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The Effect of Infographic Media on Environmental Pollution to Increase Student's Learning Motivation

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ABSTRACT

This study aims to determine the effect of infographic media on environmental pollution material to increase learning motivation of 10th-grade students SMAN 10 Palembang. To optimize learning process, it's necessary to use digital learning media like infographics as one of digital learning media to increase students learning motivation. The research method used is a *Quasi-Experimental Design* using a research design *Nonequivalent Control Group Design*. The sample selection in this study used the technique of *Simple Random Sampling*. The learning motivation instrument questionnaire used a *Likert* scale of 18 valid questionnaires. Consists of 6 learning motivation indicators, teaching skills for extrinsic aspect and interest, curiosity, independence, attention, and pleasure for intrinsic aspect. The average value of the percentage of learning motivation is 75% in the control class and 80% for the experimental class, both the motivational values in the control and experimental classes are in the high category. The value of learning motivation data using t-test and learning outcomes data tested by ANCOVA. The results of the hypothesis test of the percentage value of students' learning motivation with the value *asymp.Sig (2-tailed)* of 0.028 <0.05, it shows that Ho rejected and Ha is accepted, which means that the infographic media on Environmental Pollution material has a significant effect on the learning motivation of students in class X SMA Negeri 10 Palembang.

Keywords: Infographic, Learning Motivation

Introduction

The implementation 21st century learning paradigm in Indonesia to optimize learning outcomes be applied by utilizing communication technology in learning activities. The 21st-century learning paradigm emphasizes students' critical thinking, connecting knowledge, mastering technology and information, collaborating and communicating (Daryanto & Karim, 2017). National education in the 21st century to make national goals come true, and achieve happiness with honourable and equal position in global for Indonesian (Komara, 2018). It is necessary to pay attention toward students' learning motivation. This aims to create conducive learning conditions in order to achieve the desired learning objectives. Teachers have to persuade students about the things they should do while learning to ensure that the curriculum target is achieved (Filgona et al., 2020). Learning motivation means the overall driving force that exists within students that raises the intention to carry out learning activities, so that learning objectives can be achieved (Cahyani et al., 2020). Learning motivation is encouragement from the students themselves and if there is already motivation from within the students to learn, then from the results of the competency assessment evaluation it can also increase for the better, seeing this can be from the achievement of the minimum completeness criteria or KKM that has been set at school.

In fact, SMAN 10 Palembang still uses the usual learning media. This causes students to be less interested in being able to interact with learning media. Based on observations during the Introduction to Schooling Environment (PLP) activities, it turned out that educators at SMAN 10 Palembang in Biology Learning usually only used instructional media in the form of pictures, PowerPoint slides and learning videos. The use of learning media in this way does not invite students to interact with the media displayed, but learning is only centred on the teacher and students simply listen. In fact, the use of learning media that invites students to interact with the media is effective for increasing students' interest in learning (Yuniati et al., 2011) and is appropriate for use in increasing students' understanding of learning material (Ernawati & Sukardiyono, 2017). Based on interview data with students at SMAN 10 Palembang, 83% agreed there should be innovation and used digital learning media to increase learning motivation, 15% did not agree and were satisfied with the learning media that teachers have used and no responses from 2 % of others. One of the digital learning media that can be used in 21st-century learning paradigm activities is infographic media. The use of infographics for education can visualize information from learning materials and it is also one of the mechanisms to optimize the learning process in traditional and online learning (Bystrova, 2020). Infographics are a medium for delivering information that is made to make it easier and to quickly understand the contents of the material to be conveyed (Suwondo, 2019). Infographics are presented in graphical form, transforming long text data to be easy to understand which is made with interesting visualization techniques (Arigia et al., 2016). Based on interviews with representatives of class X MIA (X Science) students at SMAN 10 Palembang, it turns out that they are less motivated by the use of learning media that have been applied by educators so far and they also sometimes have difficulty in understanding the learning material. In this case, one of the digital learning media that can be used as the solution is infographic media. Moreover, students are also interested in trying to use infographic media in the learning activity that will be carried out.

To adapt to these conditions, the use of infographic media is expected to increase students' learning motivation. By practising 21st-century learning skills students can succeed and achieve successful learning outcomes, competitive as well as prepare to compete in global life for success

(Ernanda et al., 2022) and of course the ability to functionally learn in 21st-century learning skills requires training through a process of learning and experience rather than being a personal trait (Marhamah et al., 2023). Learning using infographic media will be carried out in the 21st-century learning paradigm. Especially considering that the selection and development of appropriate learning media is also very important to increase the effectiveness of learning (Muhson, 2010) so that students can more easily understand learning material. As we know digital media literacy for education is important to produce effective digital media and being digitally literate, requires a certain set of technical and relationship skills (Reyna et al., 2018). One important aspect of learning media is that it is designed to be attractive for use in learning activities (Karwono & Mularsih, 2018). Where in the implementation of the 2013 curriculum and 21st-century learning educators are required to be able to design learning to be more interesting and meaningful (Daryanto & Karim, 2017). The learning media that will be created here is in the form of infographic media which is a visual media that contains material and illustrations, and students can also interact with the media through commands to carry out the activities contained in the infographics.

Environmental pollution material requires interesting learning media. Based on the results of interviews with biology subject teachers at SMAN 10 Palembang, during the implementation of online learning, there was a decrease in grades and also the learning motivation of class X students, especially in environmental pollution material. Moreover, the environmental pollution material is the last order material and is sometimes often underestimated by students because usually the last material is often just skipped. Therefore, if this environmental pollution material is equipped with interesting learning media, it is hoped that it can raise students' awareness to care more about and protect the surrounding environment in accordance with increased student motivation. To test the use of this infographic media, the STAD (Student Team Achievement Division) cooperative learning model was selected. The STAD learning model applied to environmental pollution material was found to be capable of increasing students' motivation and learning outcomes (Permatasari, 2019) and the STAD learning model is also effective in increasing academic achievement when compared to traditional learning models (Madang, 2019). Following the improvement of academic achievement, is expected to increase students' learning motivation by using the STAD learning strategy. Therefore, always keeping the environment clean is very important wherever it is and raising students' awareness is expected to reduce the impact of environmental change and damage through learning with the STAD strategy and the use of infographic digital learning media. In addition to increasing learning motivation, the use of digital interactive learning media is also effective in increasing learning outcomes (Andriani et al., 2023) and motivation to learn biology is one of the aspects that had an impact on their learning outcomes (Heryanti et al., 2022).

Therefore, when the implementation of 21st-century learning and the need to increase the learning motivation of 10th-grade students at SMAN 10 Palembang on environmental pollution material by utilizing digital learning media, the researcher was interested in conducting this research to see the motivation and learning outcomes of the participants 10th grade MIA (Science) students at SMA Negeri 10 Palembang on environmental pollution material using infographic media.

Methods

The research method used is *Quasi-Experimental Design* using a *Nonequivalent Control Group Design* research design. The experimental group used infographic learning media while the control

group did not use infographic media. The population in this study were all class of 10th-grade students SMAN 10 Palembang. The sample used the Simple Random Sampling technique, two of eight tenth-grade classes were selected, X MIA 3 class as the experimental class and X MIA 6 class as the control class. The learning motivation questionnaire data obtained was analyzed by normality to see whether data is normally distributed or not by using the *Skewness-Kurtosis* test.

Table 1. Normality Test Results of Learning Motivation Questionnaire

Class	N	Skewness	Kurtosis	Explanation
Experiment	39	-0,164	0,252	Normal
Control	36	-0,306	-0,165	Normal

Based on Table 1, the percentage of motivational questionnaire scores in both the control and experimental classes is normally distributed with values between -2 to 2. Table 2 shows the results of the homogeneity test to see the similarity of the variances of the two groups in the experimental and control classes using *Levene's* test.

Table 2. Homogeneity Test Results of Learning Motivation Questionnaire

	Levene Statistic	df1	df2	Sig.	Explanation
Learning Motivation	0,828	1	73	0,366	Homogenous

Based on Table 2 shows a significance value of 0.366 or Sig> 0.05, the variance of experimental class data and control class posttest data are the same or homogenous. After the normality test and homogeneity test, the data tested were normally distributed and homogenic, then it was continued with the *Independent Sample t Test* which can be seen in Table 3.

Table 3. *Independent Sample t-Test*

Category	Asymp. Sig. (2-tailed)	Explanation
Students Learning Motivation	0,015	Significant

Table 3 shows the significance value of *Independent Sample t-Test* and percentage value of students' learning motivation with an asymp value. Sig (2-tailed) of 0.015 <0.05 indicates that Ho is rejected and Ha is accepted, which means that the infographic media on Environmental Pollution material has a significant effect on the learning motivation of students.

The data collection instrument of learning motivation consisted of 18 questions of questionnaire with a Likert scale. There are 6 learning motivation indicators, teaching skills for extrinsic aspect and interest, curiosity, independence, attention, and pleasure for intrinsic aspect. Learning motivation was a student's encouragement to understand learning material in order to achieve learning objectives. There are 2 types of learning motivation, which already exist innate and learning motivation that should be learned, developed also improved (Sardiman, 2016). To ensure continuity of learning in order to provide direction to achieve learning objectives (Hikmah, Anwar, & Riyanto, 2018). After that, describes the indicators of students' learning motivation from several sources and then adjusts them for model and learning media that was used to become a learning motivation questionnaire. The questionnaire on learning motivation

that have been made also validated by experts before being used in this research. Reliability and validity test value R table (n:30) = 0,361 (5%) and 0,463 (1%).

Table 4. Indicators of Learning Motivation Questionnaire

Aspect	Learning Motivation Indicators	Questions Number	
		Positive	Negatives
Extrinsic	1. Teaching Skills	1, 2, 3	4*, 5
Intrinsic	2. Interest in Infographic media	9, 10, 11	13, 14
	3. Curiosity about learning material		18
	4. Students' independence during learning		15, 16, 17, 19
	5. Focusing attention on environmental pollution material	8	20
	6. Students' sense of enjoyment during learning	6*, 7, 12	

Description: Questionnaire item no. 4* and 6*, are not valid so they are not included.

Learning activities in the control class aimed to compare learning motivation between those who did not use infographic media and those who used infographic media in the experimental class. Learning motivation data in experimental and control classes for each indicator is shown in Table 5.

The infographic learning media made in this study is one type of visual learning media that presents information more interestingly and easily understood, containing information in the form of a combination of text, graphics, and images related to environmental pollution to increase student learning motivation.

This kind of learning media like an infographic was chosen because already been proven can be used as an effective learning media that effective to increases student learning motivation and makes information on environmental pollution learning materials easier to understand.

Results and Discussion

Learning motivation is the aspect analyzed in this research. The analysis of learning motivation is obtained from the percentage value of the learning motivation questionnaire which has been validated by experts and tested for validity and reliability. The results of the data analysis of the results of this study were aimed to see the effect of using infographic media to increase learning motivation of 10th-grade students SMAN 10 Palembang on environmental pollution material. Learning motivation score was analyzed from a questionnaire that was filled out by students in both the experimental class and the control class. The average value of learning motivation in the experimental and control classes is shown in Figure 1.

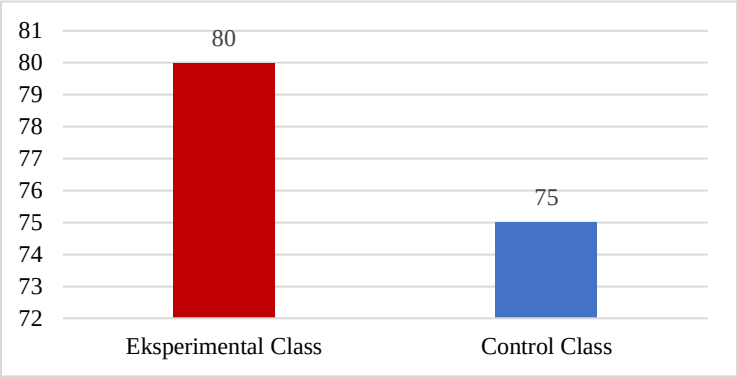

Figure 1. Average score of students' learning motivation

Based on Figure 1, the value of learning motivation in the experimental class is higher than the value of motivation in the control class, which is 80% for the experimental class and 75& in the control class. In other words, the experimental class has a higher learning motivation value than the control class. The difference in scores between the experimental class and the control class is 5 points. It means that the use of infographic media has increased learning motivation.

Table 5. Learning Motivation Categories in Experimental and Control Class

Indicator	Eksperimental Class	Category	Control Class	Category
1	89,87	Very High	86,11	Very High
2	80,82	High	77,89	High
3	67,43	Medium	27,50	Very Low
4	70,94	High	65,00	Medium
5	80,25	High	74,72	High
6	85,38	Very High	83,33	High

From Table 5, it can be seen that the average scores of students' learning motivation in the experimental class are already higher than the control class in each indicator. For category in the experimental class, indicators 1 and 6 are in the very high category, indicators 2, 4 and 5 are in the high category while indicator 3 is included in the medium category. While the category of learning motivation values in the control class in the first indicator is in the very high category, showing the high category in indicators 2, 5 and 6; while indicator 4 is in the medium category and indicator 3 is in the very low category. Infographic media was given before learning began and then displayed so that students could interact with it, making students in the experimental class more interested in learning about environmental pollution. Based on the feedback and

suggestions regarding the use of infographic media written by students in the motivation questionnaire column, there are a lot of positive responses given by students and they also expect that infographic learning media can be made for other biology materials. Students also mentioned that the use of infographic media makes learning more exciting, interesting and less boring. When using this infographic media, students say that they feel happy and able to understand learning material more easily because the presentation of infographic media attracts their attention, this makes students more focused and easy to understand the material. The infographic media used in this research is shown in Figure 2.

Figure 2. Infographic media

Conclusion

The conclusion from the results of this research is that the use of infographic learning media on environmental pollution material has a significant effect on increasing students' learning motivation. The average value of learning motivation in the experimental class was 80 higher than in the control class, which was 75, even though these two classes were in the high motivation category. The use of infographic media on environmental pollution material shows an increase in motivation, therefore researcher recommend perhaps in the future this infographic media can be developed for other biology materials.

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