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IMPROVING STUDENT UNDERSTANDING IN ANIMATION LESSONS USING OPEN ENDED PROJECT BASED LEARNING MODELS ASSISTED WITH AUGMENTED REALITY TECHNOLOGY

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ABSTRACT

The competence of students in understanding and applying animation in making animated films is still low. This study aims to improve the learning outcomes of Animation lessons in class XII Film Production using the Open-Ended Project Based Learning model assisted by Augmented Reality Technology. This study used the CAR (Classroom Action Research) method, carried out in two cycles with one meeting in each cycle, consisting of planning, implementation, observation, and reflection. Data collection techniques in this study were observation, interviews, tests, and field notes. The data analysis technique used quantitative and qualitative analysis. The results in this study are the percentage of students' knowledge in the first cycle, which is 69% quite good, and in the second cycle, 74% good. The percentage of students' skills in the first cycle is 80% good, and in the second cycle, 94.3% is very good. This study concludes that the Open-Ended Project Based Learning model assisted by Augmented Reality Technology can improve cognitive and psychomotor learning outcomes in Animation lessons in class XII Film Production.

Keywords: Animation, Augmented Reality, Open Ended Project Based Learning.

1. INTRODUCTION

The ability to understand in a lesson is needed by students to apply their abilities in productive lessons, compete in the world of work, and understand the problems that exist in other learning [1]. In essence, every student must experience problems in understanding a subject matter, both the realm of knowledge and the realm of skills. Results research [2] shows that most students successfully complete problems with the steps according to the instructions of their teacher, but on the other hand, only a few students who can Answer the question conceptual and open-ended questions. This problem is also experienced by students of class XII Film Production, who in learning 78% can operate animation software based on instructions from the teacher, but on the other hand, 22% do not understand the function of each animation software tool.

To increase the understanding of students' knowledge and skills, it is necessary to apply the learning model right during learning [3]. One of them is Models *Open Ended Project Based Learning* (OPjBL) which provides opportunities for students to create and develop student knowledge and skills. Investigation activities, selection of decisions, and finding solutions problem solving are on the OPjBL model and the result is established in the form of products and work of each student [4]. Animation learning uses the OPjBL learning model It will be more effective and interesting if assisted by learning media that are interesting and liked by students. Learning media is a tool to make it easier for teachers to convey subject matter to students, so that it can be easily understood and increases student motivation [5].

Most teachers use technology as a medium so that students are interested in learning and participate in every learning activity. Media utilization, PowerPoint*, video,* and audio, as well as media use online students really need because it can make it easier to understand what material has been delivered by the teacher. Basically, the teacher has prepared media and technology for the process of teaching and learning activities, but the use of media and technology is only a tool and has not been used as a learning resource [6]. Media is not a source of learning but rather a tool, that is what is questioned by [7] "Does the media affect learning outcomes?". Based on questions according to Clark regarding the use of media only as a tool but not as a source

of learning, the researchers think about technology and media that are often used by children today, one of which is smartphones. Quoted by ICT Kominfo (2017), the users of smartphones among students at the high school level is 79.56% of children. Therefore, with smartphones, they can be used as media and tools for learning, the reason being that students always carry smartphones wherever and whenever. Using a smartphone as a medium and learning tool, it helps and facilitates the teaching and learning process by displaying video, audio, text, and other graphics [9].

Learning media on Android mobile phones provide interesting video, audio, text, and graphics, one of which is using technology augmented *Reality* (WITH). *Augmented Reality* is a technological innovation or breakthrough in the educational process [10]. With AR technology, it combines conventional and virtual learning processes that emphasize three-dimensional visualization in the form of images and 3D shapes [11]. AR itself is formed from realistic and real-time visual elements, where users will be encouraged to participate and play together, making it suitable as an alternative learning tool [9].

Through observations, interviews, tests, and document analysis carried out in class XII Film Production students at SMK Negeri 51 Jakarta, there are problems that occur in learning Animation with material and animation rigging. Learning still experiences various deficiencies including teachers not trying other learning models so that students are less motivated in participating in the learning process, passive student activity can be seen from the attitude of students who do not ask when difficulties are in learning, and students are less critical in analyzing an example of a 3D object that problematic in the animation [12]. The problems that occurred resulted in the knowledge and skills of some class XII film production students is still low [14], this was supported by the results of the questionnaire where many students still did not understand the coloring matter and movement of 2D and 3D objects. Therefore, the problem in this study is formulated how to increase students' understanding of material animation lessons and animation rigging in class XII Film Production at SMK Negeri 51 Jakarta.

2. RESEARCH METHODS

Classroom Action Research (PTK) used in this study is research that combines knowledge, research, and action [13]. It can be said that action research is learning by action applied in the context of one's work. When someone does an activity or job, that person will generate new ideas that are embodied in performance improvement, so that the results obtained will be more perfect [13]. In this classroom action research uses 2 research cycles with each cycle 1 meeting. Class design in PTK is a one-cycle process or cycle consisting of: *diagnosis, design, action and observation, evaluation,* and reflection [13].

The research subjects that the researchers studied in this study were teachers and students of class XII film production, totaling 35 students with details of 14 boys and 21 girls. The variables discussed in this study are students' knowledge and skills in learning animation using Open *Ended Project Based Learning* assisted by augmented reality technology.

Data collection in this study was carried out using observation techniques, interviews, tests, and field notes. The data analysis technique used is descriptive quantitative and qualitative analysis techniques. Quantitative data is in the form of scores of observations of students' knowledge and skills. Qualitative data is in the form of student interview results related to students' understanding of Animation lessons, and the quality of learning media.

The OPjBL model syntax that is applied to class XII students learning Film Production at SMKN 51 Jakarta can be started from before production, formulation of problem strategies, product design, production processes, and presentation of project results [15], [16]. OPjBL [12] learning syntax and descriptions are outlined in Table 1.

Table 1 Syntax Model Open Ended Project Based Learning (OPjBL)

Syntax OPjBL	Description
Before Production	Students watch video tutorials about Animation to convince themselves that they understand correctly and listen to instructions from the teacher.
Problem Strategy Formulation	1. Students develop steps to formulate a problem-solving strategy based on the group that has been selected by the teacher.

Syntax OPjBL	Description
	2. The result of this stage is in the form of planning for making animated products, namely in the form of project themes that have been determined by each group
Product Planning	Students make designs in the form of 3D objects made by each individual or group
Production process	1. Creation of 3D object models 2. Giving color and material to 3D objects 3. Creation of animated rigging
Project Results Presentation	The presentation is intended to see the results of animation products that have been made by students, and to check the competence of each student by practicing the steps for making animation products.

3. RESULTS AND DISCUSSION

At first students still did not have basic knowledge of how to make 3D animation, so by providing initial training material, the teacher used video tutorials that were incorporated into augmented reality technology. Students become interested and have an idea about 3D Animation. After being given direct knowledge about how to make 3D animations using augmented reality technology, by giving 2 exercises namely guided exercises and independent exercises, students carry out projects directly based on OPjBL syntax. During the learning process, students tend to discuss with groups and consult. When students face a problem, they must find a solution, and if they have difficulty finding a solution, they must ask the teacher for help to consult. In this case, the teacher provides input to students and provides solutions to the problem. So that students are motivated to improve their abilities in knowledge and skills in Animation lessons, especially animation materials and rigging. At the end of the lesson, students display the results of their performance in the form of 3D animation products and how to make them. By guiding students to explain the steps for making 3D animation products when presenting project results, students inevitably must be able to master every tool available in 3D Animation software and reduce students who don't work when doing group work.

First Cycle

The first cycle was carried out on August 30, 2022, from 06:30 to 09:30 with 35 students taking part in the lesson. The material presented in the first cycle is about material or texturing. The results of the value of knowledge and skills can be concluded in Table 2 and Table 3.

Table 2 Results of Student Knowledge Assessment

Information	Student
Average value	75,6
The highest score	100
Lowest Value	20
Total Completed Students	24
Number of Students who did not complete	11
Completeness Presentation	**69%**

Table 3. Results of Student Skills Assessment

Information	Student
Average value	81,8
The highest score	54
Lowest Value	96
Total Completed Students	28
Number of Students who did not complete	7
Completeness Presentation	**80%**

Second Cycle

The second cycle was carried out on September 12, 2022, from 06:30 to 09:30 with 35 students taking part in the lesson. The material presented in the second cycle is about animation rigging. The results of the value of knowledge and skills can be concluded in Table 4 and Table 5

Table 4 Student Knowledge Assessment Results

Information	Student
Average value	82,5
The highest score	100
Lowest Value	60
Total Completed Students	26
Number of Students who did not complete	9
Completeness Presentation	**74%**

Table 5 Results of Student Skills Assessment

Information	Student
Average value	86,3
The highest score	100
Lowest Value	79
Total Completed Students	33
Number of Students who did not complete	2
Completeness Presentation	**94,3%**

Comparison Between Cycles

Based on the results of the research, the results were obtained in the form of the first and second cycles as well as the results of a questionnaire about the effectiveness of augmented reality technology as a supporting medium to increase interest and interest in Animation lessons. The following is a comparison of the results of the value of knowledge and skills for each cycle. The comparison can be seen in Table 6.

Table 6 Recapitulation of Inter-Cycle Comparison Results

No	Information	Completeness Presentation	
		First cycle	Cycle second
1	Knowledge	69%	74%
2	Skills	80%	94,3%
Rate		74,5%	84,15%
Category		Good	Very good

Students' understanding in each cycle has increased. The biggest increase is in the skills of students. With this result, students' understanding has exceeded the indicators of research achievement. Based on this research, the OPjBL model assisted by augmented reality technology can increase students' understanding of class XII Film Production at SMKN 51 Jakarta. Increasing student understanding can be proven by increasing the percentage of student knowledge and skills. This research is also in line with OPjBL research by previous research which shows that by starting open learning that focuses on student independence in exploring their knowledge, it can be through video tutorials or online media using smartphones, then followed by a project where students already understand the material to be presented. by the teacher and ends by showing his work in front of the class. This makes students think critically, and creatively, and of course, student competence is far more improved than previous learning. The competency increase experienced by students was 9.65%.

Based on the flow of learning activities using the OpjBL model assisted by augmented reality technology, it proves that the OPjBL model assisted by augmented reality technology is an effective effort to

increase student understanding. This is because of the model OPjBL requires the activeness of students to analyze 3D animation projects, and requires good and compact cooperation between group members to discuss and solve project problems. So that the OPjBL model in addition to increasing understanding in the realm of knowledge and skills, also provides open opportunities for students to be able to connect problems in 3D Animation lessons with life in the real world.

4. CONCLUSION

The effectiveness of augmented reality technology as a supporting medium to improve understanding, and students' skills by applying the OPjBL model. The increase in students' understanding can be proven by the increase in the percentage of students' knowledge and skills of 9.65%. To be able to apply the OPjBL model effectively in class, learning strategies are needed that can build, including collaborative learning strategies, prioritizing student activity during learning, student experience during practicum, initial skills in practicum, and initial ability in problem-solving. The results of this study can be used as a reference to improve students' understanding during learning. The benefits for teachers are used as a reference for learning models in solving problems, namely increasing students' understanding and skills. As well as innovating in the learning process. As for students, applying the OPjBL learning model encourages students to think critically and creatively.

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