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Learning Cycle 7E with Audio Visual Media Enhancing Science Learning Outcomes

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ABSTRAK

Hasil belajar IPA siswa kelas V SD cenderung rendah, hal ini dilihat dari jumlah siswa yang belum mencapai KKM lebih banyak dibandingkan dengan jumlah siswa yang mencapai KKM. Hal tersebut menjadi alasan utama dilakukannya penelitian ini. Penelitian ini bertujuan untuk mengetahui pengaruh model pembelajaran *Learning Cycle* 7E bermediakan audiovisual terhadap hasil belajar IPA siswa kelas V SD. Jenis penelitian ini adalah penelitian eksperimen semu menggunakan desain *non-equivalent post-test only control group design*. Populasi penelitian ini adalah seluruh siswa kelas V SD yang berjumlah 129 siswa. Sampel menggunakan teknik *random sampling*, dengan jumlah 81 siswa. Pengumpulan data dalam penelitian ini menggunakan metode tes dengan instrumen tes pilihan ganda. Data yang diperoleh dianalisis menggunakan analisis statistik deskritif dan statistik inferensial. Berdasarkan uji hipotesis diperoleh t_{hitung} 51,23 lebih besar dari t_{tabel} 1,91, dengan demikian dapat disimpulkan bahwa terdapat pengaruh yang signifikan model pembelajaran *Learning Cycle* 7E bermediakan audiovisual terhadap hasil belajar IPA siswa kelas V SD.

ABSTRACT

The science learning outcomes of grade V elementary school students tend to be low; this is seen from the number of students who have not reached KKM more than the number of students who have reached KKM. This is the main reason for doing this research. This study aims to determine the effect of the Learning Cycle 7E learning model providing audiovisual to the learning outcomes of science learning in fifth grade elementary school students. This type of research is a quasi-experimental study using a non-equivalent post-test only control group design. The population of this research is all of the fifth-grade elementary school students, amounting to 129 students. The sample uses a random sampling technique, with 81 students. Data collection in this study uses a test method with multiple choice test instruments. The data obtained were analyzed using descriptive statistical analysis and inferential statistics. Based on the hypothesis test obtained tcount 51.23 is greater than ttable 1.91, thus it can be concluded that there is a significant effect of the Learning Cycle 7E learning model providing audiovisual on the science learning outcomes of fifth grade elementary school students.

1. Introduction

Natural Science (IPA) is often referred to as natural science. Natural science is concerned with finding out about nature systematically. Science is not only a knowledge in the form of facts, concepts, or principles, but also a discovery process. This is in line with (Sumiyati & Sujana 2016) which states that science is a set of guided knowledge. The point is science learning must be taught in an organized and guided manner in elementary schools, so that students can learn about themselves and the natural surroundings, and can apply them in everyday life. To achieve this, it needs concrete learning, for example when studying metamorphosis or natural disasters we cannot learn it quickly because we cannot observe the process at the time we want. According to (Wayan, Nyoman, & Nyoman, 2020) in learning process, the media has an important meaning because the unclear material presented can be assisted by the media. With audiovisual media, it can be studied concretely so that learning becomes meaningful. This is in line with Ozmen (Sharma, 2018) who stated that the learning cycle offers a new approach for science educators. The learning methodology is much more effective in teaching real concepts in science.

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Audiovisual media involves the hearing and sight sense in one process. Audible and engaging visual messages can be presented through audiovisual programs such as films, videos, and animations. This is in line with (Fujiyanto et al., 2016) arguing that audiovisual media is a media that contains sound and image elements that can be seen, such as video recordings, animations, slides, films, sound, and so on. Those can make it easier for students to understand abstract material. Audiovisual media is very suitable in science learning because it shows an event that the process cannot be observed at the time we want, for example, animal metamorphosis, natural disasters, and so on.

Learning outcomes is an Indicators that can show the learning process. According to Susanto (Darsana et al., 2019), learning outcomes are changes that occur in students, both cognitive, affective, and psychomotor aspects as a learning activity result. Learning outcomes achieved by students in teaching and learning process. Science learning in Indonesia is still classified as not improving, based on the Program for International Student Assessment (PISA) data which states that Indonesia in science learning ranked 70 out of 78 participating countries with a 396 in 2018. In elementary school science learning, many teachers have not carried out learning that involves students to be active and creative. It supported by the interview results conducted with elementary school teachers in Gugus VIII, Kecamatan Buleleng. It was found that (1) students were still less active when participating in the learning process, (2) students lacked of interest in learning, (3) teachers rarely made and use innovative learning models and learning media or teaching aids during the learning process.

This finding supported by observations that find several problems, (1) in learning process, teachers rarely use the learning model. It can be seen from the learning activities which are always dominated by teachers, (2) students are not enthusiast in learning process. It can be seen from only a few students who are active in discussing, answering questions from the teacher and asking questions, (3) teachers lack in utilizing technology-based learning media in learning shows an event that occurs and is unable to observe the process at the same time. desired. for example, animal metamorphosis material, so that students tend to get bored quickly and find it difficult to understand the material being taught.

If the problem is not handled properly, the learning process will affect student's learning outcomes. The solution is to apply innovation and various learning models. One of them is the 7E Learning Cycle. The 7E Learning Cycle is a constructivism-based learning model, whose learning activities are student-oriented. In line with (Sumiyati & Sujana, 2016) stated that constructivist approach is a learning view that teaches students to construct their knowledge through schemes that students have previously had. Sumiyati's explanation also supported by (Balta, 2016) which states that constructivist theory requires students to be active in class during learning. Constructivist learning is an approach that helps students to acquire new knowledge using their previous knowledge and develop special learning methods by actively participate in learning process. The solution is to implement innovative learning activities such as the 7E Learning Cycle.

The Learning Cycle had 3 stages, then developed into 5 stages, then developed into 7 stages known as 7E. This model emphasizes the learning from initial knowledge. According to (Laelasari et al., 2014) Sometimes the learning model must be changed to maintain new information, new insights, and new knowledge. Applying the 7E learning cycle model requires students to study material meaningfully by thinking and working, so that the knowledge gained is the result directly experienced by students. According to (Sakdiah, 2019) the 7E learning cycle model is a learning cycle model that involves students learning actively through 7 phases in learning. This is in line with (Adilah & Budiharti, 2015) stated that the 7E learning cycle model is a constructivism-based learning model consist of seven phases in the form of Elicit, Engage, Explore, Explain, Elaborate, Evaluate, and Extend which are organized and student-centered so that students discovering his concepts actively. The 7E learning cycle model is very effective to apply in science subjects because it requires thinking and working actively, so that learning becomes meaningful.

The 7E learning cycle must be supported by the teacher's skill in asking questions and the students to active in explore their knowledge. It can be concluded that the 7E learning cycle is student-oriented. Learning the material meaningfully by working and thinking, so that the knowledge is students' experience result. It will not happen if there is no teacher's role in learning process. In learning process, the teacher must be able to become a motivator to make students more active and enthusiast in following lessons. The teacher must be able to become a facilitator to help students make plans to achieve learning objectives without taking a certain position in discussion so that the expected learning can be achieved. According to Lorsbarch (Permana, 2018) the advantages of this model are (1) stimulate students to remember previous subject matter, (2) motivate students to be more active and increase their curiosity, (3) practice students to convey concepts they have

learned orally. This is in line with Fajaroh and Dasna (Rawa et al., 2016) which state that the learning cycle is a series of activity organized in such a way that students can master the competencies that must be achieved in learning by taking an active role, (4) students practice to learn in finding concepts, (5) allow students to think, seek, find, and explain examples of application concepts that have been learned, (6) teachers and students work together carry out the learning stages, and (7) teachers can apply this model in different ways. This is in line with (Parno et al., 2019) stating that the Learning cycle (LC) is based on Piaget's theory. It's design to help students understand concepts and actively work on solving problems.

Some researchers believe that the 7E learning cycle affects learning outcomes. Research conducted by (Sumiyati, Y., Sujana A., 2016) showed that there is a significant effect using the 7E learning cycle model on science learning outcomes, especially in water cycle process for fifth-grade elementary school students. Another study was conducted by (Sakdiah, 2019) which showed that there was a significant effect using the 7E learning cycle learning model on the critical thinking skills of fifth-grade elementary school students. 7E learning cycle model can make students think critically. This is in line with (Nurmalasari et al., 2014) that the learning cycle can improve student understanding. It can be seen from the stages. The stages in this learning model can measure several of Bloom's cognitive aspect, including C2 (understanding), C3 (applying), and C4 (analyzing) so that it will improve students' conceptual understanding. Based on this statement, it believes that a hypothesis can be concluded that the 7E learning cycle model affects learning outcomes.

The purpose of this study was to determine the significant effect of 7E learning cycle provide audiovisuals on science learning outcomes at fifth-grade elementary school students in Gugus VIII, kecamatan Buleleng, 2019/2020 academic year. This study focused on the low cognitive learning outcomes of students with the help of audiovisual media. This evidenced by research that has been conducted by haliyah, Bakri, & Siswoyo (Istuningsih et al., 2018) which states that the e-modules implementation based on the 7E learning cycle can improve students' abilities because the module content more interactive with animation, audio, and videos so that students can easily understand the material and increased the learning achievement results more optimal. Other relevant research by (Lisma et al., 2017) has the aim of getting a picture of increasing student understanding through 7E Learning Cycle (LC) model. (Lisma et al., 2017) focused on the aspects of interpreting and concluding in physics learning. Another study using the 7E learning cycle model is (Physics & Semarang, 2013) to improve students' critical thinking by designing a Learning Cycle-7E that fits the criteria set in their school.

2. Research Method

This research was conducted at Elementary School in Gugus VIII, Buleleng Regency. The implementation of this research is designed in the second semester in 2019/2020 academic year for fifth grade. This research is quantitative, experimental research with a quasi-experimental design. The population of this study was the fifth-grade elementary school students in Gugus VIII, Kecamatan Buleleng. 129 students were divided into 5 classes, fifth-grade Elementary School of 1 Kendran (20), fifth-grade Elementary School of 1 Beratan (10), fifth-grade Elementary School of 2 Liligundi (18), Elementary School of 1 Paket Agung (41) and Elementary School of 2 Paket Agung (40). Sampling using a random sampling technique. Before specifying the sample, the equality test was carried out using one-way analysis of variance (Anava A). The test criteria if Fcount> from Ftable, then H0 was rejected and H1 was accepted, so the group interpreted unequally. If Fcount <from Ftable, then H0 was accepted and H1 was rejected, so the group interpreted as same. Based on the Equivalence Test result, Fcount <from Ftable, so that the groups are defined as the same. After conducting the equivalence test followed by determining the sample using random sampling with the lottery technique. Based on the results of the lottery, two classes were used as the research sample, fifth-grade Elementary School of 1 Paket Agung with 41 students as the control group. Treated by not using the 7E learning cycle providing audiovisual. The fifth-grade Elementary School of 2 Paket Agung with 40 students as an experimental group treated using the 7E learning cycle audiovisual media.

The data collection method used the test method in the form of a multiple-choice test with 30 items. Multiple-choice tests conducted to measure students' knowledge in the cognitive realm. This multiple-choice test was chosen with the assumption that by answering this test, students were able to choose and understand which answer was correct in written question, and to assess the results using true and false points if they were answered correctly, they got 1. If the answer was wrong, they got 0. The multiple-choice test first validated by the experts, then tested the validity (content and

items), reliability, differentiation power, and difficulty level. Before compiling the instrument and testing it, a learning plan and instrument grid are drawn up first.

Table 01. Science Learning Outcomes Test Grid Theme 7

Basic competencies	Indikator Level	Question Number
3.7. Analyzing the effect of heat on changes in temperature and shape of objects in everyday life.	• • Selecting changes in the form of solid, liquid, and gases in everyday life • • Analyze the occurrence of melting, freezing, and evaporating events in everyday life. • • Examining the process of changing the shape of objects that require heat and release heat in everyday life. • • Conclude that heat can change the shape of objects and the temperature of objects in everyday life. • • Selects evaporation and crystallization condensation events in daily life. • • Arrange the process of crystallization events in everyday life • • Interpret the events of condensation and evaporation in everyday life.	1-22 3-53 6-9 4 10-13 4 14-163 17-18 2
	• • Conclude about the differences in the properties of solid, liquid and gas in everyday life. • • Correcting the properties of solid, liquid, and gas objects in everyday life • • Proving the nature of liquid objects in everyday life. • • Correcting the properties of liquids and gases in everyday life	19-21 3 22-23 2 24-26 3 27-28 2 29-30 2

The data obtained analyzed using descriptive statistics and inferential statistics. Descriptive statistics carried out to determine the high and low quality of learning outcomes in experimental group and the control group. Descriptive analysis used were the mean and standard deviation. To determine the quality of students' science learning outcomes, the mean score of each variable converted using the ideal average criteria (Mi) and the ideal standard deviation (SDi). Meanwhile, inferential statistical analysis used to test the hypothesis was the t-test. The test criteria, if F count ≥ then the sample is not homogeneous, and if F count <then the sample is homogeneous. The test carried out with 5% significant level with degrees of freedom for the numerator and degrees of freedom for the denominator. Before tested, analysis prerequisites that must be done, the normality test and the homogeneity test of variance.

3. Result and Discussion

Based on the results above, the frequency distribution for science learning outcomes in experimental group average score = 21.65. Based on the five-scale PAP, students in experimental

group was at high criteria. Meanwhile, the control group average score = 13.80. Based on the five-scale PAP, the control group students were in moderate criteria.

Table 02. Post-test Analysis Result of Science Learning Outcomes

Statistic	Science Learning Outcomes	
	Experiment class	Control class
Mean	21,65	13,80
Standard Deviation	3,74	4,24
Variance	13,98	17,97
Highest score	28	26
Lowest score	14	11

Furthermore, the average (mean) and science learning outcomes determined by converting the average percent of students' science knowledge competencies with the five-scale PAP criteria as follows.

M % = $\frac{M}{SMI} x\ 100\%$
M % = $\frac{21,65}{100} x\ 100\%$
M % = 0,2165 x 100%
M % = 21,65 (Experiment group)
M % = $\frac{M}{SMI} x\ 100\%$
M % = $\frac{13,80}{100} x\ 100\%$
M % = 0,1380 x 100%
M % = 13,80 (Control group)

The average is compared with the five scale PAP criteria as follows.

Table 03. Five scale PAP criteria

Percentage	Students' ability level
22,5 $\leq$ M $\leq$ 30	Very high
17,5 $\leq$ M < 22,5	High
12,5 $\leq$ M < 17,5	Moderate
7,5 $\leq$ M < 12,5	Low
0 $\leq$ M < 7,5	Very low

Based on the results of the descriptive analysis in tables 1 and 2 above, it can be seen that the average science learning outcomes of the experimental group is 21.65 which is in high category, while the average science learning outcomes of the control group is 13.80 which is in high category. which is being. It showed that the average science learning result of the experimental group is higher than the control group. Before proceeding to hypothesis testing, a prerequisite test performed first. The prerequisite tests that must be met are the normality and homogeneity tests. Based on the prerequisite tests that have been carried out with Microsoft Office.

Table 04. Normality and Homogeneity Test for Experiment Group and Control Group

No	Sample	DK	Mean	SD	Varian	X^2_{hit}	X^2_{tabel}	F_{hitung}	F_{tabel}
1	Experiment	40	21,65	3,74	13,80	4,5	11,07		
	1,07	3,96							
2	Control	41	17,09	3,60	12,96	5,35	11,07		

After the data normally distributed, the variance homogeneity test performed. The homogeneity test of variants in this study used the F test at 5% significance level with degrees of freedom for the n1-1 numerator (40-1 = 39) and degrees of freedom for the denominator n2-1 (41-1 = 40) the score of Ftable = 3, 96. The variance homogeneity test was carried out based on the data on student science learning outcomes taught with the Learning Cycle 7E Providing Audiovisual learning model and student data who were not taught using the 7E Learning Cycle Providing Audiovisual model. From the results Fcount = 1.07, so that Fcount = 1.07 <Ftable = 3.96, then both variances and both groups are homogeneous.

Based on the results of the test for normality and homogeneity of variance from the two groups, students who were taught with the Learning Cycle 7E learning model providing audiovisual and data from students who were not taught with the Learning Cycle 7E model providing audiovisuals that were normally distributed and the variants of the two groups were homogeneous. The statistical test used in this study is the t-test with the polled variance formula. With the criteria if <from, then H0 accepted and H1 rejected, and if > from, then H0 rejected and H1 accepted. At 5%, the significance level is with degrees of freedom (dk = 40 + 41 - 2 = 79), so the price is obtained, = 1.91. Based on the t-test analysis = 51.23, because = 51.23> = 1.91 then H0 rejected and H1 accepted. It means that there is a significant difference in student science learning outcomes between groups of students who learn using 7E learning model providing audiovisual with groups of students who take learning not using the 7E Learning Cycle providing audiovisual.

Table 05. Hypothesis test

School	N	DK	t_{hitung}	t_{tabel}	Conclusion	
Experiment	40					
		79	51,23	1,91	$H_{0\ ditolak}$	
Control	41					

Based on the description of the research data, students in the experimental group had a higher average score of science learning outcomes compared to students in the control group. The results of the analysis of the data distribution using the t-test showed that the t count was greater than t table (t table t table), so that there was a significant effect on student science learning outcomes between students in the experimental group and students in the control group. It can be seen from the high scores of the experimental group students' science learning outcomes.

The 7E learning cycle model that provides audiovisuals has advantages such as providing a stimulus to students to remember previous subject matter, allow students to think, search, find, and explain examples of application concepts that have been learned. The findings in this study were (1) the increased activeness of students who were rarely active at first due to the students' lack of material understanding being studied. (2) using the 7E learning cycle learning model with providing audiovisuals can increase student motivation. (3) students' interest in learning materials increases because they use audiovisual media in the form of animated videos in explaining teaching materials, so that students become focused. This is in line with Arsyad (Johari et al., 2016) which states that audiovisual media has an affective function, a function to attract and direct students' attention to concentrate on the content of the lesson related to the visual meaning displayed or accompanying the text of the subject matter. The function of learning media, especially visual media. (4) when interacting, students interacted well with friends and also saw the solidarity of students when solving problems given by the teacher. (5) students seem happy to take part in learning because the learning model used makes students get direct experience of the problems given. This is in line with (Sumiyati, Y., Sujana A., 2016) which states that the 7E learning cycle learning model providing audiovisuals can improve critical thinking, activeness, students' curiosity in knowing the material they want to study, so that it has an impact on student learning outcomes. The opinion of Sumiyati is also supported by (Mulyono & Noor, 2017) suggesting that after the implementation of learning using the 7E-learning cycle, it can describe self-regulation and self-regulation. This is in line with solving problems based on student goal orientation after the implementation of the 7E learning cycle. With the implementation of the 7E learning cycle learning model Providing audiovisuals makes students' science learning outcomes increase and the 7E learning cycle model that provides audiovisuals can affect student science learning outcomes. This is in line with the results of research from (Jati et al., 2017) which states that student learning abilities can increase, students gain new knowledge through various learning sources, students become able to apply learning methods in real life. In control, the class is given direct learning to students.

The 7E learning cycle model that provides audiovisuals is very helpful for students in understanding the learning material. This is because the learning process focuses on students. This is in line with (Rosmaiyadi, 2017) which states that the 7E Learning Cycle model applies an interactive nature in the learning process because students play a more important role in the learning process through discussions and presentations and the teacher is only a facilitator. Science learning assisted by audiovisual media can attract students' attention with an attractive appearance and can display the reality of the material, so that students can easily understand something abstract to become something concrete. According to (Sumiyati, 2016), the 7E learning cycle model that provides audiovisuals is a student-oriented model, students learn actively, creatively, and innovatively which builds their knowledge, so that student learning becomes meaningful. The findings in the experimental group were that students who were initially less active became active in learning seen from the critical thinking level of students by increasing various questions from students, this was because students began to be interested in the material being taught. This is in line with the opinion (Yulianti & Saputra, 2019) which states that the application of the 7E learning cycle model can make students think critically in the learning process.

The students' conditions in the experimental group differed from those of the control group students. Students who are not taught using the 7E learning cycle learning model providing audiovisual tend to be passive, due to the lack of media used by the teacher to make students interested in learning. Students only listen to the teacher's explanation, so that teacher-centered occurs. Student activities in the classroom only record what the teacher explains, when the teacher asks only a few questions who are brave and able to answer the teacher's questions. Many of the students do not understand the material explained because the material described is still abstract. This atmosphere will make students feel bored quickly with the learning that is taking place. These findings prove that there is a different effect from 7E learning cycle model with audiovisual and learning that does not use the 7E learning cycle with the audiovisual learning model.

The results of this study are following those obtained by (Sumiyati, Y., Sujana A., 2016) and (Yulianti & Saputra, 2019) which states that the application of the 7E learning cycle learning model can make students enthusiastic, active, collaborative, critical, and disciplined. in the learning process, to improve student learning outcomes. According to (Dewi et al.,, 2017) when students can understand concepts, apply concepts to solve problems, they indirectly can think critically. After students gain new knowledge, the teacher wants to expand students' understanding so that the concepts being taught can be applied in real life. This is in line with Kurniasih (Widyaningsih et al., 2018) saying that after students gain experience in new knowledge, teachers need to assess student understanding on an ongoing basis and provide feedback. When students' sense of understanding can come true. Based on the findings in this study, it can be stated that the 7E learning cycle learning model providing audiovisual affects the science learning outcomes of fifth-grade elementary school students in Gugus VIII, Kecamatan Buleleng, Academic Year 2019/2020.

4. Conclusion

Based on the results of research and data analysis, the following conclusions are obtained from the effect of the learning cycle 7E learning model providing audiovisual on the science learning outcomes of fifth-grade elementary school students in Gugus VIII, Buleleng Regency, 2019/2020 academic year with very good qualifications. Several suggestions can be conveyed in this study, students in the learning process should be more actively involved so that later they can improve learning outcomes and gain new knowledge, students can develop their knowledge and can learn through the implementation of the 7E learning cycle learning model. Furthermore, teachers can use the 7E learning cycle learning model in the learning process because this model can create interesting, fun, and more meaningful learning and for other researchers who will conduct further research on the 7E learning cycle learning model providing audiovisuals in the subject area Science and other appropriate subjects should pay attention to the constraints experienced in this research as a consideration for the improvement and perfection of the research to be carried out.

References

Adilah, D. N., & Budiharti, R. (2015). Model Learning Cycle 7E Dalam Pembelajaran IPA Terpadu. *Prosiding Seminar Nasional Fisika Dan Pendidikan Fisika (SNFPF) Ke-6*.

Balta, N. (2016). The Effect of 7E Learning Cycle on Learning in Science Teaching: A meta-Analysis Study. *European Journal of Educational Research*, *5*(2), 61–72. https://doi.org/10.12973/eu-

jer.5.2.61

Darsana, I. G. B., Wiarta, I. W., & Putra, M. (2019). Pengaruh Model Problem Based Learning Berbasis Portofolio Terhadap Kompetensi Pengetahuan Matematika, *3*(4), 200–207.

Dewi, N. P. S. R., Wibawa, I. M. C., & Devi, N. L. P. L. (2017). Kemampuan Berpikir Kritis Dan Keterampilan Proses Dalam Pembelajaran Siklus Belajar 7E Berbasis Kearifan Lokal. *JPI (Jurnal Pendidikan Indonesia)*. https://doi.org/10.23887/jpi-undiksha.v6i1.9476

Fisika, J., & Semarang, U. N. (2013). Learning Cycle-7E Model To Increase Student ' S. *Jurnal Pendidikan Fisika Indonesia (Indonesian Journal of Physics Education)*.

Fujiyanto, A., Jayadinata, A. K., & Kurnia, D. (2016). Penggunaan Media Audio Visual Untuk Meningkatkan Hasil Belajar Siswa Pada Materi Hubungan Antarmakhluk Hidup. *Penggunaan Media Audio Visual Untuk Meningkatkan Hasil Belajar Siswa Pada Materi Hubungan Antarmakhluk Hidup*, *1*(1), 841–850. https://doi.org/10.23819/pi.v1i1.3576

Istuningsih, W., Baedhowi, B., & Bayu SANGKA, K. (2018). The Effectiveness of Scientific Approach Using E-Module Based on Learning Cycle 7E to Improve Students' Learning Outcome. *International Journal of Educational Research Review*. https://doi.org/10.24331/ijere.449313

Jati, N. H. D., Budiyono, & Slamet, I. (2017). Students' Mathematical Communication Ability using Learning Cycle 7E on Junior High School. In *Journal of Physics: Conference Series*. https://doi.org/10.1088/1742-6596/895/1/012040

Johari, A., Hasan, S., & Rakhman, M. (2016). Penerapan Media Video Dan Animasi Pada Materi Memvakum Dan Mengisi Refrigeran Terhadap Hasil Belajar Siswa. *Journal of Mechanical Engineering Education*. https://doi.org/10.17509/jmee.v1i1.3731

Laelasari, L., Subroto, T., & Karimah, N. I. (2014). Penerapan Model Pembelajaran Learning Cycle 7e Dalam Kemampuan Representasi Matematis Mahasiswa. *Euclid*. https://doi.org/10.33603/e.v1i2.347

Lisma, L., Kurniawan, Y., & Sulistri, E. (2017). Penerapan Model Learning Cycle (LC) 7E Sebagai Upaya Peningkatan Pemahaman Konsep Aspek Menafsirkan dan Menyimpulkan Materi Kalor Kelas X SMA. *JIPF (Jurnal Ilmu Pendidikan Fisika)*. https://doi.org/10.26737/jipf.v2i2.228

Mulyono, & Noor, N. L. (2017). Self-Regulation and Problem Solving Ability in 7E-Learning Cycle Based Goal Orientation. In *Journal of Physics: Conference Series*. https://doi.org/10.1088/1742-6596/824/1/012035

Nurmalasari, R., Kade, A., & Kamaluddin, K. (2014). Pengaruh Model Learning Cycle Tipe 7e Terhadap Pemahaman Konsep Fisika Siswa Kelas VII SMP Negeri 19 Palu. *JPFT (Jurnal Pendidikan Fisika Tadulako Online)*. https://doi.org/10.22487/j25805924.2013.v1.i2.2389

Parno, Supriana, E., Yuliati, L., Widarti, A. N., Ali, M., & Azizah, U. (2019). The influence of STEM-based 7E learning cycle on students critical and creative thinking skills in physics. *International Journal of Recent Technology and Engineering*. https://doi.org/10.35940/ijrte.B1158.0982S919

Permana, N. D. (2018). Penerapan Model Pebelajaran Learning Cycle 7E Berbantuan Website Untuk Meningkatkan Keterampilan Berpikir Kritis Siswa Pada Materi Kinematika Gerak Lurus. *Journal of Natural Science and Integration*, *1*(1), 11–41. https://doi.org/10.24014/jnsi.v1i1.5187

Rawa, N., Sutawidjaja, A., & Sudirman, S. (2016). Pengembangan Perangkat Pembelajaran Berbasis Model Learning Cycle 7E Pada Materi Trigonometri Untuk Meningkatkan Kemampuan Koneksi Matematis Siswa. *Jurnal Pendidikan - Teori, Penelitian, Dan Pengembangan*. https://doi.org/10.17977/jp.v1i6.6368

Rosmaiyadi, R. (2017). Analisis Kemampuan Berpikir Kritis Matematis Siswa Dalam Learning Cycle 7E Berdasarkan Gaya Belajar. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*. https://doi.org/10.24127/ajpm.v6i1.722

Sakdiah, H. (2019). Pengaruh Model Pembelajaran Learning Cycle Terhadap Hasil Belajar Fisika Siswa Sma. *Relativitas: Jurnal Riset Inovasi Pembelajaran Fisika*, *1*(1), 1. https://doi.org/10.29103/relativitas.v1i1.1192

Sharma, S. (2018). 7E Learning Cycle Model : a Paradigm Shift in, *6*(2), 13–22.

Sumiyati, Y., Sujana A., D. D. (2016). Penerapan Model Learning Cycle 7E Untuk Memprevensi. *Jurnal Pena Ilmiah*, *1*(1), 41–50.

Wayan, N., Nyoman, W., & Nyoman, K. I. (2020). Pengaruh Model Visualization , Auditory , Kinestetic Berbantuan Media Gambar Terhadap Hasil Belajar IPA, *4*(1), 9–15.

Widyaningsih, E., Waluya, S. B., & Kurniasih, A. W. (2018). Analysis of critical thinking ability of VII grade students based on the mathematical anxiety level through learning cycle 7E model. In *Journal of Physics: Conference Series*. https://doi.org/10.1088/1742-6596/983/1/012117

Yulianti, Y., & Saputra, D. S. (2019). Jurnal cakrawala pendas. *Jurnal Cakrawala Pendas*, *5*(2), 40–44.