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Implementation of Contextual Teaching and Learning Based Physics Module on Newton's Law Material to Improve Critical Thinking Skills of Class X Students

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ABSTRACT

This research consisted of two stages, namely the first stage of developing a CTL-based Physics module using Research and Development, through the ADDIE model approach, and the second stage of experimentation at MA Al-Ihsan Boarding School Riau. The experimental stage is to see the effect of using the developed module on improving students' critical thinking skills. The assessment of students' critical thinking skills used pretest and posttest critical thinking skills questions. Data analysis used SPSS Statistics 24 Software. The results of the module development research showed that the feasibility value by experts was 0.879 in the valid category. This shows that the CTL-based modules produced in this study are considered feasible to be used in learning Newton's Law material. The results of the experimental phase research show that there is a significant effect of the use of CTL-based modules on students' critical thinking skills. In the experimental class, critical thinking before treatment was 43.35, the low category increased to 84 good categories after treatment. Whereas in the control class critical thinking before treatment 39.4 low categories increased to 74 good categories after treatment. This means that the experimental class has further increased its critical thinking compared to the control class. The conclusion of this study is that the CTL-based Physics module on Newton's Law material is valid and the use of the developed module can improve students' critical thinking.

1. Introduction

High-quality human resources which are the main foundation so that a nation can compete with other nations, are currently urgently needed in facing the era of globalization. High quality human resources cannot be separated from education.

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Education is an effort to prepare participants to face an environment that is always experiencing rapid changes. Education is also a tip in applying the principles of science and technology for the formation of human resources as a whole. Education must be able to produce graduates who are able to think globally and act locally, and are based on morals as reported by Rika (2015).

The Indonesian government has made various efforts to improve the quality of education. One of the efforts made by the government is the preparation of the curriculum. At present the curriculum that is used as a reference for learning in schools is the 2013 curriculum. K13 was developed on a philosophical basis which provides the basis for the development of all potential students to become quality Indonesian human beings listed in the national education goals. As for the implementation of the 2013 curriculum, one of them is in learning physics.

Learning physics in the 2013 curriculum uses a scientific approach with students' thinking skills being honed and developed through learning with scientific steps. To support students' thinking skills, learning in schools can be improved with various aspects such as media, tools and teaching materials that support the function of national education to run optimally as reported by Muna (2018).

In learning physics, what is first demanded is the ability to understand concepts, principles and laws, then it is expected that students are able to rearrange them in their own language according to their level of maturity and intellectual development. Learning physics that is developed is the ability to think analytically, inductively and deductively in solving problems related to natural events around, both qualitatively and quantitatively by using mathematics, and can develop knowledge, skills and self-confidence (Ministry of National Education in Permatasari, 2013).

The rapid development of science and technology has a direct impact on human life, including in the field of education. The educational process is required to prepare quality human resources and be able to behave and think critically in processing various information and science and technology that is good and right. Therefore, in the educational process, teachers are required to accustom students to critical thinking in every lesson. The pattern of critical thinking is a pattern that requires students to be able to analyze, synthesize, and conclude the information they get so that students can distinguish between good and bad information, and can make decisions on the information they get critically and correctly. The aim of training critical thinking skills is to prepare students to become critical thinkers so that they can solve the problems they face wisely and responsibly.

As students, students are expected to be able to think critically in solving problems that are contextual or directly related to real life. This is in line with the goals of national education which familiarize students to be active in learning where students are directly involved in the learning process. The 2013 curriculum also requires learning that does not only study concepts, theories and facts, but also their application in everyday life. This contextual approach is in line with the demands of the 2013 revised 2017 curriculum which emphasizes 4C skills,

namely critical thinking and problem solving skills (critical thinking and problem solving), collaboration (collaborative), creativity (creativities), and communication (communication). Most of these 4C components have been covered in contextual learning as reported by Novrizal (2019).

Physics is part of the Natural Sciences (IPA), which is a systematic way of building and organizing knowledge in the form of explanations that can be tested and able to predict natural phenomena as reported by Yuliani (2017). Learning science, especially Physics, students can gain direct experience and can add strength to receive, store, and apply the concepts they have learned in everyday life as reported by Viyanti (2014).

Physics is important to be taught as a separate subject at the high school level. Puskur (2009) explained that Physics subjects can provide knowledge to students with the aim of being a means to foster thinking skills that are useful for solving problems encountered in everyday life. But these subjects are often feared and disliked by students. This statement is supported by the findings of Kamba (2018) that middle school students to university students find it difficult in physics lessons.

One of the reasons that makes it difficult for students to understand Physics is learning that is less contextual as reported by Sulardi (2017). The application of contextual learning can make physics lessons more relevant in the daily lives of students as reported by Tural (2013). This is caused by the lack of associating Physics material with events in everyday life as reported by Ekici (2016). Even though Physics is a science that is close to everyday life as reported by Herman (2012). Therefore, it is necessary to learn Physics that is contextual and close to everyday life, one of which is CTL-based learning.

In learning Physics, one of the materials that is widely applied in everyday life is Newton's Laws. By understanding the concept of Newton's law, it is expected to be able to develop students' critical thinking skills and cooperative aspects in connecting the material being taught to real life. The ability to think critically is an important capital in education because it can be used as a basis for making good questions and answers, streamlining the learning process, increasing communication skills, curiosity, and increasing the ability to work together and cooperative attitude.

Preliminary observations made by researchers at several schools in Riau showed results including: 1) The teaching materials used were still based on textbooks so that students were not directed to be more independent in learning. 2) Students' critical thinking skills are still not optimally honed, and 3) Students' difficulties in associating an event that occurs in everyday life with related physics concepts.

Based on the results of these observations, researchers create teaching materials that can require students to be more active, independent and think critically. One of the teaching materials that can make students active, independent and think critically is a CTL (Contextual Teaching and Learning) based module. Teaching

materials are all forms of materials used to assist teachers or instructors in carrying out teaching and learning activities as reported by Mudlofar (2012). According to Andi Prastowo in his book entitled *Creative Guidelines for Making Innovative Teaching Materials*, it is stated that teaching materials are all materials (both information, tools, and text) that are systematically arranged to present a complete figure of competencies that will be mastered by students and used in the learning process with the aim of for planning and reviewing the implementation of learning as reported by Andi (2014). In this case the teaching material used to improve students' critical thinking skills is the CTL module.

Modules are teaching materials that are arranged systematically in language that is easily understood by students, according to their age and level of knowledge so that they can study independently with minimal guidance from educators as reported by Andi (2014). The use of modules in learning aims to enable students to learn independently without or with a minimum of the teacher. In learning, the teacher is only a facilitator.

CTL is learning that emphasizes the process of full involvement of students to be able to find the material being studied and relate it to real life situations. So that encourages them to apply it in their daily life as reported by Yuwandra (2020). CTL is learning that encourages learning and learning activities in the classroom. CTL is a learning and teaching system that helps teachers link the material they teach with real-world situations of students and encourages students to make connections between the knowledge they have and its application in their lives as family members, citizens, and jobs.

Selvianiresa (2017) in their research demonstrated CTL learning, success in learning using collaborative collaboration with students, a high level of activity in lessons, connections to real-world contexts, and integration of science content with other content and areas of expertise. The same thing is also shown in Dewi's research (2019) CTL learning has a better impact on students' critical thinking in learning.

2. Methodology

In this research the type of research used is Research Development or Research and Development. Research and development is research that is used to produce certain products, and test the effectiveness of these products (Sugiyono, 2017). The development model used in this research is the ADDIE model or Analyze, Design, Development, Implementation, Evaluation, which is one of the systematic learning design models. While the research approach used is a combination of qualitative and quantitative approaches. The research approach that seeks to combine the two research approaches mentioned above is the research and development approach as reported by Haryati (2012).

This study used a pretest-posttest group design. In this design, there are two groups that are selected to serve as the experimental class and the control class.

Then each class will be given a pretest whose purpose is to find out the difference in the initial state between the experimental class and the control class.

The research was carried out at MA Al-Ihsan Boarding School Riau, in October 2022. The data obtained in the study were qualitative data and quantitative data in the form of assessment results from validation sheets by experts, as well as test results for students' critical thinking skills. The population in this study were all students of class X with a total of 112 students. As for the research sample, 31 students of class X IPA Al-Khwarizmi used it as an experimental class and 30 students in class X IPA Al-Jazari used as a control class. In addition to these 2 classes, the samples in this study were 2 high school physics books based on the 2013 curriculum, 2 physics education lecturers at the University of Riau and 1 Widya Iswara expert as a validator for the physics module being developed.

The sampling technique is probability sampling where the sampling technique provides equal opportunities for each element of the population to be selected as a member of the sample. While the method of taking samples using random sampling, because the collection of sample members from the population is done randomly without paying attention to the existing strata in the population as reported by Sugiyono (2017).

The validity data collection technique in this study used a questionnaire. The validation sheet is used to measure the validity of the developed media. Validation was carried out by three validators, namely two expert lecturers and one practitioner. The validator is given a validation sheet then examines the modules that have been developed and provides an assessment. Suggestions and input from the validator form the basis for revising the developed module. The validation result sheet is then analyzed to see its validity level.

CTL-based modules that have been declared valid and practical will be implemented in learning by carrying out limited quasi-experiments consisting of one experimental class and one control class. Data was collected by holding a pretest and posttest using questions, and observation to support the results of the assessment of students' critical thinking skills. The results will be analyzed and a conclusion will be given whether the developed module can improve students' critical thinking skills. Data analysis using SPSS Statistics 24 software.

3. Results and Discussion

Initial Product Development Results

The results of product development based on Contextual Teaching and Learning (CTL) are explained in 5 stages with the ADDIE development model. This stage is carried out coherently and systematically in order to obtain good product results.

Instrument Modification

The instruments used have been modified according to the needs of the CTL-based module assessment. The instrument used is the validation sheet. The Validation Sheet is used to collect data about the validator's assessment of the CTL-based module that has been developed. The assessment components contained in the validation sheet are concept correctness, concept presentation, coherence with the curriculum, CTL integration, critical thinking aspects, design quality, interactive modules, and module flexibility.

Results of Validation Assessment and Field Trials

In the assessment phase, validation activities and field trials are carried out. The following is a description of the validation and trial activities that have been carried out by researchers:

Module Validation by Experts

Expert validation in this study was carried out to determine the feasibility of the module to be used in the learning process. Module validation that has been developed is carried out by requesting an expert's assessment of the feasibility of a CTL-based module using an assessment instrument in the form of an expert validation sheet. Validation was carried out by 3 validators consisting of 2 lecturers in the Physics Education Masters Program at the University of Riau and 1 expert from Widya Iswara. In general, the module has fulfilled the feasibility aspect of module flexibility, which means that the suitability in terms of ease of use and storage of the required tools and materials is correct.

Revision of CTL Based Modules

After the module has been validated by the validators, the next step is to revise the module based on suggestions for improvement or input that has been given by the validator. These suggestions and improvements are used as a reference for revising in order to obtain a module that is valid and suitable for use in learning.

Field Trial Results

The field trial was carried out with a pretest-posttest group design which consisted of Class X IPA Al-Khwarizmi as the experimental class, and X IPA Al-Jazari as the control class. This field trial aims to see whether there are differences in learning using CTL-based modules against conventional learning. In addition to seeing whether the CTL-based physics module can improve students' critical thinking skills. This CTL-Based Physics Module was used in field trials after being validated, assessed, and revised by expert trials. In the experimental class, learning uses lesson plans with a contextual approach, and in the control class using conventional learning methods.

The results of students' critical thinking skills in the experimental class and control class are presented in Figure 1.

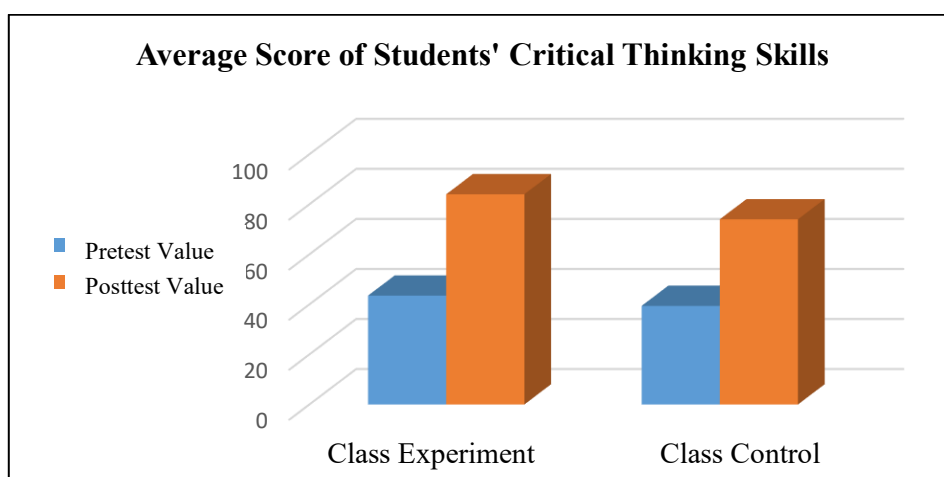


Figure 1. Description of the Average Score of Students' Critical Thinking Skills

In Figure 1 it describes that the critical thinking skills of early students as seen from the pretest scores, have not yet reached the minimum school graduation criteria score. Both the control and experimental classes showed their initial abilities at the same value. There was no significant difference between the initial abilities of the control and experimental classes. Post test results of students showed an increase in critical thinking skills. However, the increase in the experimental class was greater than the increase in the control class. This provides information that the use of CTL-based physics modules is more effective in improving students' critical thinking skills than conventional learning.

Normality Test

The normality test in this study used the Shapiro Wilk test, this is because the sample is under 50 people. The Shapiro Wilk test was carried out using the SPSS version 24.0 program. Following are the results of the normality test with Shapiro Wilk, presented in Table 1.

Table 1. Normality Test

Variabel	p value	Shapiro-Wilk	
		Alpha	Information
Pre-test Experiment	0,072	0,05	Data is normally distributed
Post-test Experiment	0,053		Data is normally distributed
Pre-test Control	0,062		Data is normally distributed
Post-test Control	0,339		Data is normally distributed

Based on Table 1 above, it shows that: (1) The p value in the experimental pretest is $0.072 > 0.05$, this means that the experimental pretest data is normally distributed; (2) The p value in the experimental posttest is $0.053 > 0.05$. This means that the experimental posttest data is normally distributed; (3) The p value of the control pretest is $0.062 > 0.05$. This means that the control pretest data is normally distributed; and (4) The p-value in the control posttest is $0.339 > 0.05$. This means that the experimental posttest data is normally distributed.

Homogeneity Test

The main purpose of this test is to see whether the existing data variance is homogeneous or not. Homogeneity test in this study used the Levene's Test method. The following results of the homogeneity test with SPSS version 24.0 are presented in Table 2.

Table 2. Homogeneity Test

Variabel	Levene's Test		
	<i>p value</i>	Alpha	Information
Pretest*Posttest Experiment	0,583	0,05	Variants of the two data (Pretest and Posttest) are homogeneous
Pretest*Posttest Control	0,081		Variants of the two data (Pretest and Posttest) are homogeneous

Based on Table 2 above, it shows that: (1) The p value in the Pretest*Posttest Experiment data is $0.583 > 0.05$. This means that there is the same variance in the pretest and posttest data groups or the variances of the two data are homogeneous; and (2) the p value in the Pretest*Posttest Control data is $0.081 > 0.05$. This means that there is the same variance in the pretest and posttest data groups or the variances of the two data are homogeneous.

Hypothesis testing

Differences in Critical Thinking Skills in Experimental Groups

The following are the results of the pre-test and post-test of Critical Thinking Skills in the experimental group in class X MA Al-Ihsan Boarding School. The pre-test and post-test hypotheses were tested using the Paired Sample T-Test with SPSS version 24.0. The results of the test for differences in critical thinking skills in the experimental group are presented in Table 3.

Table 3. Differences in Critical Thinking Skills in the Experimental Group

Group	Mean	Median	Min-Max	Uji Paired Sample
				T-Test
				<i>p value</i>
Pre-test Experiment	43,37	43,80	31,30 – 59,40	0,000
Post-test Experiment	83,98	84,40	71,90 – 93,80	

Based on the data in Table 3, it shows that in the Pre-test Experiment, the mean value (average) is 43.37, the median value is 43.80, the minimum value is 31.30, the maximum value is 59.40. Whereas in the Post-test Experiment the mean (average) value was 83.98, the median value was 84.40, the minimum value was 71.90, the maximum value was 93.80. Based on Table 3, the Experiment Group's Paired Sample T-Test test shows that the Sig value ($0.000 < 0.05$), meaning that there is a difference in the Critical Thinking Skills of class X MA Al-Ihsan Boarding School results from the pre-test and post-test which were treated with using modules. These results also indicate that there is an effect of the implementation of the CTL-Based Physics Module on the Critical Thinking Skills of class X MA Al-Ihsan Boarding School students.

Differences in Critical Thinking Skills in the Control Group

The following are the results of the pre-test and post-test of the control group's Critical Thinking Skills in class X MA Al-Ihsan Boarding School. Test the pre-test and post-test hypotheses using the Paired Sample T-Test with SPSS version 24.0, which is presented in Table 4.

Table 4. Differences in Critical Thinking Skills in the Control Group

Group	Mean	Median	Min-Max	Uji Paired Sample
				T-Test <i>p value</i>
Pre-test Control	39,42	40,60	31,30 – 46,90	0,000
Post-test Control	74,00	75,00	59,40 – 87,50	

Based on the data in Table 4, it shows that in the Control Pre-test, the mean (average) value is 39.42, the median value is 40.60, the minimum value is 31.30, the maximum value is 46.90. Whereas in the Post-test Control the mean (average) value was 74.00, the median value was 75.00, the minimum value was 59.40, the maximum value was 87.50. Based on Table 4, the Paired Sample T-Test for the Control Group shows that the Sig value (0.000) <0.05, meaning that there is a difference in the Critical Thinking Skills of class X MA Al-Ihsan Boarding School students in the pre-test and post-test results of the control group.

Differences in Critical Thinking Skills in the Control Group and the Experiment Group

Hypothesis testing to find out the differences between the 2 groups (control and experiment) was carried out using the Independent Sample T-Test. The following are the results of the Independent Sample T-Test with SPSS version 24.0, which are presented in Table 5. Based on Table 5, the results of the Independent Sample T-Test show that the P Value (0.000) <0.05, meaning that there is a difference in the Critical Thinking Skills of class X MA Al-Ihsan Boarding School students between the control group and the experimental group. These results answer the hypothesis that there is an effect of the implementation of the CTL-Based Physics Module on the Critical Thinking Skills of class X MA Al-Ihsan Boarding School students.

Table 5. Independent Sample T-Test Results

Variabel	Mean	Median	Min-Max	Independet Sampel
				T-Test <i>P Value</i>
Post-test Eksperimen	83,98	84,40	71,90 – 93,80	0,000
Post-test Kontrol	74,00	75,00	59,40 – 87,50	

This was also indicated by the mean value in the experimental class, which was 83.98, which was greater than the mean value in the control class, which was 74.00. So it can be concluded that there is an effect of the implementation of the CTL-Based Physics Module on the Critical Thinking Skills of class X MA Al-

Ihsan Boarding School students. Based on the results of hypothesis testing, it shows that the implementation of the CTL-Based Physics Module has a positive and significant effect on the Critical Thinking Skills of class X MA Al-Ihsan Boarding School students. This can be explained that during the implementation of the CTL-Based Physics Module in the experimental class it showed an increase in students' critical thinking skills in each learning process.

The CTL-Based Physics Module influences students' Critical Thinking Skills because through contextual learning (CTL) students can understand facts, concepts, generalizations and theories in learning Physics related to the context, both the context of time and place. Contextual learning (CTL) allows students to solve various problems in the real world and in their daily life environment. The characteristics of learning Physics which are characterized by indoor and outdoor learning, using surrounding objects and observing natural phenomena are basically in accordance with the characteristics of contextual learning (CTL) which are able to present real-world situations in learning Physics (Fatirul, 2008).

The characteristics of contextual learning (CTL) are emphasizing higher-order thinking, transferring knowledge across disciplines, and collecting, analyzing, synthesizing information and data from various sources and points of view. The main components of contextual learning (CTL) include constructivism, inquiry, asking, modeling, learning communities, reflection and authentic assessment (Fatirul, 2008). Contextual learning model (CTL) in learning Physics, in the end will be able to improve students' critical thinking skills by learning to solve real world problems critically so that what is learned in class can be applied in students' real world situations (Fatirul, 2008). If the teacher has been able to cultivate a critical and creative attitude in students, then the physics learning process is no longer a boring activity and does not challenge students to think critically, but can become an effective, efficient and fun learning activity for students and teachers.

The results of the observations showed that after being given treatment with the CTL-Based Physics Module students began to show activeness in studying various problems and raising real problems in the environment. Students become trained to solve various real problems related to Newton's Law material so that in each ongoing learning process students are able to respond critically and present various alternative answers using their own language.

4. Conclusion

Based on the results of the research that has been done, it can be concluded: (1) The design of the CTL-based module on Newton's law material in Physics learning is carried out through five stages, namely Analyze, Design, Development, Implementation, and Evaluation; (2) The validity of the CTL-based module on Newton's law material in Physics learning was carried out by 3 validators consisting of 2 lecturers from the Masters in Physics Education at the University of Riau and 1 expert from Widya Iswara. The final result of the

validation is that the CTL-Based Physics Module on Newton's Law material is valid and feasible to use; (3) Implementation of the CTL-based module on Newton's law material in Physics learning was carried out for students of class X IPA Al-Khwarizmi as the experimental class (given the implementation of the CTL-based module on Newton's law material) and students of class X IPA Al-Jazari as the control class (without being given implementation newton's law material CTL-based module); and (4) Based on the results of hypothesis testing, it shows that the implementation of the CTL-Based Physics Module has a positive and significant effect on the Critical Thinking Skills of class X MA Al-Ihsan Boarding School students. This can be explained that during the implementation of the CTL-Based Physics Module in the experimental class it showed an increase in students' critical thinking skills in each learning process.

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References

- Andi, P. (2014). *Panduan Kreatif Membuat Bahan Ajar Inovatif*. Yogyakarta: Diva Press.
- Dewi, A. P. Y. (2019). Effect of Learning Module with Setting Contextual Teaching and Learning to Increase the Understanding of Concepts. *International Journal of Education and Learning*, 1(1), 20-21.
- Ekici, E. (2016). Why Do I Slog Through the Physics ?” Understanding High School Students’ Difficulties in Learning Physics. *Journal of Education and Practice*, 7(7), 104-110.
- Fatirul, A. N. (2008). Paradigma Baru Dalam Pembelajaran. *Jurnal Wahana*, 51(2), 27-32.
- Haryati, S. (2012). Research and Development (R&D) Sebagai Salah Satu Model Penelitian Dalam Bidang Pendidikan. *Majalah Ilmiah Dinamika*, 37(1), 15-21.
- Herman, J., & Drenckham, W. (2012). *Physics in daily life (1st ed.)*. Les Ulis, France: EDP Sciences.
- Kamba, A. H., Giwa, A. A., Libata, I. A., & Wakkala, G. T. (2018). The Relationship Between Science Process Skills and Student Attitude toward Physics in Senior Secondary School in Aliero Metropolis. *African Educational Research Journal*, 6(3), 107-113.
- Mudlofar, A. (2012). *Aplikasi Pengembangan Kurikulum Tingkat Satuan Pendidikan dan Bahan Ajar dalam Pendidikan Islam*. Jakarta: Rajawali Pers.
- Muna, I. (2018). *Pengembangan Modul Fisika Berbasis Integrasi Sains Dan Islam Materi Tata Surya, Pesawat Sederhana, dan Gaya Untuk SMP/MTS*. Fakultas Sains Dan Teknologi Universitas Islam Negeri Walisongo.
- Novrizal, S., Desnita, M., & Dewi, W. S. (2019). Analisis Sajian Buku Teks Pelajaran Fisika SMA Kelas XI Semester 2 Terkait Komponen Contextual
-

- Teaching and Learning (CTL). Universitas Negeri Padang, Sumatera Barat.
- Permatasari, I. (2013). Penerapan Media Mind Mapping Program Pada Pembelajaran Contextual Teaching and Learning (CTL) untuk Meningkatkan Motivasi dan Hasil Belajar Fisika Pada Siswa Kelas XI.A2 SMA Negeri 4 Surakarta. *Jurnal Pendidikan Fisika*, 1(2), 28-34.
- Puskur. (2009). *KTSP*. Jakarta: Balitbang, Depdiknas
- Rika, A. (2015). Pengembangan Modul Berbasis Contextual Teaching and Learning (CTL) Dilengkapi dengan Media Audio Visual untuk Meningkatkan Hasil Belajar Fisika Peserta Didik SMA. *E Jurnal Prosiding Seminar Nasional Fisika*, 4(2), 137-143.
- Selvianiresa & Prabawanto, S. (2017). Contextual Teaching and Learning Approach of Mathematics in Primary Schools. *Journal of Physics Conference Series*, 10(1), 1-8.
- Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, dan R & D*. Bandung: Alfabeta.
- Sulardi, S. (2017). Pengembangan Perangkat Pembelajaran Fisika Model Problem Based Learning (PBL) Untuk Melatih Keterampilan Berpikir Kritis Siswa. *JPPS (Jurnal Penelitian Pendidikan Sains)*, 5(1), 802–810.
- Tural, G. (2013). The Functioning of Context-Based Physics Instruction In Higher Education. *Asia-Pacific Forum on Science Learning and Teaching*, 14(1), 1–23.
- Viyanti, N. (2014). Pengembangan Media Interaktif Pembelajaran IPA Terpadu Tema Mata Untuk Siswa Kelas VIII. *Unnes Science Education Journal*, 3(1), 364-370.
- Yuliani, H., Mariati, Yulianti, R., & Herianto, C. (2017). Keterampilan Berpikir Kreatif Pada Siswa Sekolah Menengah Di Palangka Raya Menggunakan Pendekatan Saintifik. *Jurnal Pendidikan Fisika Dan Keilmuan (JPFK)*, 3(1), 48-56.
- Yuwandra. (2020). Development of Learning Tools Based On Contextual Teaching And Learning In Fifth Grade Of Primary Schools. *Journal of Physics : Conference Series*, 1554(1), 1-6.

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