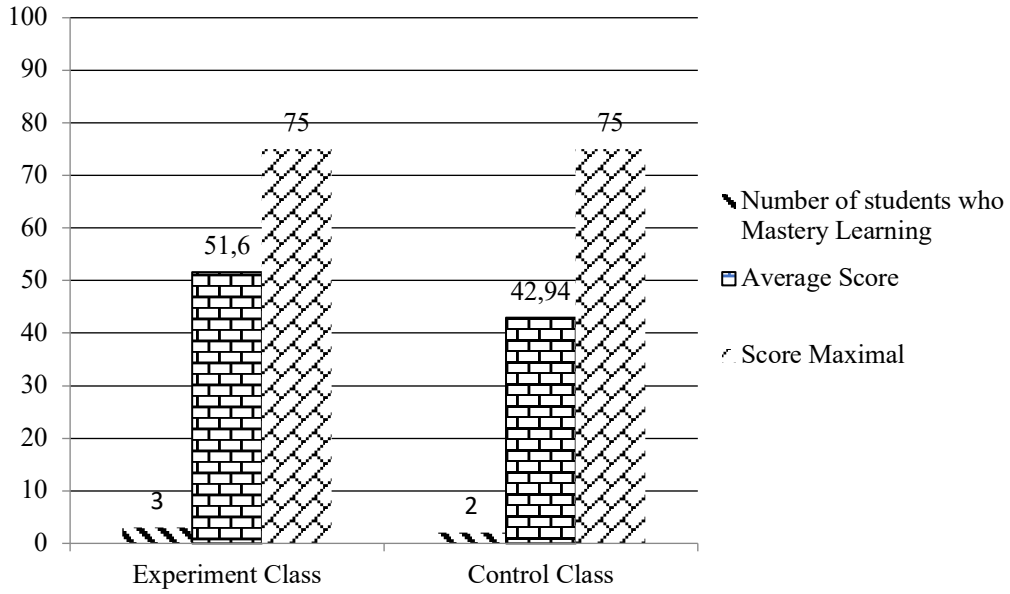

Figure 2. Comparison of Students' Initial Interpretation Skill in Experiment and Control Class

Based on Figure 2, it can be concluded that the initial interpretation skill of the experimental class is better than the control class with an average difference of 8.64 in learning outcomes from the results of the pretest scores of the experimental class and the control class. This is due to the existence of a student grouping system at the beginning of the class division based on the level of students' academic ability, which is a form of related school policy.

The data on the comparison of students' final interpretation skill in the experimental and control classes can be seen in Figure 3.

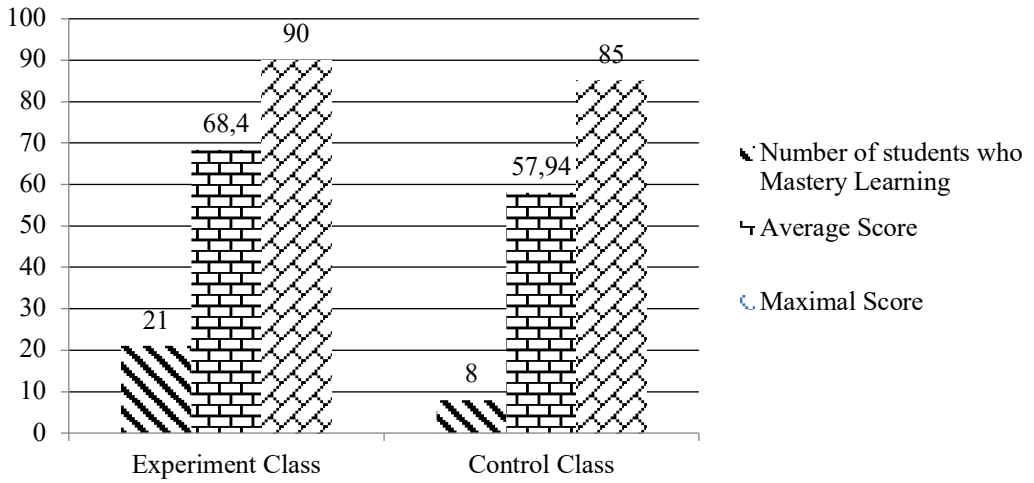

Figure 3. Comparison of Students' Final Interpretation Skill in Experiment and Control Class

Based on Figure 3, it can be concluded that the final interpretation skill of the experimental class students is better than the control class. There is a difference in the average learning outcomes of 10.46 from the posttest of the two classes.

The learning outcomes of the control class who studied the human respiratory system using PPT and learning videos of the human respiratory system as well as the experimental class using the replica of the human respiratory system are descriptively presented in Table 1.

Table 1.

Results of Descriptive Analysis of the Learning Process of The Human Respiratory System

Data	Experiment Class		Control Class	
	Pretest	**Posttest**	**Pretest**	**Posttest**
Average Score	51.57	68.42	43,37	57,75
The highest score	75	90	75	85
Lowest value	35	50	15	30
The number of students	38	38	40	40
Number of students passing KKM	3	21	2	8
Mastery Learning	7.9%	55.2%	5%	20%

Based on Table 1, it can be concluded that student learning outcomes on the human respiratory system material in the experimental class are better than the control class.

The achievement of the improvment of the use of replica of human respiratory system integrated discovery learning model in the experimental class is determined by referring to the following three indicators, namely: classical completeness of at least 50%, there is an increase in N-gain in the medium or high category and there is a significant average difference between groups students who study with replica of human respiratory system discovery learning with groups class of students who study with media od slide powerpoint and video.

1) Results of Classical Completeness Analysis of Human Respiratory System Material Learning

The first indicator of effectiveness is classical completeness. The results of classical completeness analysis in the experimental class reached 55.2%, ie from 38 there were 21 students who passed the KKM, while 17 others had not passed the KKM. This percentage is higher when compared to the control class, which is 20% classical completeness. The number of students who passed the KKM in the control class was 8 out of a total of 40 students. The comparison of the percentage of calcical completeness of the experimental class and the control class can be seen in Figure 3.

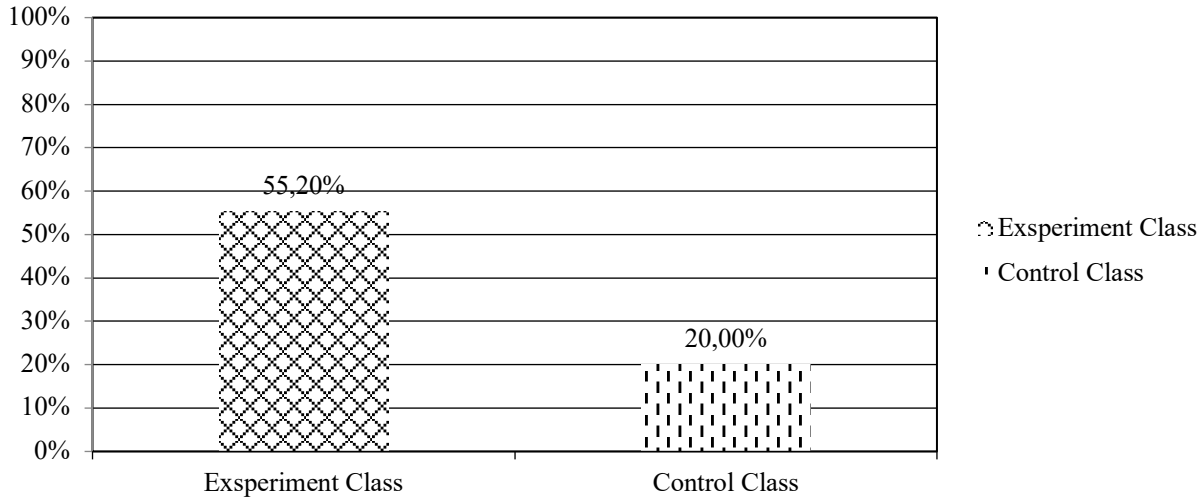

Figure 3. Results of Class Classical Completeness Calculations in Human Respiratory System Learning

Based on Figure 3, it can be concluded that the experimental class has a higher class classical mastery than the control class in learning the human respiratory system. The data from the analysis above shows that the experimental class classical completeness has reached the improvement indicator, because it is more than 50%, while the control class has not reached the improvment indicator, which is only 20%. The conclusion that can be drawn is that the use the replica of human respiration system is improve in improving students' interpretation skills.

2) Analysis Results of Increasing N-Gain in Human Respiratory System Learning Using Three-Dimensional Media and Learning Videos

The results of calculating the N-gain value were used to analyze how much improvement in students' interpretation skills occurred before and after learning the human respiratory system material, both in the experimental class and the control class. The result of calculating the N-gain value in the experimental class is 0.32 and is in the medium category. In the control class, the N-gain value is 0.22 and is in the low category. The comparison of N-gain values in the control and experimental classes is presented in Figure 4.

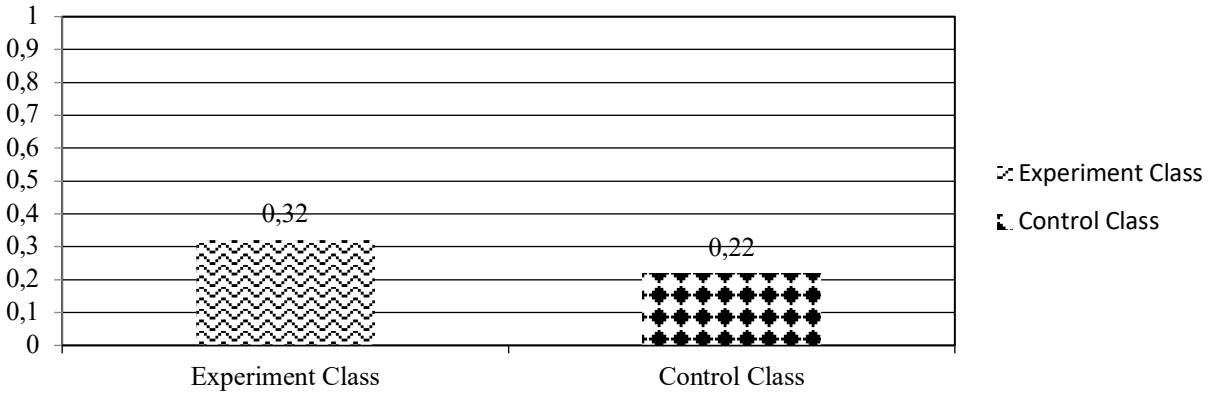

Figure 4. Results N Gain in Learning of Human Respiratory System

Based on Figure 4, it can be concluded that the N-gain value in the experimental class is higher than the control class. That is, the experimental class is in the medium category, while the control class is in the low category. This shows that replica of the human respiratory system is improve for improving students' interpretation skills.

3) The results of the analysis of the average difference in learning the human respiratory system using three-dimensional media and learning videos

The third improvement indicator is the difference in the average of the two groups (mean difference test). The result of the t-test analysis is the value of Sig. (2-tailed) < 0.05, i.e. 0.00, this can be interpreted that there is a significant difference between learning outcomes in the experimental class and the

control class.

Discussion

Interpretive skills are important for students to have. Interpretive skill is a basic skill that needs to be trained to students so that they can have higher-order thinking skills. Higher order thinking skills help students to be able to interpret and conclude the data obtained in the learning process (Sa'adah et al., 2020). Without having the ability to interpret, students find it difficult and allow errors to occur in concluding knowledge (Rohman & Kusaeri, 2021). In the respiratory system material, the ability to interpret is needed. This is because the respiratory system is a system that cannot be sensed directly by humans, so there needs to be a deep understanding and proper interpretation of the knowledge that has been obtained.

Based on Figure 2 shows that the experimental class has a better initial interpretation skill than the control class. This proves the biology teacher's statement that the experimental class has better academic skill than the control class. This difference in the initial skill of students affects the learning process and the final skill of students. Students with better initial academic skills tend to understand learning more easily, so that their learning outcomes tend to be better. The same thing that students will understand the material faster if they have better initial abilities (Astuti, 2015) said. This is evident in the results of the final ability analysis of students. Students in the experimental class with better initial interpretation skills have better final interpretation skills than the control class. The final interpretation capability is shown in Figure 2.

Based on Figure 3 the experimental class has a better final interpretation skill than the control class. The final interpretation skill of students is shown from their learning outcomes. Based on the results of the descriptive analysis presented in Table 1, the experimental class had better learning outcomes than the control class. This happens because some students experience problems in learning. Based on the results of interviews with 17 students from the experimental class who had not yet completed, the average obstacle they experienced was their low awareness of learning. Some students admitted that they did not study at all before the posttest was conducted. Other students said that they were less careful in working, coupled with the types of questions which were mostly in the form of long readings, which resulted in them being lazy to read the questions. Several other students said that the replica of human respiratory system visual aid of the respiratory system had facilitated the learning process, but students had not reviewed the learning material in class so that the posttest results were less than optimal. Reviewing important material for students to do. In order for students to review the material, the teacher provides exercises so that the information received by students can be embedded in students' long-term memory. This statement is supported by information processing theory, namely information that is given attention and is repeated through practice, the information will enter long term memory (Kusaeri, 2018).

During the pretest, there were 3 students in the experimental class who passed the KKM, while at the posttest there was a significant increase, namely 21 students who passed the KKM. The KKM set in schools is 70. The increase in the number of students who pass the KKM is influenced by the learning process that has been carried out by using replica of human respiratory system integrated with the discovery learning model. Agusriyalni et al., (2021) also said that the discovery learning model can improve student learning outcomes. In line with that, (Safitri et al., 2014) also revealed that learning by using discovery learning models and media can increase students' activities and learning outcomes. The results of research conducted by (Erlianti et al., 2016) also revealed that discovery learning can also improve students' understanding.

Based on Figure 4, the N-gain in the experimental class has a higher average than the control class. This shows that the use of replica of human respiratory system has a better effect on improving students' interpretation skills than learning with video and slide powerpoint in the control class. This happens because by using the replica of the human respiratory system, students can observe directly and in real terms the objects they are studying. These direct and real observations help students to more easily understand the respiratory system material. Students can simulate directly related to the mechanism of breathing. Alwi et al., (2021) think in harmony that the use of visual media is more effective in learning than learning without visual media. Not only visual media factors, discovery learning models also provide experience to find their own knowledge and can train students' thinking skills (Wicaksono, 2022).

Students in the learning process can perform simulations directly using visual media. This makes students directly involved, starting from holding the respiratory organs, simulating how air enters, what channels are passed and others. The simulation process directly helps students remember the respiration material better, because the students themselves operate the visual media. This is in accordance with the Deal learning experience cone that the simulation provides an opportunity for students to be directly involved in learning so that their memory of the material being studied becomes higher, namely at the percentage of 90% (Dewinggih and Adawiyah, 2021).

The learning process in the experimental class uses a discovery learning model using replica of human respiratory system. Students actively conduct discussions according to the instructions on the Student Discussion Sheet with the learning stages according to the discovery learning syntax, namely stimulation, problem statements, data collection, data processing, verification and generalization. Discovery learning syntax is related to the ability to interpret. One of the topics discussed by students is asthma. In the syntax of data collection and processing, students use replica of the human respiratory system to determine the visual appearance of the organs affected by asthma, the structure of these organs and the consequences of asthma disorders. In the data processing syntax, students can conduct a literature review to find out the causes of asthma. After knowing the cause of asthma, students can perform simulations using three-dimensional visual media of the human respiratory system to find out how asthma disorders can occur and their consequences. The process of collecting data through simulations of three-dimensional visual media of the respiratory system and literature review is what helps students practice their interpretation skills. Interpretive skill helps students understand the problem so they can collect data and conclude the answer to the problem correctly (Subaidi, 2016).

The stimulation stage in the experimental class was carried out using a video containing ten types of respiratory system disorders. At the stimulation stage, students are faced with problems that aim to create a desire to find solutions to problems themselves (Toy et al., 2018). Students who have been divided into ten groups get one type of disorder that must be discussed according to the worksheet guidelines. The ten types of disorders are asthma, rhinitis, pharyngitis, laryngitis, bronchitis, sinusitis, pneumonia, influenza, tuberculosis (tubercullosis) and emphysema. After the video is played and each group in the experimental class has got one type of respiratory disorder, the next step is to make a problem formulation. The next stage is the statement of the problem. One student in each group conveys a formulation of the problem that has been made. For example, in asthma. Videos about asthma will show a disturbance in the human respiratory system, starting from the presence of air mixed with allergens that enter the human respiratory tract until the initially normal respiratory tract becomes narrowed due to the amount of mucus in the respiratory tract. Through this stimulation stage, students will be encouraged to raise questions that will become problems and students will be motivated to find answers to the formulation of the problem. An example of a problem formulation formulated by students is "what causes constriction of the respiratory tract causing asthma?". In the next process, students will perform simulations using three-dimensional visual media of the human respiratory system by connecting the causes of asthma in the form of narrowing of the respiratory tract with the process of human respiration. This stage is carried out at the first meeting of learning, including the pretest. Material reinforcement in the form of various human respiratory organs and their functions is also carried out in this learning stage.

At the data collection stage, the replica of human respiratory system integrated with the discovery learning model was actively used by students. That is, students directly conduct simulations using , the replica of human respiratory system. At this stage, students in the experimental class carry out the process of discovering knowledge or knowledge and gain direct experience to answer the problems that have been formulated. This process occurs because the visual media have communicative, meaningful, motivating, and other characteristics.

The next stage is data processing. Students conduct discussions with their group members to process the data that has been collected. This discussion process encourages students to express opinions so that they can make students more active and focused in learning (Kamza et al., 2021). The data that has been discussed is then carried out with data verification, namely re-checking the results of the discussion with relevant theories or facts so that conclusions can then be made to answer the formulation of the problem. Data collection to verification was carried out at the second meeting in the experimental class. Researchers also provide material reinforcement to students by, the replica of human respiratory system integrated with the discovey learning model including the mechanism of

respiration and respiration bioprocess.

At the third meeting, students in each group prepare to present the results of the discussions that have been carried out. This discussion process will encourage students to be active and confident in conveying the results of their discussions with their group members. This is as expressed by (Ana, 2019) that the use of the discovery learning model in learning makes students more active, confident, able to work independently and better able to solve problems. At this stage, only four groups were selected for presentation, namely asthma, pneumonia, rhinitis, and bronchitis groups. All group members who get this type of disorder take turns presenting the results of their discussions in front of the class equipped with a simulation process using the replica of human respiratory system. At this stage, students play a more active role in learning than the teacher. This student activity helps students to assemble their own knowledge. This is in accordance with the results of research (Istiqomah & Nurulhaq, 2021) that the discovery learning model helps students to build their own knowledge through student activities in learning.

The learning stages based on the discovery learning syntax are in accordance with the cognitive learning theory, which is about how students gain knowledge about something they learn through the stages of learning by presenting their findings (Widiyati, 2014). In the experimental class, through the discovery learning model, the teacher provides opportunities for students to learn actively, namely by discovering their own knowledge throught he replica of human respiratory system and literature studies. This makes learning activities run better. Then the learning process in the experimental class using replica of the human respiratory system and discovery learning learning models provide better learning outcomes than the control class in improving students' interpretation skills.

The learning process in the control class is different from the experimental class. In the control class, the learning of the respiratory system is done conventionally using video and PPT with lecture and discussion methods without using. The use of the lecture method in learning causes boredom for students, so that students pay less attention to the explanation of the material by the teacher (Savitri et al., 2018). The first meeting in the control class was carried out with a pretest and delivery of material using PPT which included various respiratory organs and their functions. The second meeting was conducted using a video lesson which contains the mechanism of breathing and bioprocesses that occur in the human lungs.

Students in the control class also held discussions at the third meeting. The discussion process involves students in the question-and-answer process, listening and paying attention to the things being discussed, thereby increasing the effectiveness of learning (Ahmad, 2018). The things discussed were about various respiratory disorders. Students in the control class must discuss the types of disturbances, the causes of the disturbances to the solutions to overcome these disorders. The results of the discussion are written on a piece of paper and then presented by each group. At the fourth meeting, the experimental class and the control class were conducted posttest using 20 multiple choice questions. The posttest was carried out for fifty minutes. The allocation of posttest time which is longer than the pretest is intended so that students can be more optimal in working on the questions given. The results of the posttest in both classes were analyzed according to the effectiveness indicators used so that the N-gain value of each class could be known as described previously.

The third improvement indicator is the difference in the average group of students who learn with replica of human respiratory system with groups of students who study with PPT and video. The results of the t-test showed that there was a significant difference between the learning outcomes in the experimental class and the control class. Based on the results of the analysis of the three improvement indicators above, the replica of human respiratory system can be said to be improve for improving students' interpretive skill. The use of replicas of the respiratory system in learning needs to be optimized to get better results. This is suggested because in this study 44.7% of students in the experimental class had not yet finished. This is due to the characteristics of students who are not familiar with learning media and models that direct students to be more active. Because in normal learning, biology teachers at schools use the lecture method and media in the form of PPT and videos from YouTube, so there needs to be habituation in a better direction.

CONCLUSION

Based on the results of the research that has been done as well as the results of the analysis and discussion in the previous chapter, it can be concluded that the replica of human respiratory can be

improve students' interpretation skills. The replica of the human respiratory system can visualize the human respiratory system that cannot be sensed directly into a more tangible form which includes organs, organ structures to the structure of the respiratory system in the human body.

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