PAPER

Improving Student Learning Outcomes Using Powtoon Media Apps

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ABSTRACT

21st-century learning requires us to utilize technology to enhance learning. Powtoon is one of the media that can be used. The aim of this research is to demonstrate that the utilization of Powtoon video media can enhance student learning outcomes regarding the excretory system. This research utilizes a pre-experimental method employing a one-group pretest-posttest design. This research involved 80 students who were divided into three groups: the upper group, the middle group, and the lower group. Data collection techniques include observation, tests, and questionnaires. The data analysis technique employs a quantitative analysis approach. The research results show that: 1). the learning outcomes in the top group showed an N-gain of 0.68. 2) The learning outcomes in the medium group had an N-gain of 0.57. 3) The learning outcomes in the top group showed an N-gain of 0.66. Thus, it can be concluded that the use of Powtoon video media can enhance student learning outcomes. We recommend that if Powtoon media is used and created with greater creativity, it can effectively support the learning process.

KEYWORDS

learning outcomes, Powtoon media, Powtoon application, excretory system

1 INTRODUCTION

One of the key aspects that highlight 21st-century learning is the proficiency of both teachers and students in utilizing technology. Technology is an indispensable necessity in today's learning. During the COVID-19 pandemic, learning has almost shifted to online platforms worldwide. This shift has necessitated the use of relevant technology to support remote learning. This form of online learning can be done wherever and whenever students are, without the need to meet in person. In the digital era, online learning is becoming more sophisticated with the use of various applications and features that enhance the user experience. Online learning can be facilitated through various technological tools such as video streaming, voice messages, email, animated online reading, or online video streaming [1].

Before implementing online learning, there are three conditions that must be met for education to run smoothly. These conditions include: (1) conducting the teaching and learning process through an Internet connection; (2) providing students with services such as print and digital resources; and (3) ensuring that tutors are available to assist students in overcoming any difficulties they may encounter during the learning process [2].

In online learning, teachers experience difficulty delivering learning materials because they cannot interact directly with students. Thus, learning is not effective if you do not meet face-to-face. Over time, various types of applications and features have emerged to facilitate learning for both teachers and students. Some commonly used applications for online learning include e-learning, Google Classroom, WhatsApp groups, Zoom meetings, Google Meet, Google Forms, YouTube, and others [3]. In this case, teachers must possess strong digital literacy skills and be proficient in using various applications that can support learning, such as Powtoon Media. In this study, we utilized Powtoon Media to present the material on the excretory system.

2 LITERATURE REVIEW

Improving student learning outcomes is the teacher's responsibility as part of the teaching and learning process in the classroom. Teachers must be able to facilitate interaction with students so that all students can actively participate in an optimal learning process. Teachers must also create effective and enjoyable learning environments so that students do not get bored and their academic performance improves. This can be achieved if the teacher is able to effectively utilize media for teaching and learning activities, allowing students to concentrate on the content of the learning material.

Student learning outcomes influence the quality of student achievement. There are several factors that influence low learning achievement among students at school, namely internal and external factors. Several factors influence student learning outcomes. Firstly, it originates from within the student, including their level of cognitive development, ability to focus, talents, and interests, as well as their physical and mental maturity. These factors can either enhance or hinder their interest in learning. Second, there are various factors that contribute to a student's academic success, including the learning environment, teaching methods employed by teachers, school regulations, infrastructure, and family support.

From the problem analysis that has been conducted, this research aims to demonstrate that the utilization of Powtoon video media can enhance student learning outcomes. Powtoon is an audiovisual teaching tool that showcases animated visuals. Powtoon is an online service with interesting animation features that allow users to convey messages in video form [4]. This is an alternative approach to technology development that serves as an interactive learning tool. It aims to make difficult material more interesting and easier for students to understand by presenting it through a combination of various media, including audio and images. Therefore, Powtoon is a very interesting media tool to use in the classroom as an alternative learning resource. It helps prevent students from feeling bored while studying and also adds variety to the teacher's instructional materials.

Powtoon media has been widely used and has succeeded in improving student learning outcomes across various subjects. This Powtoon-based learning is considered valid by experts, practical in its application, and has the potential to impact students' understanding of the learning material [5]. Powtoon can be a solution to improve

communication skills in the learning process. Powtoon has many useful features, such as text, music, animation, characters, and audio-visuals, for EFL students [6].

Several features, such as learning videos, can be created and packaged by teachers to support the learning process with specific materials. One example is the use of videos that teachers can design directly through the application. The use of videos is highly effective in supporting learning and enhancing student learning outcomes. Animated videos can be used as alternative media for the learning process [7, 8]. Powtoon media can be applied to help students understand and improve their expressive abilities [9]. Different treatments demonstrate significant disparities in learning outcomes between the control class and the experimental class [10]. Powtoon animated videos can be developed using various materials, which can serve as an alternative learning medium to create an enjoyable learning experience and enhance student motivation [11, 12]. Powtoon is a web-based application that allows users to create animated presentations using images and music. The advantage of Powtoon media is that it can present animated cartoon displays that attract students' attention and engage them in the learning process. Learning using Powtoon videos can have a positive impact on improving learning outcomes [13].

Students' understanding of the subject matter can be enhanced by using Powtoon media, which makes the learning process more effective. Powtoon animation learning media is a feasible and effective tool for improving understanding of mathematical concepts [14]. Using Powtoon media in the learning process can enhance the effectiveness of learning, especially when dealing with lighter material [15]. The learning media developed using Powtoon is highly valid and has received a positive response from students [16]. Apart from that, the Powtoon video learning media is effectively used and influences student learning outcomes [17].

Powtoon media can also be packaged as effective digital teaching materials that can be used in the learning process. Digital teaching materials, specifically learning videos, have been created using the Powtoon application. These videos focus on the topic of the properties of light and are categorized as being of high quality. The aim of these materials is to enhance students' conceptual understanding of the properties of light [18]. By presenting material through animated videos, it can be observed that there is an increase in learning motivation, which, of course, has an impact on learning outcomes [19]. Powtoon media is effectively implemented in schools. This will directly enrich existing technological media in elementary schools, specifically in English language lessons [20]. Another opinion revealed that the Powtoon application-based learning video on the topic of the solar system in class VI is valid and suitable for use in learning [21].

Powtoon-based media animations can be combined with various learning models and approaches. Powtoon animation videos, as a learning media based on a contextual approach, have been developed using various materials. These videos have yielded valid results and can be effectively utilized in student learning. The implication of this research is that students can learn to use media, especially animated video media [22]. Implementing problem-based learning, combined with the use of Powtoon media, can enhance student engagement and help them achieve their learning goals [23, 24]. The 5e+Powtoon learning cycle can be recommended to increase elementary school students' learning motivation [25]. So, PowerPoint-based animation video learning media is worth considering as a solution to the problem of limited innovative media.

Powtoon-based animated video learning media has "high validity" and can be utilized in the science learning process [26]. So, by using various references, a formative assessment can also be developed through Powtoon media. Formative

assessment through Powtoon, along with regular feedback, effectively enhances experiential learning for final-year students. In addition, students enjoy online visual presentations, and it is evident that Powtoon plays an important role as a formative assessment tool for students. It challenges and stimulates creativity using modern technology [27].

3 METHOD

3.1 Research design

The research design used in this study is a pre-experimental design with a one-group pretest-posttest design.

The design can be described as follows:

A1	X	A2

A1 : Pretest
A2 : Posttest
 X : Experiment using Powtoon videos

The steps that researchers will take are as follows:

1. Identify and define the problem being researched, and then provide a detailed description of the problem to narrow down the scope of the research.
2. In defining the problem, consider using hypotheses from multiple experts as the basis for the research.
3. Given the details of the defined problem, the analysis employs various significant hypotheses to address the problem statement.
4. Next, formulate a concise answer to the problem definition, which has been refined and supported by expert hypotheses, known as a speculation. Speculation is used to help scientists come up with innovative solutions to the discussed issues.
5. To test the validity of this hypothesis, analysts gathered data on a specific population, specifically class VIII students at SMP Negeri 3 Tanjungpinang City. To find the correct information, specialists need to utilize research instruments. Moreover, experts test the information for legitimacy and reliability.
6. After collecting information, scientists analyze the data to identify answers to predetermined questions and hypotheses. Information testing is conducted using software applications, particularly SPSS v24.0 for Windows and Microsoft Excel 2013. In quantitative research, data analysis involves information retrieval. Discussion of exploration results involves both external and internal clarification of the introduced information.

3.2 Samples

This research utilizes purposive sampling, which is a method of selecting participants based on specific criteria. Involving as many as 80 students, who were grouped into three groups. The first group consists of 27 students (upper group), the second group consists of 26 students (medium group), and the third group consists of 27 students (lower group).

3.3 Data collection

The following data collection procedures were carried out to obtain research data:

- **Test**
  Test procedures are used to gather information about the effectiveness of learning outcomes. The type of test used is a descriptive test consisting of a number of multiple-choice questions with answer choices A, B, C, and D. In this review, the students' prior knowledge is assessed by administering a pre-test. Afterward, they are provided with the material through Powtoon video media. Finally, a post-test with 20 similar questions is given to evaluate their understanding.

- **Questionnaire**
  A questionnaire is needed to gather supporting data regarding the use of Powtoon media using a Likert scale.

3.4 Data analysis technique

- **Data analysis**
  In this research, the information to be examined will identify the relationship between research factors. The data analysis that will be used in this research is as follows:

- **Improving student learning outcomes**
  To assess the improvement in student learning outcomes, an N-Gain calculation is conducted to determine the effectiveness of the applied learning method.

4 RESULT AND DISCUSSION

4.1 Improving student learning outcomes

To determine the increase in learning outcomes, three groups were formed: the high group, the medium group, and the low group. After determining the increase in capacity to capture content ideas with Gain in the high, medium, and low categories, student learning outcomes are calculated using Gain and further analyzed using N-Gain. The results of the gain and N-gain tests are shown in the table below.

Table 1. Improvement in student learning outcomes

Category	N-Gain	
	Score	Category
Group 1	0.68	Medium
Group 2	0.57	Medium
Group 3	0.66	Medium
Average	0.636	Medium

In Table 1, students' knowledge is categorized into three groups based on classes A, B, and C: the upper group, middle group, and lower group. This indicates that the improvement in student learning outcomes falls within the moderate category for all groups.

4.2 Hypothesis testing

In research, hypothesis testing is conducted to evaluate temporary hypotheses. Hypothesis testing using nonparametric tests, specifically the Wilcoxon test, is conducted based on the findings of the N-Gain test. The N-Gain test displays media usage data from Powtoon, which indicates an increase in learning outcomes. The hypothesis being tested is as follows:

H0:	*The use of Powtoon video media does not significantly affect the learning outcomes of eighth-grade students at SMP Negeri 3 Tanjungpinang.*
H1:	*The impact of Powtoon video media on the learning outcomes of class VIII students at SMP Negeri 3 Tanjungpinang.*

The data from this research was tested using the SPSS program. The results of the Wilcoxon nonparametric test are presented in Table 2.

Table 2. Wilcoxon test

Ranks				
		N	Mean Rank	Sum of Ranks
Posttest – Pretest	Negative Ranks	0^a	.00	.00
	Positive Ranks	75^b	38.00	2850.00
	Ties	5^c		

1. **Negative ranks**
   The difference in N, Mean, and Sum Rank of student learning outcomes for excretory system material using Powtoon media in the pre-test and post-test is 0. This indicates that there is no decrease in value from the pre-test to the post-test.

2. **Positive ranks**
   The increase in student learning outcomes for excretory material using Powtoon media, as measured by in the pre-test and post-test, was 75 for variable N. This indicates 75 that out of 80 students, experienced an improvement in their learning outcome scores.
   The average number of improvements is 38.00, and the number of positive rankings is 2850.00.

3. **Ties**
   The "ties" refer to the number of similar scores between the pre-test and post-test. The N value is 5, indicating that there are five students who have the same score between the pre-test and post-test that were administered.

Table 3. Wilcoxon test results

Test Statistics[a]	
	Posttest – Pretest
Z	7.537[b]
Asymp.Sig. (2-tailed)	0.000

The basis for making the Wilcoxon test decision is that if the Asymp.Sig value is < 0.05, then the hypothesis is rejected. Conversely if the Asymp.Sig value is > 0.05, then the hypothesis is accepted. Based on the results of the statistical tests that have been carried out, the Asymp.sig value is 0.000, which is smaller than 0.05. Therefore, so it can be concluded that the hypothesis is accepted. "The use of Powtoon video media has a significant influence on the learning outcomes of eighth-grade students at SMP Negeri 3 Tanjungpinang."

4.3 Powtoon video media assessment based on student responses

In this research, the assessment of the Powtoon video media was completed by students from the experimental class. It is based on their responses after the learning activities were conducted. The student response questionnaire in the experimental class consisted of 10 statements containing student feedback on the use of Powtoon media as a learning tool. The following is a summary of the results from student response assessments in the experimental class, as shown in Figure 1.
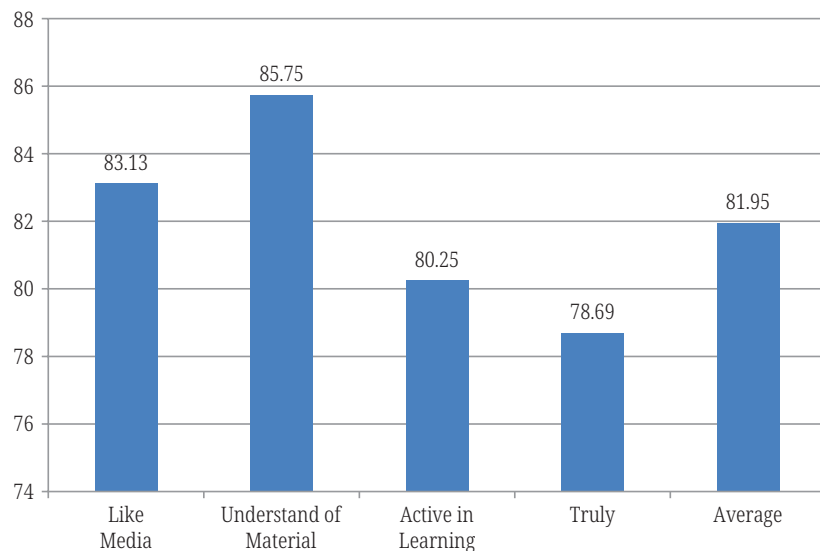

Fig. 1. Student responses to Powtoon media

In Figure 1, it can be seen that students' responses based on indicators of liking or enjoying with Powtoon video media were 83.1%. For indicators of understanding excretory system material, they were 85.7%. However, for indicators of students being active, they were 80.2%, and for indicators of students taking part in learning seriously, the percentage was not provided. The actual amount was 78.6%, with an average indicator achievement of 81.9%. With the conclusion that students are

happy and understand the lesson on the excretory system, the use of Powtoon media makes students more engaged and attentive.

4.4 Implementation observation results

To assess the effectiveness of using Powtoon video media for students and teachers, observations were conducted. An observation sheet filled out by two observers, namely the principal and the tutor, demonstrates the implementation of Powtoon video media in teaching the excretion system material. The results of implementation observations can be seen in Table 4.

Table 4. Presentation of the implementation of Powtoon video media for students

Meeting	Percentage of Implementation		Interpretation
	Yes	No	
1	80	20	Very good
2	100	0	Very good

Based on Table 4, it can be seen that the percentage of Powtoon video media implementation among these students was 80% at the 1st meeting. Furthermore, there was a 100% increase in implementation at the 2nd meeting. This indicates that learning with Powtoon media is progressing smoothly and in line with the necessary stages.

Table 5. Presentation of the implementation of Powtoon video media for teachers

Meeting	Percentage of Implementation		Interpretation
	Yes	No	
1	100	0	Very good
2	100	0	Very good

Based on Table 5, it can be observed that the percentage of Powtoon video media implementation among these students increased by 100% from the initial meeting to the second meeting. This indicates that learning with Powtoon media is progressing smoothly and in line with the necessary stages.

In this study, the, researchers collected samples from all eighth-grade students at SMP Negeri 3, Tanjungpinang. The research was conducted over the course of two meetings, with each meeting lasting two class hours. All students receive the same treatment, which is through the use of Powtoon as a learning medium. Before the learning process begins, students are administered a cognitive test or pretest on the excretion system, consisting of 20 questions. After receiving the treatment, students undergo a posttest. The aim of this research is to prove that using video media, specifically Powtoon, to teach about the excretory system can enhance student learning outcomes.

In this research, the effective learning media used for online learning is Powtoon. Powtoon is an online presentation creation service with a variety of impressive animation features. These include handwritten animations, dynamic animations and transitions, and user-friendly timeline settings. Powtoon is still considered unfamiliar

by some people because this application is relatively new to the general public. Powtoon's popularity can result in high-quality animated films compared to regular videos. According to several previous studies, it has been explained that the use of Powtoon media has been widespread and successful in enhancing student learning outcomes across different subjects. This PowToon-based learning media is considered valid by experts, practical in its application, and has the potential to impact students' understanding of the learning material [5]. Powtoon can be a solution to improve communication skills in the learning process. Powtoon has many useful features, such as text, music, animation, characters, and audio-visuals, for EFL students [6].

When conducting online learning, Google Meet is utilized to provide Powtoon video media treatment using a discovery learning model. As the learning process progressed, students began to pay more attention to the Powtoon video media that was being provided. However, during the first meeting, the students' contributions were incomplete. Not all students asked questions, and only a few students were present and inquired about charm [4].

The growing interest of students in learning is evident in their utilization of Powtoon as a learning medium. Students make use of the time allocated by their teachers to focus on the provided material. They are able to comprehend the material explained by their teachers through the use of Powtoon. Additionally, upon graduation, students utilize keywords to create topic notes based on the content they find in Powtoon. Students pay attention to the media and their preferences for the class, which helps them better understand and engage with the material. The use of videos is highly effective in supporting learning and enhancing student learning outcomes. Animated videos can be used as alternative media for the learning process [7, 8].

From the analysis of experimental class data consisting of 80 students divided into high, medium, and low groups, a normalized reinforcement test was conducted to determine the effectiveness of using Powtoon video media. Gain testing is carried out by calculating the gain, which is determined by the difference between the values before and after testing. From the results of the study, the effectiveness of using Powtoon video media can be determined to be moderate in all groups. To proceed with the non-parametric test, specifically the Wilcoxon test, the data indicates that the negative difference N, the mean, and the cumulative range of student learning outcomes for elimination using the Powtoon mean in the pre- and post-test is 0. This suggests that the score value has not decreased. The positive difference in student learning outcomes for the elimination material, using Powtoon media, between the pretest and posttest was 75 for variable N. This indicates that 75 out of 80 students showed an improvement in their appreciation for the learning outcomes. The average number of upgrades was 38.00, and there were 2850.00 positive reviews. The loop is the number of similarity values between the pretest and posttest. The N value is 5, which means that 5 students have the same value between the pre-test and post-test. Based on the results of the statistical tests carried out, the Asymp.sig value is 0.000, which indicates that it is less than 0.05. Therefore, the null hypothesis (H0) is rejected, and the alternative hypothesis (H1) is accepted. This means that this research shows the "use".

"The use of Powtoon video media has a significant impact on the learning outcomes of eighth-grade students at SMP Negeri 3 Tanjungpinang." In line with this, [13] revealed that Powtoon is a web-based application that allows users to create animated presentations using images and music. The advantage of Powtoon media is that it can present various animated cartoon displays that attract students' attention and engage them in the learning delivered by the teacher. Learning through the use of Powtoon videos will have a positive impact on enhancing learning outcomes.
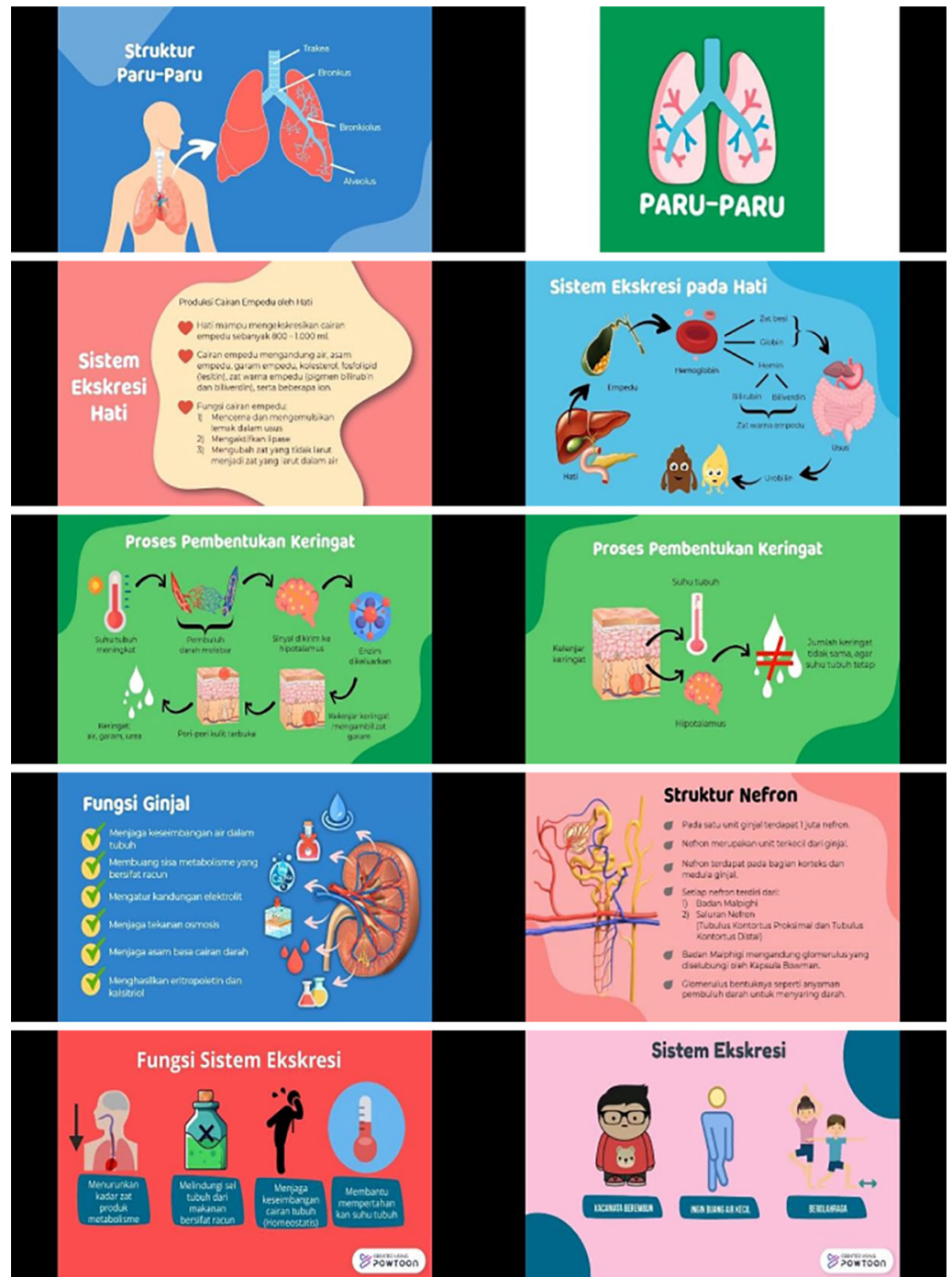
Fig. 2. Several displays created in the Powtoon application regarding excretory system material

The results of research using Powtoon video media show that the learning outcomes of eighth-grade students at SMP Negeri 3 Tanjungpinang have increased. The success of using this media is demonstrated by an increase in pre-test and post-test results. The pre-test results yielded an average score of 52.8, whereas the post-test results showed an average score of 83.5 after using Powtoon video media for learning. This research utilizes tests for validity, reliability, distinguishing power, and instrument difficulty. The validity test in this study consisted of 25 questions. The validation results revealed that 20 questions were valid, while 5 questions were

deemed invalid. Based on the results of the reliability test calculations for 25 items, a value of r11 = 0.96 was obtained, indicating that the questions were reliable. Then, the results of calculating the specificity of the 25 questions showed that there were 5 questions in the "very bad" category. Students' understanding of the subject matter can be enhanced by using Powtoon media, thereby making the learning process more effective. Powtoon animation learning media is a feasible and effective tool for improving understanding of mathematical concepts [14]. The learning media developed using Powtoon is highly valid and has received a positive response from students [16]. Apart from that, the Powtoon video learning media is effectively used and influences student learning outcomes [17].

The results of this research show a significant increase in learning outcomes when video media is used. The pre-test scores of 53% improved to 83.5% in the post-test for 80 class VIII students at SMP Negeri 3 Tanjungpinang. Like previous research examined by Trina, Kamaruddin, and Rahmani (2017, p. 166), in their research, the results of individual completeness obtained in the learning outcomes of cycles I, II, and III increased by 90%. Therefore, it can be concluded that the application of Powtoon animation software can assist teachers in improving student learning outcomes. PowToon animated videos can be developed using various materials, which can serve as an alternative learning medium to create an enjoyable learning experience and enhance student motivation [11, 12].

Powtoon media can also be packaged as effective digital teaching materials that can be used in the learning process. Digital teaching materials, specifically learning videos, have been created using the Powtoon application. These videos focus on the topic of the properties of light and are categorized as being of high quality. The aim of these materials is to enhance students' conceptual understanding of the properties of light [18]. By presenting material through animated videos, it has been observed that there is an increase in learning motivation, which, of course, has an impact on learning outcomes [19]. Another opinion suggests that using learning videos based on the Powtoon application on the topic of the solar system in sixth grade is valid and suitable [21]. As part of this research, teaching materials are supplemented with digital content in the form of educational videos. These videos are well received by students and enhance their understanding of the excretory system.

Thus, it is clear that Powtoon media can be used to support the learning process with various materials. This research still needs further development in the future, using different materials and creating more engaging and interactive videos. We recommend conducting more extensive research in the future. We highly recommend using Powtoon as a technology-based learning tool to enhance 21st-century education.

5   CONCLUSION

Based on the research results, it has been shown that the use of Powtoon media can be effective in various class groups, with no significant differences in student learning outcomes. The use of video Powtoons can also improve student learning outcomes in all classes. Learning becomes more effective, and students can easily understand the material. From the results of the teacher's observations in implementing learning using Powtoon video media on the excretory system material, significant achievements were obtained by following all the steps during the learning process using Powtoon video media. The implication of the results of this research

is that the use of Powtoon videos can be combined with various learning models or approaches, incorporating more diverse and interactive video styles. This combination can enhance the learning process and make it more enjoyable. We recommend using this media for implementation in various scientific fields, accompanied by more visually appealing video packaging.

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