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[Research Article]

THE EFFECT OF THE CONTEXTUAL TEACHING AND LEARNING (CTL) LEARNING MODEL BASED ON SIMULATION MEDIA ON THE MOTIVATION AND LEARNING OUTCOMES OF STUDENTS IN PHYSICS LEARNING

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ABSTRACT

The purpose of this study is 1) to analyze the learning motivation, 2) to analyze the learning outcomes, and 3) To determine the effect of the simulation media-based CTL on the motivation and learning outcomes. This is a quasi-experimental study at Junior High School on Selayar Island with a sample of 44 students selected using a purposive sampling technique. The results of this study indicate that the average value of the student's motivation to learn physics in the pre-test in the control class is 53.47, and the post-test is 57.05, with a difference of 3.54 and for the average value of the motivation to learn physics for the pre-test students in the experimental class is 57. 21 and post-test of 71.84 with a difference of 14.57. The average value of student learning outcomes pre-test in the control class is 48.16, and post-test in the control class is 54.47, with a difference of 6.31. For the experimental class, the pre-test value is 50.53, and the post-test is 75. 00 with a difference of 24.47. In addition, the results of hypothesis testing obtained a 2-tailed significant value of 0.000. Because the value of sig (2-tailed) < 0.05, H_0 is rejected and H_1 is accepted, so there are differences in motivation and learning outcomes between the control and experimental classes. So it can be concluded that the CTL Model Based on Simulation Media has an effect on the motivation and learning outcomes of students' physics. This research has implications for providing information related to the CTL model based on Simulation Media that can be used as a learning model to increase students' motivation and learning outcomes.

Keywords: Learning Outcomes, Contextual Teaching, and Learning (CTL) Model, and Learning Motivation.

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1. INTRODUCTION

Learning Physics is a form of implementing Physics education in schools. Physics learning involves Physics mastery activities for students through teaching interactions or the Teaching and Learning Process (PBM). The Physics learning process emphasizes direct experience to develop competencies to explore and scientifically understand the natural surroundings. For Physics Learning to be more fun, educators create varied learning so that students are more interested in learning physics.

In achieving these goals, educators must be able to create educative and fun classroom conditions, especially so that students are comfortable and understand the lessons. This is only possible if an educator can understand the classroom atmosphere to make the right decisions regarding the appropriate learning model to be applied in the classroom.

The learning model guides teacher designers and teachers in carrying out learning. Choosing this model is strongly influenced by the nature of the material to be taught and is also influenced by the objectives to be achieved in the teaching and the level of students' abilities. In addition, each learning model also has stages (syntax) that students can do with the teacher's guidance. One syntax with another syntax also has a difference. These differences, including the opening and closing of learning, differ. Therefore, teachers need to master and apply various teaching skills to achieve diverse learning goals and learning environments that characterize schools in adults (Trianto, 2010).

Therefore, to support the learning process, selecting a model with the proper method will facilitate the process of knowledge formation, one of which is a contextual learning model (CTL, Contextual Teaching and Learning).

In order to improve students' learning outcomes and motivation, one of the models and media that can activate and improve student's learning outcomes and motivation is the contextual learning model (CTL) using simulation media. Using this Contextual Teaching and Learning (CTL) model can help them relate academic lessons to the real-life contexts they face.

One of the learning approaches that can be done to increase students' motivation and ability to understand students' concepts is the Contextual Teaching and Learning (CTL) approach. Several studies found that: the CTL approach is feasible to use as a learning guide and can develop character and improve learning outcomes.

The Contextual Teaching and Learning (CTL) learning model is a concept that helps teachers relate subject concepts to real-world situations and motivates students to make connections between knowledge and its application in life (Trianto, 2010). The CTL learning model is a concept supported by various research in cognitive science (cognitive science) and equivalent behavior theory (Setiawati, 2018).

CTL has the potential to make students interested in learning. Furthermore, by Davis (1997), "Because every human brain is a unit and because humans have different bits of intelligence," CTL encourages students to build a variety of different relationships that increase their ability for students to achieve high educational standards (Johnson, 2002). The activities of students in the CTL learning model are learning that is carried out directly so that students get the experience they learn. This means that students learn the subject matter according to their experience by linking the learning material to the real-world situation of students and what students will experience in everyday life (Sarwinda, 2020).

According to Johnson, identifying eight characteristics of contextual teaching and learning, namely 1) Making meaningful connections (making meaningful relationships), 2) Doing significant work (doing important work), 3) Self-regulated learning (learning to self-regulate), 4) Collaborating (cooperation) students can work together, 5) Critical and creative thinking (think critically and creatively), 6) Nurturing the individual (nurturing individuals), 7) Reaching high standards (achieving high standards) students recognize and achieve high standards high and

8) Using authentic assessment (holding an authentic assessment). Students use academic knowledge in real-world contexts for a meaningful purpose (Nurhidayah, 2016).

The purpose of contextual learning is to provide students with more practical knowledge and skills because the essence of this learning is to bring theoretical things into practice. So that the method of implementation is the developed theory that is learned and applied in real situations. In this context, students understand what is meant by learning, the benefits of what status they are in, and how to achieve it. They realize that what they learn is helpful for their later life. Thus they position themselves as people who need provisions for their future lives. They learn what is helpful to them and strive to achieve it. In that effort, they need teachers as directors and mentors (Lotulung, 2018).

The learning process using a contextual learning model assisted by computer simulation media is a program that provides opportunities for students to learn dynamically, interactively, and individually. So that students will get a learning experience that resembles real life (Hayati, 2017). Using the CTL learning model based on simulation media can increase students' motivation and learning outcomes.

Learning motivation is the overall psychic driving force from students that can lead to learning activities, ensure the continuity of learning activities and provide direction for learning activities to achieve goals. A person is said to be successful in learning if he desires to learn because teaching and learning activities are challenging to succeed without understanding what will be learned and not understanding why it needs to be studied. This desire or drive is called motivation (Susianah & Hidayat, 2015).

The indicators of learning motivation, according to Hamzah B. Uno, are a) The existence of a desire and desire to succeed, b) The existence of encouragement and needs in learning, c) the hopes and aspirations of the future, d) the existence of appreciation in learning, e) the existence of exciting activities in learning, and f) The existence of a conducive learning environment that allows students to learn well (Uno, 2013).

To increase students' learning motivation, the role of educators is to motivate so that students are enthusiastic about participating in teaching and learning activities. Learning motivation must be increased because motivation in learning will also result in higher learning achievement. Motivation determines the level or failure of students' learning actions. Learning motivation will be optimal if there is motivation, if the more precise the motivation given, the more motivated the learning process will be (Nasution, 2017).

Learning motivation and learning outcomes have a very close and inseparable relationship. Because based on Sudjana's statement, motivation is one factor that affects learning outcomes. Two factors influence learning outcomes, namely internal factors, and external factors. Internal factors include learning motivation, interest in learning and attention to learning, physical factors, and persistence factors as for external factors, which include the family, school, and community environment (Sudjana, 2014).

Learning outcomes are a mastery of knowledge achieved by students who participate in a learning program per predetermined educational goals (Nasution, 2017). the classification of Benjamin Bloom's learning outcomes is broadly divided into three domains, namely the Cognitive Domain, which is the ability to think according to the expected goals. The thought process is expected to be able to be applied in action. 1). The cognitive domain consists of six aspects: knowledge, understanding, application, analysis, synthesis, and evaluation. 2). The affective domain is everything related to emotions, such as feelings, values, appreciation, enthusiasm, and attitudes. The affective domain consists of five aspects: acceptance, participation, assessment, attitude determination, organization, and the formation of a lifestyle. 3) Psychomotor domain is everything that depends on creative thinking and skills in processing information. The psychomotor domain consists of seven aspects:

perception, readiness, guided movements, accustomed movements, complex movements, adjustment of movement patterns, and creativity (Rasyid, 2009).

According to the General Provisions (Permendiknas, 2007) Regulation of the Minister of National Education No. 24 of 2007, facilities are learning equipment that can be moved around, while infrastructure is basic facilities to carry out school/madrasah functions. The means of regulation of the national education minister include buildings, classrooms, tables, chairs, and learning media tools. Meanwhile, infrastructure includes yards, parks, fields, and roads leading to schools.

Teaching or learning materials (instructional materials) generally consist of knowledge, skills, and attitudes that students must learn to achieve predetermined competency standards (Darmadi, 2010). According to (Depdiknas, 2008), defining teaching materials or learning materials broadly consists of knowledge, skills, and attitudes that students must learn to achieve predetermined competency standards.

The results of observations at a public school in Selayar show that many students still have difficulty and are weak in mastering physics concepts. This is because the physics learning process in the classroom still faces several problems, one of which is the lack of motivation of students to learn, which is still dominated by using conventional or direct learning models centered on educators, and not optimizing student learning activities. In addition, based on the results of interviews with educators at Public Junior High School at Selayar, it can be concluded that there are still many students whose desire and desire to succeed are still lacking and lack encouragement and need to learn. This can be seen from the average learning outcomes of students 65.

The low value of student learning outcomes is due to the lack of student learning motivation. Moreover, based on the results of interviews with several students, it can be concluded that several things make it difficult for them to understand science lessons, especially physics material; namely, in the learning process, they sometimes only memorize the subject matter and in the learning process students prefer to work on the context of real-life questions. In addition, there are no exciting activities in the learning process, such as the lack of activities carried out in the laboratory. This is due to limited facilities. So that students are less active in the learning process. Therefore, it is necessary to apply learning that involves students more in learning activities through the Contextual Teaching and Learning (CTL) learning model based on simulation media.

The purpose of the study was to describe the effect of the Contextual Teaching and Learning (CTL) learning model based on simulation media on the motivation and learning outcomes of students in learning physics at SMPN 11 Selayar Islands Regency.

2. METHOD

This research was conducted on 23 May 2021 – 23 June 2021. This research is a type of Quasi-Experimental Design. The use of this design is intended to reveal a causal relationship by involving the control group in addition to the experimental group. The research approach used in this study is quantitative, and the research design used in this study is "Nonequivalent Control Group Design."

The sampling technique in this study is Purpose Sampling. The sample is taken from a class determined with specific objectives and criteria. Namely, the sample has an average class value of almost the same. In this research, class A was the control class with as many as 19 people, and class B with the experimental class with as many as 19 people. The instruments used were questionnaires (questionnaires), observation sheets, learning outcomes tests, as many as 20 numbers, and lesson plans. The data obtained in this study used quantitative analysis methods using techniques.

2.1 Descriptive statistics

The descriptive statistical analysis will be described starting from the mean and standard deviation using the IBM SPSS Statistics 25 program.

2.2 Inferential statistics

Inferential statistics are used to test the proposed research hypotheses using the IBM SPSS Statistics 25 program. However, before testing the hypothesis, normality and homogeneity tests are first performed with the following steps:

1) Normality test
2) Homogeneity test
3) Hypothetical test

3. RESULT AND DISCUSSION

3.1 Results

The result of this research is the answer to the problem formulation that the researcher set earlier, in which there are five problem formulations. The formulation of the first, second, third, and fourth problems will be answered using descriptive statistical analysis. As for the formulation answer to the fifth problem formulation, it will be answered using inferential analysis and the established hypothesis. The following are the results of the research that the author got after doing research.

3.1.1 Control Class Learning Motivation

The results of research conducted on all control class students consisting of 19 students, the authors obtained data through a questionnaire on students' learning motivation which has been analyzed using descriptive analysis techniques, the average value of students' learning motivation, variance, and standard deviation for the class will be calculated—control using the IBM SPSS Statistics 25 program in the form of Table 1.

Table 1 Descriptive of Learning Motivation in Control Class

Statistics	Score	
	Pre Test	Post Test
Min	33	50
Max	62	65
Mean	53.47	57.05
S^2	40.04	21.38
SD	6.32	4.62

The data analysis shows that if the students' learning motivation results are grouped into high, medium, and low categorizations, the frequency and percentage will be obtained after the pre-test and post-test are carried out. Medium with a frequency of 94.7%, and the post-test results in the control class obtained a frequency of 19 in the medium category with a percentage of 100%.

3.1.2 Experimental Class Learning Motivation

The results of research conducted on all experimental class students consisting of 19 students have been analyzed using descriptive analysis techniques, which will calculate the average value of students' learning motivation, variance, and standard deviation for the control class using the IBM SPSS Statistics 25 program in the form Table 2.

Table 2 Descriptive of Experimental Class Learning Motivation

Statistics	Score	
	Pre Test	Post Test
Min	51	63
Max	63	78
Mean	57.21	71.84
S^2	14.95	20.14
SD	3.86	4.48

Based on the results of data analysis shows that if the results of students' learning motivation are grouped into high, medium, and low categorizations, the frequency and percentage will be obtained after the pre-test and post-test are carried out, then the students' learning motivation is obtained after being taught using the CTL model based on simulation media, namely the Pre-test results obtained a frequency of 19 people in the medium category with a percentage of 100% and the post-test results obtained a frequency of 4 people in the medium category with a percentage of 21% and 15 people in the high category with a percentage of 79%.

This is under research results (Wati, 2019), which explain that applying contextual-based learning through experimental methods can

increase students' motivation and learning outcomes.

3.1.3 Control Class Learning Outcomes

The results of research conducted on all control class students consisting of 19 students have been analyzed using descriptive analysis techniques will calculate the average value of student learning outcomes, variance, and standard deviation for the control class using the IBM SPSS Statistics 25 program in the form Table 3.

Table 3 Descriptive Control Class Learning Outcomes

Statistics	Score	
	Pre Test	Post Test
Min	35	35
Max	60	65
Mean	48.16	54.47
S^2	78.36	91.37
SD	8.85	9.55

The data analysis results show that if students' learning outcomes are grouped into high, medium, and low categorizations, the frequency and percentage will be obtained after the pre-test and post-test have been carried out. Low with a percentage of 52.6%, and the post-test results obtained a frequency of 7 people in the low category, seven people in the medium category, and five people and the high category with a percentage of 36.8% in the low category, 36.8% in the medium category and 26.4% with high category. So, it can be concluded that the average value of student learning outcomes in the control class is in the medium category.

3.1.4 Experimental Class Learning Outcomes

The results of research conducted on all experimental class students using a CTL model based on simulation media consisting of 19 students have been analyzed using descriptive analysis techniques, and the average value of student learning outcomes, variance, and standard deviation for the experimental class will be calculated using IBM SPSS Statistics 25 program in Table 3.

Table 4 Descriptive Learning Outcomes Experimental Class

Statistics	Score	
	Pre Test	Post Test
Min	35	65
Max	65	85
Mean	50.53	75.00
S^2	94.15	25.00
SD	9.70	5.00

The data analysis shows that if the results of students' learning motivation are grouped into high, medium, and low categorizations, the frequency and percentage will be obtained after the pre-test and post-test are carried out. The students' learning motivation is obtained after being taught using the CTL model based on simulation media; namely, the results of the pre-test and post-test in the experimental class have increased, as seen from the pre-test scores of students obtained a frequency of 8 people in the low category, ten people in the medium category and one person in the high category with a percentage value of 42.1% how many in the category low, 52.6% are in the medium category and 5.3% are in the high category.

As for the post-test scores, 18 people were in the high category, and one was in the very high category, with a percentage of 94.7% in the high category and 5.3% in the very high category. So it can be concluded that the average value of student learning outcomes is in the high category.

This follows research (Asnidar, 2018) that applying the CTL (Contextual Teaching and Learning) model can increase the value of student learning outcomes. This is in line with research on simulation media (Hikmayanti, 2016) which states that using simulation media in the learning process can increase the value of student learning outcomes.

3.2 Learning Effect

To find out the effect of the contextual teaching and learning (CTL) learning model based on simulation media on students' learning outcomes and motivation, inferential statistical data analysis was conducted, namely the research hypothesis test.

3.2.1 Test the learning motivation hypothesis

Hypothesis testing regarding learning motivation is presented in Table 5. In the Sig (2-tailed) section, the results are 0.000 <0.05, so as the basis for decision-making in the independent sample t-test, it can be concluded that H0 is rejected and H1 is accepted. Thus it can be concluded that there is a difference in the value of learning motivation in the control class and the experimental class, with the average value of learning motivation in the control class being 57.05 and the experimental class at 71.84.

Table 5 hasil uji hipotesis motivasi belajar

Statistical Parametric	Equality of Variances		t-test			
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Equal variances assumed	0.05	0.83	-10.004	36	0	-14.789

The decision-making is based on the comparison of the t-count value with the t-table, where it is known that the t-count value is 10.004 and the t-table is sought by referring to the formula (α/2); (df) is equal to (0.05/2); (35.97). So that the value of the t-table in the distribution of the t-value of the statistical table is 2.110, thus the t-count value is 10.004 > t-table 2.110, so based on decision making through the comparison of the t-value with the t-table, it can be concluded that H0 is rejected and H1 is accepted, which means there is the influence of the contextual teaching and learning model based on simulation media will produce different results of motivation to learn physics.

Tabel 6 hasil uji hipotesis hasil belajar

Statistical Parametric	Equality of Variances		t-test			
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Equal variances assumed	10.59	0.002	-8.294	36	0	-20.526

3.2.2 Test the learning outcomes hypothesis

The sig is known based on the independent samples t-test output table in the equal variances not assumed section. (2-tailed) of 0.000 <0.05, so as the basis for decision-making in the independent sample t-test, it can be concluded that H0 is rejected and H1 is accepted. Thus it can be concluded that there is a difference in the value of learning outcomes in the control class and the experimental class, with the average value of learning outcomes in the control class being 54.47 and the experimental class being 75.00.

The decision-making is based on the comparison of the t-count value with the t-table, where it is known that the t-count value is 8.296 and the t-table is sought by referring to the formula (α/2); (df) is equal to (0.05/2); (27.16). So that the value of the t-table in the distribution of the value of the t-table statistic is 2.110, thus the t-count value is 8.296 > t-table 2.110, so based on decision making through the comparison of the t-value with the t-table, it can be concluded that H0 is rejected and H1 is accepted, which means there is an influence of the contextual teaching and learning model based on simulation media that will produce different physics learning outcomes.

3.3 Discussion

The results of this study are in line with research conducted by (Wati, 2019), which explains that applying contextual-based learning through experimental methods can increase students' motivation and learning outcomes. It can be seen from the results of the questionnaire that the motivation to learn physics has increased from the first cycle or the control class. The percentage of students' motivation reaches 70% by being in the medium category, and then in the second cycle or experimental class, the percentage of students' motivation reaches 70%. Based on the results obtained, it can be concluded that the application of the CTL Learning Model affects students' learning motivation in the solar system in class VII MTs Al-Madaniyah Jempong

Barat Mataram city. The Contextual Teaching and Learning Learning Model can be used as one of the practical learning models for teaching and learning implementation.

Likewise, the research was carried out by (Nurhidayah, 2016). Based on the results of these studies, it can be seen that the average learning outcome showed in the pre-test was 8.60, while the Post-Test was 13.33, and the N-gain test was normalized at 0.31. So it can be concluded that the learning outcomes of class XI students at SMA Handayani Sungguminasa, Gowa Regency, increased after the Contextual Teaching and Learning (CTL) learning model was applied.

This is supported by the advantages of the contextual teaching and learning model using simulations, including almost all students being active in the learning process so that educators only act as facilitators, namely by providing orientation to students about problems. Educators motivate students to be involved in problem-solving activities. Educators also encourage students to get the correct information through experimentation, seek explanations, and help develop, analyze and evaluate the process of overcoming problems related to the material being taught.

With the help of simulations, students will find it easier to remember and know abstract physics concepts, especially in vibration, waves, and sound. In addition, simulation media also has an essential role as one factor that influences the quality of learning success (Perkins, 2006). The students better understand the material being taught compared to conventional learning, namely the activeness of students and the development of thinking skills, and train students in investigating important contextual issues to make independent individuals. The media in this study was designed by researchers using interesting multimedia simulation animation effects.

Learning motivation and learning outcomes have a very close and inseparable relationship. Because based on Sudjana's statement, motivation is one factor that affects learning outcomes. Two factors influence learning outcomes, namely internal factors, and external factors. Internal factors include learning motivation, interest in learning and attention to learning, physical factors, and persistence factors. External factors include the family, school, and community environment (Sudrajat et al., 2017). Thus, based on these internal factors, it can be said that to get the desired learning outcomes, it is essential to provide maximum motivation to students. The greater the motivation of students, the higher the learning outcomes that students will obtain.

4. CONCLUSION

Based on the results of the research, data analysis, and discussion, it can be concluded that there is an influence of the Contextual Teaching and Learning (CTL) learning model using simulation media on the motivation and learning outcomes of physics students in class VIII in Selayar Islands Regency for the 2020/2021 academic year. The average value of the experimental class physics learning outcomes tests using the Contextual Teaching and Learning (CTL) learning model using simulation media is higher than the control class using the conventional learning model.

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