Enhancement of Students' Learning Outcomes through Interactive Multimedia

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Abstract—The goal of this research was to find out the effect of implementing animated video media on student learning outcomes in Solar System science subjects and to decide the improvement in the sixth-grade student learning achievement at Padurenan Jaya elementary school. The research design used is a quantitative technique using a quasi-experimental method in a Non-Equivalent Control Group Design. The subjects of this study were the sixth-grade students at Padurenan Jaya elementary school, totaling 52 students. The sample was established by purposive sampling, namely, 28 students as the experimental group and 26 students as the control group. Techniques of data collection in this study used multiple-choice tests in pre-test and post-test. The t-test was utilized to measure differences in student learning result. Based on the study results, the average score for the pre-test control class was 46.54, and the average post-test was 64.04; while in the experimental class, the average value of the pre-test was 48.39, and the average value of the post-test was 74.82. The increase in learning outcomes for the control class was 17.50, and the experimental class was 26.43. Analysis using all results post-test and tested by t-test with the value of t count > t table (4.775 > 2.021), displaying that Ho is rejected and Ha is accepted. From these determination, it can be stated that student learning consequence using animated video media are greater than the results. Student learning using conventional methods.

Keywords—animation media, solar system, learning outcomes

1 Introduction

Information and communication technology development is very rapid in this modern era, especially in the multimedia field. Multimedia is currently being used as a means and medium of learning because of multimedia. Students are expected to understand better the lessons given. A person will remember more than what he saw, heard, and did based on research. This makes the world of education compete to use multimedia as a means and medium of learning for students. For example, in learning about the

solar system at school, if every school had to buy teaching aids so students could see what an imitation of the solar system looked like, now schools no longer need to buy props. Because with the development of multimedia technology, schools only need to display videos that describe what the solar system looks like.

Based on previous research, the application of Information Communication and Technology (ICT) is believed to significantly improve the quality of education [1]. Technology has an extraordinarily vital task. One of the considerations of using technology is that it can train students' concentration and focus on the presented material. Digital and telecommunication systems transform every aspect of 21st-century society, including schools. ICT is a good resource for school education. The outcomes will be encouraging when ICT is fully integrated into the education system. Students no longer have difficulty adapting to the ICT environment infiltrated by the education system. Readiness for ICT-based Education is linked to exposure to technology, computer use goals, college or academic experience, types of devices commonly used, levels of ICT use, and factors that may promote ICT use in schools. Showing a video as an example, besides attracting students' attention, students' attention will be focused second by second, and the students will never be willing to pass it [2]. ICT usage in education can incorporate real-world situations into teaching and learning processes learning for students learning atmosphere and motivate the students to participate in the curriculum actively and readily acquire new knowledge and skills. ICT encourages the teachers to be facilitators. The availability of ICTs in Education is vital to bring about transformational change for an effective teaching and learning process in a constructivist environment. When used in the classroom, ICT has many implications for teachers regarding the ICT-focused knowledge they need to identify, the appropriate ICT resources to use, and the pedagogical approaches to adopt to learn. Meaningful ICT learning occurs. This suggests that a specific ICT resource, ICT-oriented knowledge, and ICT-based pedagogy are necessary ingredients for the adoption of ICT by teachers. Therefore, as found in the literature, these elements could serve as possible characteristics to consider for designing ICT-based interventions that promote interactive teaching.

ICT is very important in facilitating and clarifying learning material delivery [3]. By incorporating ICT into the teaching of physics and science in general, a typical teacher-centered classroom environment could be transformed into an interactive learning environment that situates learning as a process involving the active construction of knowledge and not knowledge transfer. This suggests that the roles of teachers in such a revolution of ICT in Education are crucial to realize and appreciate the opportunities and impact of ICT as a teaching tool in education, especially teaching and learning. Therefore, it can be said that ICT can improve the quality of education. However, the impact of ICTs on teaching to achieve good results inevitably depends on their use in the classroom. Therefore, it is necessary to establish a relationship between the type of ICT and the pedagogy a teacher chooses to adopt to integrate ICT into his teaching practices. This suggests that examining pedagogy in the light of ICT requires considering what a selected ICT learning resource offers the student and teacher when used in education.

The distribution of messages or information can be done through learning media to minimize obstacles from learning resources [4]. The application of learning media in elementary schools is very important because they have limited ability to understand

abstract material at the elementary school level. One of the intended learning materials is the solar system. This material requires learning media to explain or teach students to concrete the material. In implementing learning on solar system material in general, teachers use still images available in textbooks so that students are apt to be passive and less interested because the image media cannot provide a reciprocal response, less visible and slighter appealing students. So, we need media that can simplify the material in order that the students understand the material of the solar system, get involved directly, and are interested through using learning media in the shape of multimedia.

The use of interactive animation as a learning medium is quite popular today. This is because the material delivery is more interesting and interactive and has high creativity in delivering the material. The material about the solar system is included in one of the materials of Natural Science subjects. It has a significant influence on students' level of understanding and memory. The solar system is taught for high school, junior high, and elementary school students. Hence, it is important to develop multimedia-based learning media to improve understanding of solar system concepts for 6th-grade elementary school students. Based on this, the following questions can be formulated:

a. What are the steps in developing interactive-based multimedia media learning in science learning?
b. How are the results of using interactive-based learning multimedia media on students' comprehending of solar system knowledge in science learning for the sixth-grade students at Elementary School?

1.1 Multimedia-based learning media learning

Media are media used in learning, including teaching aids for teachers and carrying messages from learning sources to recipients of learning messages (students) as presenters and distributors of messages. Learning media, in some instances, can represent teachers in presenting learning information to students.

Media is one factor that determines teaching success because it helps students and teachers deliver the subject matter in connection with teaching objectives [5]. Of the many functions of media, one of the main functions of learning media is as an intermediary capable of conveying messages or information so that they can support and affect the quality of learning provided by educators, such as motivation to learn for students, encouragement to learn, and a sense of belonging. The use of mobile applications in developing multimedia projects has attracted students' attention and ensured effective communication.

Practical research-based evidence has shown a positive association with the use of multimedia and improving children's learning skills [6]. Teaching skills through multimedia presentations can improve students' learning skills over traditional teaching methods. Better multimedia content can significantly benefit teachers and students in the classroom. Multimedia is an enhanced learning resource for teaching skills and teaching materials. Multimedia in education is a useful strategy that enables teachers to think differently and aid young children's learning process. The development of students' self-potential will run more effectively if a teacher utilizes the suitable learning media [7–9]. Teachers must have the ability to productively shape the learning media,

whether using technology or not. One of the learning media that utilizes technology is interactive multimedia. An interactive multimedia is an intermediary tool that conveys messages with collaboration from various elements that can create active learning so that messages from the information obtained can be well received. People are essential for the successful application of technology. Education can guide to adopt new technologies. The Information Technology system is essential for any data collection, storage, and analysis infrastructure.

Multimedia can create active learning for students to affect students' thinking power and provide input for the media [10–14]. Conceptually, multimedia presents two elements: text (oral or printed) and images (illustrations, photos, animations, or videos). Interactive multimedia can be created in various ways, one of which is animation with video. Interactive multimedia has a role in its use, one of which is using a computer. An innovative learning model based on the multimedia project offers students a chance to improve their language competences. Implementing multimedia in teaching helps train and develop students to express themselves orally without preparation.

Information and communication technologies are components of modern education. Mobile technologies greatly expand learning opportunities, needs, and goals and profoundly affect many learning styles and activities. With the computer, learning becomes interesting where the user does not have face-to-face with the teacher in the classroom but interacts with the media [15–19]. The concepts provided from adopting new technologies also enhance other personal skills, promoting integration into life in society.

Interactive multimedia can also increase learning motivation because, individually, students can master the subject matter as a whole. Students can also develop their abilities independently with interactive multimedia, successful learning, and efficiency in the form of more significant time savings than conventional learning [20–23]. Multimedia is a media that combines visual and audio aspects to be understood by students who have different learning styles more easily to use multimedia-based learning media as they wish. This multimedia has images, tests, animations, sounds, and videos. Multimedia transmits information using text, audio, graphics, and interactivity elements. Interactivity is defined as a navigation component. Previous research stated that multimedia could improve students' creative thinking and make it easier to absorb information. It can be concluded that multimedia is the unification of two or more communication media to convey or create something delivered via a computer or manipulated digitally to be controlled interactively to produce an attractive presentation.

1.2 Animation

Animation never develops without discovering the basic principles of human character, namely persistence of vision [24–25]. Through the optical equipment they invented, this study succeeded in proving that the human eye tends to perceive a sequence of images at a specific time as a pattern. Judging from the technique of making today's animations can be categorized into 3: Stop Motion, Traditional Animation, and Computer Animation. The development of animation at this time runs so fast in various fields. Animation is well known in cinema, especially films aimed at children.

However, now animation is used in entertainment and other areas such as advertising, web design, game marketing, and educational media. The path promotes the coaching–studying method withinside the schoolroom environment, in which everyday lectures and interactive multimedia are used. The path became stronger with numerous assisting gear and factors to guarantee the best stage of knowledge and deployment. There have been numerous gear (all designed regionally and primarily based on the neighborhood practice) to fulfill the predicted studying outgrowth. This gear is a specialized textbook primarily based totally on global best-exercise and neighborhood case studies, multimedia courseware to sell the coaching environment, commitment of stakeholders, and non-stop cycles of assessment and reinforcement primarily based totally on feed-backs and evaluation mark.

In terms of developing educational media, the animation is one of the media innovations in the form of moving visuals that can clarify the subject matter that is difficult to convey conventionally [26]. Learning animation media is a media that contains a collection of images that are processed in such a way as to move and are equipped with audio so that they are memorable and store learning messages. Learning animation media can be used as teaching tools that are ready to be used at any time to keep learning materials. By being integrated into multimedia, which contains components such as audio, video, animation, text, graphics, and images, this educational media can create dynamic and interactive presentations that make it easier for the subject matter or stages of the process of a job that cannot be presented directly.

Given the quality of animation needed, sometimes in its manufacture, it still requires sources other to be processed so that the animation looks more beautiful and maximal [27–30]. The increase in software and hardware support developments has the impact of a significant change in the current trend of teaching methods with multimedia. Because of its convenience and efficiency in all aspects, multimedia can increase interest in learning and understanding for students. Of course, this is what makes this method so attractive to teachers who want to make changes in delivering subject matter. There are several advantages of multimedia animation, including the ability to display objects that do not exist physically or termed imagery, having the ability to combine all media elements, having the ability to accommodate students according to their learning modalities, principally for those who have sight, auditive, kinesthetic, or alternative skills, being able to initiate learning components, mainly reading and listening skillfully. To design and produce animation or multimedia programs, it is required to be aware of the following factors: ease of navigation, cognitive content criteria, media integration criteria, an artistic appearance, and the overall function. The program developed must provide the learning that students want as a whole. So that when they finish running a program, students will feel they have learned something.

2 Method

The research method used aims to study the development of-based interactive multimedia media using animated videos for learning science content about the solar system, including the following steps:

2.1 Research design

This research was utilized using a quasi-experimental method from the research objectives mentioned above. The quasi-experimental research method utilized is Quasi-Experimental Design in the form of a Nonequivalent Control Group Design, namely placing the research participants into two class groups: the experimental group and the control group, which were not selected at random were pre-tested and then subjected to treatment. After being treated, the subject was handed a post-test to measure the effect of treatment on the group. The given instrument contains the same weight. The difference between the pre-test and post-test results shows the results of the treatment that has been given. The objective of quasi-experimental research is to get information that is an approximation to the information got by actual experimentation under conditions where it is unreasonable to govern and/or manipulate all relevant variables. The scheme Nonequivalent Control Group Design can be described in Table 1.

Table 1. Research design Nonequivalent Control Group Design

Group	Pre-test	Treatment	Post-test
Experiment	O1	X1	O2
Control	O3	X2	O4

Notes: O1 = Pretest for experiment group; O2 = Posttest for experiment group; O3 = Pretest for control group; O4 = Posttest for control group; X1 = Treatment of learning with animation media; X2 = No treatment of learning with animation media.

On the basis of the design above, this inquiry was run in two classes: the experimental class, which learns to use the animation media learning method, and the control class, which knows to use conventional learning methods in the science subjects of the Solar System material. The difference in the value of the experimental class learning outcomes with the control class can be interpreted as the effect of using animation media on student learning outcomes in the Solar System science subject, which is formulated as follows:

$$(O1 – O2) – (O3 – O4)$$

2.2 Population and sample

The Population of this study was sixth-grade students. The sample in this study was withdrawn from two classes at SDN Padurenan Jaya using the sampling technique using purposive sampling technique, namely to determine whether someone is a sample based on specific objectives with the considerations possessed by researchers to obtain information relevant to the research objectives. The selection of this sample was based on two considerations that the same teacher carried out the science subjects given to the two classes. So from the coordination results with the teacher concerned, the sample in this study was determined, 28 students were used as an experimental group taught with animation media, and 26 students as a control group taught using conventional

methods. The treatment given would show a clear difference in using animated media on student learning outcomes.

2.3 Research instrument

There are two sorts of data collection instruments applied in this work involving test and non-test instruments. The test instrument implemented is a test sheet for understanding elementary science concepts for solar system material, which refers to indicators (a) translation, (b) providing examples, (c) explaining. While the non-test instrument used is a questionnaire. The indicators were used to obtain an overview of students' attitudes and responses to interactive multimedia in science learning. The instrument validation used is the validity test and the reliability test.

2.4 Data analysis

Analysis used consists of initial and final data analysis. The initial data utilized is the daily test scores of students in the solar system science subject in the odd semester of the 2020/2021 academic year. Data analysis used an inferential statistical test. Before the inferential statistical test (parametric and non-parametric), the data must meet the normality requirements to display whether the data is normally distributed or not. Analyzing data applied to check the hypothesis in this research is the t-test. The data analysis technique was led using SPSS 17.0.

3 Results

3.1 System interface

Development of Multimedia-based IPA interactive learning media using Adobe Premiere Pro application program. In its development, audio-visual and animation are applied to storyboards by utilizing the Adobe Premiere Pro application facilities, which link and combine sound, video, and animation with the click of a button created. This is used to attract students' attention in learning the science of solar system material.

The design of this learning media is designed according to the material to be delivered by referring to an attractive, efficient, effective, and interactive display. In addition, the design pays attention to the ease of programmers in translating into the form of a programming language or on the animation that will be made when it is developed again. The media design is made in the form of a storyboard to facilitate the implementation of the design during the implementation of learning and simplify the students to understand the material that has been arranged according to the flow or sequence of the material on the syllabus.

The cover page display consists of the media title and a button that moves to the home slide. At this stage, what needs to be considered is students' focus before starting this interactive media. The opening page is designed in such a way with sound effects and animations to attract students' attention.

Fig. 1. Display of interactive media home page material

The cover page display consists of the media title and a button that moves to the home slide. At this stage, what needs to be considered is students' focus before starting this interactive media. The opening page is designed in such a way with sound effects and animations to attract students' attention. The content menu page display consists of instructions for use, learning objectives, and learning materials. After clicking the start button on the slide home page, you will go to the menu page. Students can follow the instructions for using this interactive learning media. The design is made simple to make it easier for students.

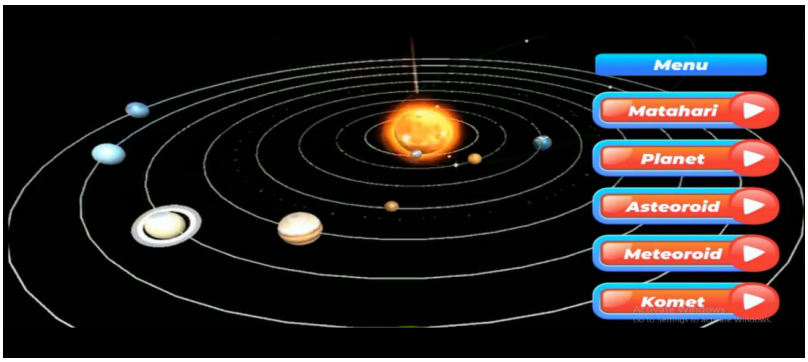

Fig. 2. Interactive media menu page display of solar system simple fractions

3.2 The effect of interactive multimedia in solar system materials to improve students' learning outcomes

Data analysis was to test the difference in initial ability between the control group and the experimental group. The test is using a t-test. Expected results show no significant

difference between the initial ability between the control and experimental groups. The second analysis is to test the proposed hypothesis. In this case, the proposed hypothesis consists of Ho and Ha. Ho is the value of student learning outcomes using interactive multimedia video animation smaller than the learning outcomes of students using blackboard media in the Solar System science subject. Ha is the value of student learning outcomes using interactive multimedia video animation greater than the learning outcomes of students using blackboard media in science subjects for the Solar System.

The analytical technique used is a t-test to test the comparative hypothesis of two independent samples if the data are in intervals or ratios. However, to use the t-test, there are analytical requirements; namely, the data must be homogeneous and normally distributed. Then the homogeneity test and normality test were managed. The homogeneity test designs to dictate whether or not the sample taken from a population is homogeneous. If the two groups have the same variance, the group is said to be homogeneous. The homogeneity test was carried out handling the F test. The normality test seeks to decide whether the data distribution is normal or not. The parametric statistical analysis technique can be used if the distribution is normal. The data normality test technique uses the value of Chi-squared.

The criteria for acceptance or rejection of Ho at a significance level of 5% can be seen through the t-count value in the table (for the one-sided test), if the t-count value is larger than the specified error level (t-count value > t table) then Ho is rejected, and Ha is accepted, whereas if the value of t count < t table, Ho is accepted and Ha is rejected.

Hypothesis testing in this study was done with t-test (Independent Sample Test). This test will be assisted by using the SPSS 17 program to facilitate the analysis process. The null hypothesis (Ho) reads, "The value of student learning outcomes using interactive multimedia based on animated videos is smaller than the learning outcomes of students using blackboard media in the Solar System science subject". While the alternative hypothesis (Ha) reads, "The value of student learning outcomes using interactive multimedia based on animated videos is greater than the learning outcomes of students using blackboard media in the Solar System science subject".

From the results of the research conducted, a description of the data that has been obtained from the initial test (will be presented pre-test) which is a description of the initial condition of students before the experiment is overseen and the final test (post-test) is the result after being given treatment. The learning given to the two groups used different treatments, learning with animated video media in the experimental class and for the control class using traditional learning or with lectures and whiteboards in science lessons on the Solar system material. This treatment was used to determine the difference in the influence of the media used.

This research was conducted using the t-test (*independent sample test*) to test the hypothesis. To perform the t-test, the requirement is that the data for each variable must be normally distributed. The data analyzed were from the *pre-test* and *post-test* in the experimental and control groups. To determine whether the data from the research *pre-test* and *post-test* above are normally distributed or not, these data need to be processed with the data normality test. If the distribution is normal, then parametric statistical techniques can be used. The normality test analysis technique uses the Chi-squared value with the provision that the calculated Chi-squared price is compared with the table's Chi-squared price at a significant level of 5%. Normality test results

pre-test and *post-test* the two groups can be viewed in Tables 2 and 3. Table 2 offers that the initial test scores of the experimental and control groups showed a value of x^2 counted $<x^2$ table, which means that the initial test scores of the experimental group and the control group the two groups are normally distributed.

Table 2. Results of the analysis of normality test pre-test

Class	x^2 count	x^2 table	Description
Experiment	9.69	11.07	Normal distribution
Control	5.85	11.07	Normal distribution

Table 3. The results of the analysis of normality test post-test

Class	x^2 count	x^2 table	Description
Experiment	6.45	11.07	Normal distribution
Control	8.70	11.07	Normal distribution

Based on the Table 3, it can be displayed that the two groups, namely the experimental group that was allowed learning treatment with animation media and the control group with conventional learning (whiteboard), showed a value x^2 count $<x^2$ table, this means that the initial test scores of the two groups are normally distributed. After the values of the two research groups were declared to be normally distributed, the homogeneity value was sought. The homogeneity test used data *pre-test* from the experimental and control classes. The test criteria for the two sample groups are said to be homogeneous if F count < F table, at = 0.05. According to Sudjana (2002: 249), if F count < F table, it means that the sample class data has a homogeneous variance. On the other hand, if F count > F table, the sample class data is not homogeneous. The results of the homogeneity test can be arrayed in Table 4.

Table 4. The results of the analysis of the homogeneity test

Data	F_h	F_t	Description
Pre-test	1.61	1.83	Homogeneous variance

It can be presented in Table 4 that the price *F* calculated is smaller than the *F* table value for error level 5%. It can be ended that the data variance *pre-test* is homogeneous. For the complete calculation, see the attachment of the homogeneity test *pre-test*. Testing is undertaken by using the t-test, which is based on the contrast of *t-count* with *t-table*, as a basis for decision making: If the statistical counted (*t-counted*) > table statistics (*t- table*), then Ho is rejected and Ha is accepted. If the statistical count (*t-count*) < table statistics (*t-table*), then Ho is accepted and Ha is rejected. Before testing the hypothesis, first, the average similarity test of the two groups was performed to determine the initial potentiality of the control group and the experimental group. A statistical hypothesis, Ho: there is no significant difference between the results of the *pre-test* students in the control class and the experimental class. Ha: there is a significant difference between the results *pre-test* of the control class students and the experimental class. The following data shows the results of the t-test with the help of SPSS 17.0.

Table 5. Independent samples test

F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
.947	.335	.417	52	.678	1.854	4.443	10.771	7.062

Based on Table 5, the result of the analysis that the value p-value Sig. = 0.678 > 0.05 then Ho is accepted and Ha is rejected. Then if we compare the t-count and t-table (0.417 < 2.021) with df (degree of freedom) = n1 + n2 = 54, it shows that Ho is accepted and Ha is rejected. So it can be drawn to a close that there is no significant difference between the results of the pre-test students in the control class and the experimental class. After testing the average similarity, then proceed with hypothesis testing. Table 6 reveals the findings of hypothesis testing with the help of SPSS 17.0.

Table 6. Independent samples test

F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
1.61	.252	4.775	52	.000	–10.783	2.258	–15.315	–6.252

Table 6 exhibits that in column F test, if its significance > 0.05, then the assumption is that the variance is the same; otherwise, if Sig. < 0.05, then the variance is not the same. From the results of the hypothesis test for the Levene Sig. 0.252 > 0.05 indicates that the variance is homogeneous. With = 0.05. The t-test column shows that the P-value = 0.0001 for the 2-sided test. P-Value Sig. = 0.0001 < 0.05, then Ho is rejected, and Ha is accepted. And when compared between t-count and t-table (4.775 > 2.021) with df (degree of freedom) = n1 + n2 – 2 = 52, it shows that Ho is rejected and Ha is accepted, meaning the value of student learning outcomes which uses animation media is greater than the learning outcomes of students who use conventional media. So from the statements and calculations above, it can be concluded that animation media positively influences its use.

4 Discussion

This analysis was to find out about the culmination of using multimedia-based learning media with animated videos on student learning outcomes through the ability to understand the concept of the solar system in science subjects for sixth grade at Padurenan Jaya elementary school. The results show that the use of interactive multimedia-based learning media has an effect on increasing students' understanding of concepts through pre-test and post-test. This happens because the manipulation of interactive learning media utilizing multimedia with animation gets students' attention so that messages conveyed through the media can increase student understanding. This aligns with the study showing that interactive multimedia positively impact teaching primary education. Using interactive methods can improve students' knowledge and

skills compared to traditional methods [31–32]. Using interactive multimedia learning media, students can control learning activities and determine the learning speed and the sequence of learning activities according to their needs.

Interactive multimedia can develop unlimited creativity [33–35]. Interactive media can provide guidance and learn a lot of fun things. Data analysis shows that the increase in students' conceptual understanding can be launched from the value and student learning outcomes that increase after the learning process with multimedia-based interactive learning media in complex Solar System science subjects can be explained using animation with analogies that are closely related to students' daily activities. So that students can visualize abstract concepts to be more concrete. This is in line with the study that stated that interactive media helped students' understanding process through concrete visualization. Students worked individually by repeating the media as much time as needed to process the learning material.

This research is also strengthened by research stating that the learning process with multimedia is important by utilizing technology. Students are given direct reinforcement by being projected by everyday life to increase their understanding of concepts [36–37]. One of the objectives of learning science is understanding the concept that can be achieved. Therefore, technology-based media helps students in developing their cognitive skills. Technology helps visualize abstract concepts more concretely. This is in accordance with the level of thinking of elementary school students at the concrete operational stage.

The hypothesis test results showed that there was a significant difference between the experimental class students' learning outcomes and the control class students' learning outcomes. The results of the pre-test group were used as data analysis to determine the level of difference between the two groups. The average pre-test result for the control class was 46.54, and the average result for the pre-test of the experimental class was 48.39.

The technique used in data analysis uses the normality test as a prerequisite test to measure the level of data normality, and the t-test is used as hypothesis testing. From the results of the research data analysis, it can be revealed that there are differences in learning achievement in science subjects using animation media. The t count > t table evidence this, then Ho is rejected, and Ha is accepted with a significance level of 0.05. This study also compared the results of the pre-test and post-test of the control class and the experimental class. These results obtained pre-test the control class an average value of 46.54, while the results pre-test experimental class obtained an average value of 48.39. Then from the post-test results, the control class's average value of 64.04 was obtained, while for the experimental class, the average value was 74.82. From these scores, after the experiment, there was an increase of 17.50 for the control class and 26.43 for the experimental class.

Given that science lessons have a higher level of understanding because concepts are based on shapes, they require visualization in their explanations. More importantly, with the ease of explanation and the attractiveness of learning with animated media, as well as from the research results and theories that have been stated above, it can be terminated that the provision of animated video media for learning science subjects in the Solar System material can improve student learning outcomes.

In practice, animation media classes are more focused and conducive to the subject matter presented. The level of student interaction is increased in conveying their

ideas and ideas. This can be seen from students' enthusiasm in participating in science lessons using animated video media. With learning activities, not only recording information from the teacher, but learning using interesting and interactive animations, learning activities feel fun and contribute to students be more motivated in the learning system.

Based on the statement above, a teacher must have the ability to choose, determine, develop various learning methods and media to achieve the expected learning objectives. These include selecting the right method and approach for presenting a concept.

5 Conclusion

Overall, based on the research results above, it shows a positive influence from the application of animation media in the teaching and learning process on student learning outcomes. The practicing of animated video media can help and fill a complementary role in explaining lessons that require visualization and field experience. By using animated media, students become focused on following the learning process, collaboration and interaction between students and teachers can be improved in a conducive classroom environment. The teacher's active role will be helped by the presence of animated media so that learning will be more accessible. Animated video media can still be developed into more interesting and interactive media. The operation of animation media in the teaching and learning process will not be limited to innovation and utilization, along with the development of technology and science.

This animated video support can be confirmed for future surveys to build on student's academic acquirement end in elementary school science classes in all districts of Jakarta. This study points to provide the most interesting and interactive material with great creativity so that it has a significant influence on the level of comprehension and memory of students. The extension of the limitations of this study includes the fact that it only covers pupils of Padurenan Jaya Primary School. Further research should be conducted in all regions of Jakarta and other Indonesian provinces to apprehend better the consequences of video animation on student learning outcomes.

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