The Effectiveness of Powtoon Animation Media on Student Learning Outcomes in Human Respiratory System Subject

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INTRODUCTION

Education is a link between individuals and their environment in an increasingly developing globalization era to increase the quality of human resources. Quality human resources are expected to be able to control, master, and make good use of science and technology (Fauzan et al., 2018).

According to Sari et al. (2017), the learning process requires carrying capacity, such as learning facilities, which include educational media, educational tools, books, and other learning resources and equipment needed to support the learning process. Learning media supports achieving learning objectives and can convey learning messages while stimulating students' attention, thoughts, and feelings (Yunita & Wijayanti, 2017). The media used for the teaching and learning process must be adapted to the material and objectives to be learned by students because not all media used can convey material well to students, so learning objectives will not be achieved.

The learning process using media can help the teacher convey the information obtained to students so that they can more easily understand the material that the teacher conveys (Tafonao, 2018). Trina et al. (2017) stated that the teacher, as a facilitator of learning, must be able to take advantage of currently developing technology by designing innovative and creative learning of the material to be taught so that students do not feel bored. Students who tend to get bored with learning will not make progress in learning because there is no enthusiasm for learning. Therefore, it needs a booster to increase student enthusiasm for learning so that it can improve student learning outcomes.

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ABSTRACT.
Powtoon is an online application that can be used as a learning medium. This study aims to determine the effectiveness of using powtoon animation media on student learning outcomes in the human respiratory system in class VIII SMP Negeri 3 Pontianak. The method used in this research is Quasi Experimental with Pre-test Post-test Control Group Design. The samples used were 2 classes, namely the experimental class with 31 students and the control class with 32 students, which were taken using the intact group technique. The instrument used was a multiple choice test totaling 20 questions. Learning outcome data was analyzed using the independent sample t-test. The average post-test result for the experimental class was 76.56, which was higher than the control class, which was 69.53. The effect size calculation obtained is 0.70 which is included in the medium category and contributes 25.80% in learning, so it can be concluded that powtoon animation media influences student learning outcomes.
Teaching and learning is a process that requires teachers to be more creative in using learning methods so that students can understand what is explained by the teacher (Sulaiman et al., 2018). Science is one of the subjects studied in schools, especially at the junior high school level. Science subject matter has a high level of understanding. Most of the material is abstract, which must be concretized so that students can more easily understand and absorb existing information (Yunarti, 2021). Especially science so that students can be critical when solving problems and then be able to make decisions. Teachers must be able to develop the right teaching materials to support learning. (Zunairi et al., 2023). Engaging media can make students more focused, followed by increased learning outcomes and a conducive classroom atmosphere.

Based on the results of interviews with science teachers who teach at State Junior High School Number 3 Pontianak, information is obtained that in the learning process carried out on the human respiratory system material, the teacher explains using the lecture and question and answer method using PowerPoint media, which is supported by the results of observations that have been made in student learning activities rarely ask and answer questions submitted by the teacher so that students become less active in the learning process. In addition, when the learning process takes place, many students are sleepy and chatty so students do not understand the learning conveyed by the teacher, which can affect the low learning outcomes obtained in the material being taught. Learning media used by teachers will affect student learning outcomes. Learning media not only helps teachers deliver material but also makes it easier for students to accept the material presented (Sutrisno & Siswanto, 2016).

Teachers can convey messages to students in the form of learning materials using the media as a learning tool to make students' learning success visible in their learning outcomes (Mukarromah & Meyyana, 2022). If the teacher does not change the mindset, understand the mechanisms and patterns of such rapid information dissemination (Qusthalani, 2022). One of the media that teachers in teaching can use is Powtoon. Powtoon is a free application with interesting animation features in conveying messages in animated learning videos (Fajar et al., 2017). Powtoon animation media has many background templates so you only need to insert images, text, audio, and video that you want to use as teaching materials (Fitriyani, 2019).

Hariadi (2018) said that Powtoon is an online presentation application. Powtoon itself has very interesting animations. One of the strengths of Powtoon is the animation in the form of cartoons. Powtoon animation can clarify the delivery of the material because it is an animated video that can be studied repeatedly. Powtoon animation media can simplify learning material because there is a voice as a substitute for the teacher in explaining, and the visualization presented is evident from the abstract to concrete (Arif & Muthoharoh, 2021). According to Septiana et al. (2020), Powtoon is software for making animated videos in a simple way but not for a type of film, but rather for presenting material in a more varied, unique,

Fajar et al.’s research (2017) showed that student learning outcomes for the experimental class using PowerPoint media obtained much better results when compared to student learning outcomes in the control class using PowerPoint media. Based on research conducted by Trina et al. (2017) showed that learning using the Powtoon animation software was very interesting and helped students understand the subject matter. It affected student learning outcomes both individually and classically.

Based on the background above, the researcher is interested in researching the effectiveness of using Powtoon animation media on student learning outcomes on the subject of the human respiratory system in class VIII SMP Negeri 3 Pontianak.

RESEARCH METHODS

Research Approach

The research method used in this research is Quasi-Experimental with a Pretest Posttest Control Group Design. Quasi-Experimental design is the research design used because it is difficult to get a control group used for research, and the experimental and control groups are not randomly selected (Sugiyono, 2019). This design consists of one experimental group and one control group. The experimental class was taught using Powtoon animation, and the control class was taught using PowerPoint.
Research Participant

The population in this study were all eighth-grade students of State Junior High School number 3 Pontianak in the 2021/2022 academic year who studied science with the same teacher, namely eighth grade E (31 students), eighth grade F (32 students), eighth grade G (30 students), eighth grade H (31 students), and eighth grade I (31 students). The samples in this study were taken using the intact group. According to Abraham & Supriyanti (2022), the intact group is a group-based sampling technique. The determination of the experimental and control classes was carried out by drawing lots. The samples in this study were students of eighth grade F, consisting of 32 students as the control class, and eighth grade I, consisting of 31 students as the experimental class.

Research Instruments

The instrument used is a learning achievement test sheet totaling 20 multiple-choice questions, which have been tested for validity and reliability first. The validity test in this study used SPSS 25 with valid results and was feasible, while the reliability test used the Iteman 4.3 program with a result of 0.93 (high reliability).

Data collection

The data collection technique used is the learning achievement test. According to Arikunto (2018), a test is a procedure used to determine and measure students' abilities in the cognitive domain in the form of questions that students must complete to measure learning success. Before being given learning, students were asked to work on pre-test questions to see the initial abilities of the experimental and control classes. After the treatment, the experimental and control classes were given a post-test to see the effect of the treatment.

Data analysis

The data obtained in this study were analyzed with the help of SPSS 25, the prerequisite analysis test used the normality test with the Kolmogorov-Smirnov test and the homogeneity test with the Levene test at a significance level of 0.05. Test the hypothesis using the t-test with the Independent Sample t-test at a significance level of 0.05. To find out the effectiveness of using Powtoon animation media on student learning outcomes in the human respiratory system material is done by calculating the effect size (ES) (Lestari et al., 2019).

RESULTS AND DISCUSSION

Results

The results of student learning in the experimental and control classes were seen from the results of the students’ pre-test and post-test. A comparison of student learning outcomes in the experimental and control classes can be seen in Table 1.

| Table 1. Average Student Pre-test and Post-test Results |
|-----------------|-----------------|-----------------|-----------------|-----------------|
|                 | Pre-test         |                 | Post-test        |                 |
|                 | Experiment       | Control         | Experiment       | Control         |
| Average         | 35.59            | 32.5            | 76.56            | 69.53           |
| Standard deviation | 15.59         | 15.62           | 8.51             | 10.35           |
| Completeness    | 0%              | 0%              | 54.84%           | 31.25%          |

Based on the research results shown in Table 1, it can be seen that the average learning outcomes of the experimental class using Powtoon animation media were higher than those of the control class using PowerPoint. The increase in learning outcomes in the experimental class is related to the use of Powtoon animation as a medium that helps students understand respiratory system material. The test is 76.56.

The learning outcomes obtained by students in the experimental and control classes are related to the percentage of completeness in answering the questions given. The percentage of completeness of student learning outcomes is supported by the high number of students who answered correctly per
learning objective in the experimental class compared to the control class. The percentage of completeness of student learning outcomes per learning objectives in the experimental class can be seen in Table 2.

<table>
<thead>
<tr>
<th>No</th>
<th>Learning objectives</th>
<th>No question</th>
<th>Percentage Correct Answer Per Question</th>
<th>Average Percentage of Correct Answers Per Learning Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Experiment</td>
<td>Control</td>
</tr>
<tr>
<td>1</td>
<td>Analyze the structure and function of the human respiratory system</td>
<td>1</td>
<td>96%</td>
<td>68%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>96%</td>
<td>68%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13</td>
<td>80%</td>
<td>78%</td>
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<tr>
<td></td>
<td></td>
<td>14</td>
<td>83%</td>
<td>65%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
<td>90%</td>
<td>71%</td>
</tr>
<tr>
<td>2</td>
<td>Analyze chest breathing and abdominal breathing</td>
<td>16</td>
<td>74%</td>
<td>71%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17</td>
<td>93%</td>
<td>65%</td>
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<tr>
<td></td>
<td></td>
<td>18</td>
<td>80%</td>
<td>81%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19</td>
<td>93%</td>
<td>75%</td>
</tr>
<tr>
<td>3</td>
<td>Analyzing respiratory frequency in humans</td>
<td>2</td>
<td>100%</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>93%</td>
<td>75%</td>
</tr>
<tr>
<td>4</td>
<td>Analyzing respiratory volume in humans</td>
<td>4</td>
<td>51%</td>
<td>56%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>96%</td>
<td>71%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>93%</td>
<td>71%</td>
</tr>
<tr>
<td>5</td>
<td>Analyzing disorders of the respiratory system in humans and efforts to maintain the health of the respiratory system in humans</td>
<td>7</td>
<td>45%</td>
<td>34%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>38%</td>
<td>34%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9</td>
<td>87%</td>
<td>78%</td>
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<td></td>
<td></td>
<td>10</td>
<td>58%</td>
<td>68%</td>
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<td>93%</td>
<td>71%</td>
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<tr>
<td></td>
<td></td>
<td>20</td>
<td>100%</td>
<td>90%</td>
</tr>
</tbody>
</table>

Based on Table 2, the average percentage of correct answers per learning objective for the experimental class was 77.92%, which was 77.92% higher than the control class, which was 69.2%. This shows that using Powtoon animation media in the experimental class helps students answer post-test questions.

Discussion

Research shows increased student learning outcomes on respiratory system material after using Powtoon animation as a learning medium. This is because using Powtoon animation media can attract students' attention, make students more focused on the material being explained, and make students more enthusiastic in participating in the learning process to improve learning outcomes. This is in line with the opinion of Nurharyani et al. (2015), who stated that using Powtoon animation can attract students' attention, stimulate students' thinking, and increase student motivation to make learning more memorable. According to Pangestu & Wafa (2018), Powtoon is an online service for making presentations with very interesting animation features, including handwritten animations, cartoon animations, livelier transition effects, and very easy timeline settings. The result of this media is in the form of animated videos with Video lengths that can be adjusted according to needs.

Table 2 shows that the percentage of students answering correctly on learning objectives is influenced by the media used during learning. Learning outcomes can be a benchmark for achieving a learning goal (Shiddiqy & Suputra, 2022). Learning media helps the effectiveness of the learning process and delivery of messages by helping students improve understanding, presenting data, and improving student learning outcomes (Tarigan & Siagian, 2015).

The 1st learning objective analyzes the structure and function of the respiratory system. The percentage of complete learning outcomes per learning objective in the experimental class is 89% higher than the control class, which is 70%. In the 1st learning objective, there are five questions, namely, 1, 12, 13, 14, and 15, and of the five questions, experimental class students have a higher
percentage of correct answers per question than the control class. This is because students learn and discover the respiratory organs in humans and their functions by themselves in Powtoon animation media so that students can better remember the material presented. In line with Fajri’s opinion (2019), learning must maximally involve students in gathering and identifying information so that they can discover knowledge on their own. The use of Powtoon animation media for the first learning objective contains material on the structure and function of the human respiratory system, which is supplemented by clear pictures and video animations about respiratory organs to assist students in associating the material studied with the post-test questions given so that students already have the information needed when working on the problem. According to Mardahiah & Akbar (2018), the carrying capacity is required from using the media because the learning process must provide variety in teaching and provide more reality in teaching so that children's experiences are more concrete. Whereas in the control class, the PowerPoint media did not help students answer the post-test questions in the form of pictures because of the lack of explanations that explained the parts of the pictures properly.

The second learning objective is to analyze chest breathing and abdominal breathing, the percentage of complete learning outcomes per learning objective in the experimental class is 85% higher than the control class, which is 73%. In the second learning objective, there are four questions, namely, 16, 17, 18, and 19. Question number 18 has a lower percentage of the four questions than the control class. The material for question number 18 is already available in the Powtoon animation media and the student worksheets. Question number 18 is a question about the muscles that play a role when doing chest and abdominal breathing. In the experimental class using Powtoon animation media, students receive material containing animated videos presenting how chest or abdominal breathing occurs. However, the animation showing the chest and abdominal breathing mechanisms is displayed too fast. Hence, the explanation in the video of the processes that occur is not quite right. According to Septiana et al. (2020), Powtoon is a software for making animated videos in a simple way not for a type of film, but rather for presenting material in a more varied, unique, and fun way according to the level of imagination, substance, creation, and contemplation. According to Kurniawan (2016), videos provide messages that students can receive more evenly because videos can explain a process, overcome space and time limitations, are more realistic, and can be repeated or stopped as needed.

The 3rd learning objective analyzes respiratory frequency in humans, the percentage of completeness of learning outcomes per learning objective in the experimental class is 96.5% higher than the control class which is 75%. The 3rd learning objective has two questions, number 2 and 3. Of the two questions, experimental class students have more correct answers per question than the control class. In the experimental class using Powtoon animation, students receive material on human respiratory frequency in the form of a clearer video equipped with moving animation. According to Maulida et al. (2019), the advantages of animated video media are the combination of elements such as audio, text, video, Images, and sound into one so that it becomes an interesting medium for students and can clarify the message conveyed so that students can easily understand the material being studied. According to Masani (2021), media clarifies information, emphasizes essential parts, and clarifies the learning structure. In the control class, using PowerPoint, students only depend on the teacher's explanation to record essential points in learning, and it is difficult for students to remember the material presented.

The 4th learning objective analyzes the respiratory volume in humans, the percentage of completeness of learning outcomes per learning objective in the experimental class is 68.5% higher than that of the control class, which is 66%. In the 4th learning objective, there are three questions, namely numbers 4, 5, and 6. Of the three questions, question number 4 in the experimental class has a lower percentage of correct answers per question compared to the control class. The material in question number 4 is already available in the Powtoon animation media and the student's worksheet. Regarding numbers, 4 is a matter of statement regarding the respiratory volume in humans. In the experimental class using Powtoon animation, students received material on respiratory volume in humans through a video with animation, writing, and sound explaining various air volume types in
humans. However, because this material must be memorized, some students are mistaken in differentiating the volume contained in the lungs. According to Romadhona (2017), video packaging is in the form of animation to attract students to be more active in learning. The material presented is more interesting and makes it easier to receive learning material.

The 5th learning objective analyzes disorders of the respiratory system in humans and efforts to maintain the health of the respiratory system in humans. The percentage of complete learning outcomes per learning objective in the experimental class is 77.6% higher than the control class, which is 62%. In the 5th learning objective, there are six questions, namely numbers 7, 8, 9, 10, 11, and 20. Of the six questions, question 10 in the experimental class has a lower percentage of completeness than the control class. The material for question number 10 is already available in the Powtoon animation media and the LKPD. The question in number 10 is a picture of the human respiratory organs affected by respiratory system diseases. In the experimental class, Powtoon animation displays videos with explanations and animations related to disorders of the respiratory system in humans and efforts to maintain the health of the respiratory system in humans. However, the video that is displayed does not explain the images related to respiratory system diseases that are conveyed. Videos can provide opportunities for students to understand and strengthen their understanding of the material (Busyaeri et al., 2016). According to Andriani (2018), Powtoon helps teachers design learning material concepts by using animated illustrations that follow the description of the material that occurs in real life.

To find out the initial abilities of students before receiving the treatment process in learning between the experimental and control classes, the normality test and homogeneity of variance test were first carried out on the student's pre-test data on the respiratory system material. The Kolmogorov-Smirnov test carried out the pre-test data normality test. The experimental and control classes obtained a sig value of 0.200 > 0.05, and it can be concluded that the data is normally distributed. Based on the results of the homogeneity test with the Levene test, it was obtained sig 0.889 > 0.05, which means that the variance of the experimental and control classes is homogeneous, so it is continued with the t-test. Based on the t-test results using the Independent sample t-test, it obtained a sig (2-tailed) value of 0.456 > 0.05, which means there was no difference in the pre-test learning outcomes of the experimental and control classes.

To see the knowledge and understanding of students after participating in the learning process given by giving different treatments to the human respiratory system material. The experimental class will use Powtoon animation while the control class will use PowerPoint, so the normality test and homogeneity of variance test are first carried out on the post-test data of students on the respiratory system. The Kolmogorov-Smirnov test carried out the post-test data normality test. In the experimental class, a sig value of 0.167 > 0.05, and in the control class it was obtained a sig value of 0.089 > 0.05 can be concluded that the data of both classes are normally distributed. Based on the results of the homogeneity test with the Levene test, sig 0.298 > 0.05 was obtained, which means that the variance of the experimental and control classes is homogeneous, so it is continued with the t-test. Based on the results of the t-test using the Independent sample t-test, it obtained a sig (2-tailed) value of 0.00 <0.05, it can be concluded that there is an effect of the use of Powtoon animation media on student learning outcomes in the human respiratory system material. The effect size calculation results obtained a value of 0.70, included in the medium category. If it is converted into a table of normal curves from OZ, an area of 25.80 is obtained. Thus, the Powtoon animation media contributes 25.80% to the effect of learning outcomes for Eighth Grade State Junior High School Number 3 Pontianak. The effect size calculation results obtained a value of 0.70, included in the medium category. If it is converted into a table of normal curves from OZ, an area of 25.80 is obtained, thus the Powtoon animation media contributes 25.80% to the effect of learning outcomes for Eighth Grade State Junior High School Number 3 Pontianak. The effect size calculation results obtained a value of 0.70 included in the medium category. If it is converted into a table of normal curves from OZ, an area of 25.80 is obtained, thus the Powtoon animation media contributes 25.80% to the effect of learning outcomes for Eighth Grade State Junior High School Number 3 Pontianak.

Overall the Powtoon animation media visualizes and clarifies the material of the human respiratory system through videos in the form of pictures and animations. According to Istiqomah et
al. (2017), the use of video media has the advantage that it can be played repeatedly and can be used for a long period in the learning process as long as the content of the media is still relevant to the existing material and can also show some aspects that are difficult to explain directly. According to Nurharyani et al. (2015) using Powtoon animation can attract students’ attention.

Apart from that, the conditions in which students arrange their learning media allow the Powtoon animation media to have a better effect on student learning outcomes in the material of the respiratory system. This condition does not exist in the PowerPoint media that is applied in the control class because the PowerPoint media is only operated by the teacher when explaining material on the human respiratory system. According to Kurniawan (2016), videos provide messages that students can receive more evenly because videos can explain a process, overcome space and time limitations, are more realistic, and can be repeated or stopped as needed. According to Kasman (2020), students can receive information and remember it better when students can adjust the pace of the presentation of the material themselves.

CONCLUSION

The results showed that the average student learning outcome using Powtoon animation on the human respiratory system subject was 76.56, and students using PowerPoint media were 69.53. The calculation results in the test using the Independent sample t-test on the post-test data of the experimental and control classes obtained a sig (2-tailed) value of 0.00 <0.05, and an effect size value of 0.70 included in the moderate category contributing 25.80% in learning, so it can be seen that the animated Powtoon media is effective on student learning outcomes. The author suggests applying Powtoon animation to improve 21st-century skills.

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References


