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Research Article

The effect of learning cycle 5E+Powtoon on students' motivation: The concept of animal metamorphosis

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ABSTRACT

During the Covid-19 pandemic period, elementary school students experienced many learning difficulties, which resulted in decreased learning motivation. This study aimed to determine the effect of the 5e+Powtoon learning cycle learning model on learning motivation in science. This quasi-experimental research was conducted at public Elementary School (ES) Teladan Ambon, Maluku. There were two groups, one as the experimental class and another as a control class with 60 students. The research design used was a pretest-posttest non-equivalent control group. The instrument used is a learning motivation questionnaire, with a value of validity = 0.769 and reliability = 0.897. The analysis results with ANCOVA showed the value of Sig = 0.000 > alpha (0.05), so applying the 5E+Powtoon model effect students' learning motivation. Thus, the 5e+Powtoon learning cycle can be recommended to increase elementary school students learning motivation. Further research is suggested to compare student motivation in Maluku with other developed countries by using the 5E model with other online learning applications.

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INTRODUCTION

Primary education is believed to be the initial reference point in formal education that can change student behavior towards nature. In a sense, elementary school students need proper learning facilitation. According to some experts, one of the subjects that can provide behavioral provisions to elementary school students in science learning (Mack et al., 2021). This learning is more related to how to find out about nature systematically, not only mastering a collection of knowledge in the form of facts, concepts, or principles, but also a process of discovery (Darling-Hammond et al., 2019; Hsieh, 2014). Therefore, learning science requires various perspectives to learn about nature to facilitate students' learning (Gokalp & Kirbulut, 2013; Kho & Chen, 2017). Through science learning, students gain direct experience and solve problems according to their learning concepts (Lin et al., 2021). However, some research results prove that elementary school students are afraid of being wrong in practicing concepts, so they tend to be afraid to try again (Wu et al., 2021). Therefore, the role of the teacher must be a skilled facilitator to facilitate the learning needs of students.

During the Covid-19 pandemic, teachers have a role in more complex learning, especially online science learning. As is known, during online learning, the student's study room moves from class to home. This condition makes the teacher must try as much as possible to carry out learning effectively. On the other hand, it was reported that many students experienced learning loss during this pandemic during the online learning period. One of the reasons for the loss of learning is the reduced motivation of students to learn (Dağgöl, 2013; Zaitun et al., 2021), especially students who study individually from home without any direct interaction with their friends. In addition, learning conditions often change rapidly, and the safety factor is sometimes uncertain. Hira and Anderson (2021) and Raiman et al (2021) reports that this situation makes students lose their motivation to learn, especially those under psychological pressure and stress caused by various factors. Moreover, those who lack psychological resilience are also prone to losing motivation.

Another fact shows that Indonesia is still trying to improve its position in PISA and TIMSS so as not to lag behind other countries in Asia (Agasisti et al., 2021). According to Fenanlampir et al (2019), the efforts made to improve the results of PISA and TIMSS are to improve the quality of learning by encouraging student learning motivation. Wenno (2015) underlines that motivation is one factor that influences low science learning outcomes. Several efforts are intended to increase learning motivation, such as the implementation of independent learning programs (freedom of learning) and independent campuses (Yusuf & Arfiansyah, 2021) as well as digital-based learning transformation (Borleffs et al., 2018; Dukut, 2019), which focuses on interest in learning. Student learning motivation is indicated to be strong and directly proportional to learning outcomes. If learning motivation is high, learning outcomes are also expected to be high, and vice versa. The results of a survey of science learning in 10 regions and cities in Maluku Province show that elementary science learning outcomes still need to be empowered by applying learning models that help students gain a lot of learning experiences (Leasa et al., 2021).

Recent studies report that learning models can potentially increase students' learning motivation (Kho & Chen, 2017; Wang et al., 2021). Furthermore, in online learning, the use of media is necessary to encourage an increase in students' learning motivation (Sung et al., 2015). This condition requires the innovation of student-centered practical and contextual learning models. These innovations are developed integrally with media integration to build students' creativity and innovation. One of the recommended learning models is learning cycle 5E, which involves students learning something new, or trying to understand something more deeply (Grau et al., 2021; Ylostalo, 2020). In addition, 5E can stimulate students' cognitive thinking processes allowing them to explore their knowledge through various exploratory experiences (Niederberger, 2009), increasing motivation (Goldston et al., 2010), and learning outcomes (Schallert et al., 2021).

Learning cycle 5E can be implemented in two features, involving students in scientific inquiry and constructivism, which is rooted in how all children learn science and resembles how scientists conduct investigations and discoveries (Goldston et al., 2013). Model 5E is indicated to positively influence cognitive learning stages such as interpretation, analysis, evaluation, supporting the investigation process, learning new concepts, or trying to understand known concepts in all aspects (Ulaş et al., 2012). Learning cycle 5E can increase the creativity of elementary school students from three aspects of science learning: fluency, flexibility, and uniqueness. The final test results showed a significant number of 10 to 60%, 30 to 90%, and 20 to 130% compared to students in the control group (Zhou, 2021).

However, the 5E learning cycle requires more time and energy than compiling and implementing the learning. It requires the seriousness and creativity of teachers in designing and implementing the learning process (Abdusselam et al., 2018). Therefore, in cycle 5E learning, it is necessary to implement solutions that can facilitate the required period but are not hindered by the limited formal lesson schedule (Schallert et al., 2020). One solution that can be taken is to apply 5E cycle learning with Powtoon media. Powtoon media can help teachers create and present more interesting learning materials so students can focus more on learning motivation (Susanti et al., 2020). In addition, Powtoon has been recommended as a digital-based learning program suitable for use in education (Muliyati et al., 2021; Susanti et al., 2020). Powtoon is a digital-based media with various features and effects that influence creativity, dynamic thinking, and student motivation (Kafah et al., 2020; Zamora et al., 2021).

Powtoon media is a relatively new learning media, so teachers still rarely use it in learning to stimulate students' motivation, especially concept mastery (Amelia & Manurung, 2022; Suprianti, 2020). Another finding states that students who are taught using virtual laboratory-based learning understand better when compared to actual experiments (Olympiou & Zacharia, 2012; Simbolon & Sahyar, 2015), especially elementary students in science learning. Therefore, an exploration was carried out in measuring the use of the 5E learning cycle learning model assisted by Powtoon media on students' learning motivation. Therefore, the purpose of this study was to determine the effect of the 5E learning cycle model with the help of Powtoon media on students' learning motivation in science learning.

METHOD

This study uses a quasi-experimental approach with a non-equivalent control group design. This research was conducted at the Teladan State Elementary School (ES), Ambon - Indonesia. The population in this study were all students of class IV ES Teladan. A total of 42 students were selected using a random sampling technique and divided into Class A (experimental) and Class B (control). The way to track these two homogeneous classes is to do an equivalence test. The data was collected using a student learning motivation questionnaire distributed to both classes, namely class A as the experimental group and class B as the control group. The questionnaire instrument contains 20 statements, namely ten positive statements and ten negative statements when students study science (Table 1). Before this research, a trial was conducted on several elementary schools in Ambon City with 100 students. The validity score is 0.769, and the reliability is 0.897, which indicates that validity and reliability are included in the high category (Taherdoost, 2018). The following is a blueprint for a student learning motivation questionnaire learning motivation theory, shown in Table 1.

Table 1. Learning motivation questionnaire

Variable	Indicators	Statement		Number of Questions
		Positive	Negative	
Learning Motivation	Tenacious in the face of adversity	1,4,19	2,9,20	6
	Show interest	8,10,6	7,5,16	6
	Enjoy working independently	17,15	18,	3
	Not quickly to leave a conviction	3	11	2
	Can defend his opinion	13	12,14	3

The research process is carried out in the following stages: 1) before conducting the research process, the researcher takes a sample using a random sampling technique to determine the experimental and control groups, 2) After taking samples, an equivalence test was carried out to ensure that the two sample groups came from populations that had the same variance, 3) tested the validity of the research instrument to class V students to see its validity before being given to the experimental group, 4) distributed pretest questions to the experimental group to know the students' initial abilities, 5) giving treatment or teaching to the experimental group using the 5e learning cycle model with the help of Powtoon media, 6) Next for the last stage the researcher divides the posttest which is then followed by testing prerequisites and hypotheses to find out the results of the research data.

The teaching and learning process is carried out online. The duration of learning hours is 2x35 minutes for one meeting with two to three learning objectives for each meeting. The results of this study used the prerequisite test for data analysis, normality using the Kolmogorov-Smirnov test, and homogeneity using the F test. Hypothesis testing was carried out using the ANCOVA test at a 95% confidence level. The data has passed the prerequisite stage, namely customarily distributed and homogeneous.

RESULTS AND DISCUSSION

The pretest, posttest, and students' learning motivation in experimental and control classes are presented in Table 2. Again, it can be seen that there is a significant increase when taught with 5E+Powtoon. The comparative value of increasing learning motivation between the experimental and control groups is 16.61% in the experimental group and 11.25% in the control group. Meanwhile, the students' pretest and post-test scores showed that the experimental group obtained 64.52 and 75.24 while the control group was 55.00 and 61.19.

Table 2. The improvement of pretest and posttest on students' learning motivation in the experimental and control classes

Pretest		Posttest	
Control Class	Experiment Class	Control Class	Experiment Class
55	64.52	61.19	75.24

The results of the ANCOVA statistical test in Table 3 show an influence on students' learning motivation after implementing the 5e learning cycle model with the help of Powtoon media in the learning process. This explanation is supported by a significance value (<0.05) so that H_o is rejected and H_a is accepted. It shows differences in students' learning motivation using the 5E+Powtoon learning cycle and the conventional model. The conventional model teaches without any learning model (anonymous learning), but the teacher gives lectures, questions and answers, and assignments. The analysis results show the effect of applying the

5E+Powtoon learning cycle model to students' learning motivation. The application of the learning cycle 5E model was student-centered activity in seeking and finding information based on their learning experience. Learning cycle 5E is a learning model with a series of stages arranged systematically to learn biological science concepts and play an active role in learning (Ross & Cartier, 2015; Sickel et al., 2013).

Table 3. ANCOVA test results on students' learning motivation

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2173.292[a]	2	1086.646	10.548	.000
Intercept	4352.154	1	4352.154	42.246	.000
Pretest	101.268	1	101.268	.983	.328
Model	1931.091	1	1931.091	18.745	.000
Error	4017.779	39	103.020		
Total	201625.000	42			
Corrected Total	6191.071	41			

In the learning cycle 5E model, the teacher only becomes a facilitator who directs students' understanding, so student involvement during the learning process is extraordinary. The learning situation with 5E is more innovative when compared to ordinary learning, where the teacher is more dominant in explaining than the students find themselves. The results of this study are supported by several previous studies that show a positive influence on the application of the 5E learning cycle model, such as increasing science learning outcomes (Desouza, 2017) and student learning motivation (Cetin-Dindar & Geban, 2017). Other research results show that reverse class 5E+ can improve student learning outcomes during the Covid-19 pandemic for students at The University of Hong Kong (Hew et al., 2020). Learning in the experimental class motivates students more than in the control class. In the control class, the teacher does not use any learning model (anonymous learning), but the teacher still teaches with a scientific approach as in the experimental class. The media used is PowerPoint according to the order of the material.

Powtoon media can be paired along stage 5E (Table 4). For example, the teacher displays a learning video with Powtoon at the engagement stage to encourage students to relate previous learning and explain the problems to be studied. In the exploration stage, the teacher prepares students to conduct direct investigations so that learning experiences are formed. Finally, at the explaining stage, the teacher explains the learning material using a scientific approach to make students' concepts more profound. However, teachers can also set up Powtoon throughout stage 5E (Bybee et al., 2006). For example, at the elaboration stage, an explanation of the discussions carried out by students is presented. Likewise, students can easily accept and find the key concepts learned at the evaluation stage.

Table 4. Stage of learning cycle 5E

Stages	Activities
Engage	The teacher provides opportunities for students to reference prior knowledge, face challenging situations, and use questions to investigate a problem.
Explore	The teacher facilitates a series of learning experiences for students to carry out investigations. Students explore their ideas and formulate concepts from the learning experience.
Explain	The teacher introduces a scientific approach to match student explanations, makes connections between student explanations and exploratory experiences, and facilitates conversations in which concepts or processes become clear and understandable.
Elaborate	The teacher facilitates activities that combine application, collaboration, and group discussion. Students participate in activities that allow the elaboration of concepts or applying concepts to different situations.
Evaluate	Teachers evaluate students informally throughout the learning process and formally at the end to assess learning outcomes. Students evaluate their understanding of science concepts.

Powtoon is a learning medium utilizing variations in the form of integrated multimedia. It allows students to see or hear animations displayed during the learning process. Powtoon is developed with a web-based application that offers a selection of graphics, cartoons, and animated images to create logical and attractive animated presentations. Powtoon uses slides that contain text and images that can be added (Figure 1). It also allows animation and a combination of sound or music to attract students' interest in learning (Semaan & Ismail, 2018). Powtoon is also developed according to student needs by selecting relevant images or videos. The result is a product that combines the view or views of PowerPoint Presentations and can be browsed on YouTube. Thus students can read and synthesize information and then be able to present it. In addition, it

strongly encourages the development of indicators of being happy to work independently and not quickly leaving beliefs (Hira & Anderson, 2021; Tanner, 2012).

Figure 1. The Powtoon content display in Indonesian: (a) The opening display of the learning video, (2) the display of questions to students about the meaning of metamorphosis, (3) the chicks' growth and development, (4) the metamorphosis process in crickets

Multimedia is one of the tools used as interesting digital material in the learning process. Learning media is a crucial component of online learning activities that convey information from teachers to students and assist the learning process (Alqahtani & Rajkhan, 2020). Media use in learning can stimulate feelings and thoughts, stimulate students' attention, and make learning fun and exciting (Rangarajan et al., 2019). In addition, it can increase students' interest, motivation, and participation in the learning process (Muliyati et al., 2021). In the end, Powtoon can arouse students' learning motivation because it has the advantage of animated images and sounds in explaining the study material (Basri et al., 2021). Powtoon animation is one of the online interactive media in which various kinds of templates are used to create material that will be presented to students through attractive visualizations (Awalia et al., 2019).

CONCLUSION

The conclusions that can be drawn from this study include a strong relationship between learning cycle 5E+Powtoon learning media and students' motivation to learn about animal metamorphosis. That is the main attraction for students to remain active in self-study and solve problems according to the concepts studied. Furthermore, teachers are strongly advised to apply multimedia and be integrated it into the learning model that is carried out to answer the needs of elementary school students. Further research can develop other dependent variables or learning strategies that are more creative and innovative in the learning process, especially in science learning.

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