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## Smoking behavior and learning outcomes in student of senior high school on respiratory system with PjBL

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**Abstract.** The Goals of this research is to analyze smoking behavior and learning outcomes in students of senior High school after receiving learning system of respiration with PjBL. The kind of research is Quasi Experiment with Non Equivalent Control Group design. Two classes as samples taken with purposive sampling. First class with PjBL and second class without PjBL. The methods of it taken data by observation, documentation, tests, questionnaires, and interviews. T-test analysis on smoking behavior and learning outcomes show that the two classes are significantly different. The average of N-gain class PjBL is 0.73 high category and non PjBL class is 0.57 medium category. The result of Product Moment analysis on class PjBL shows that  $r = 0.580$  indicates there is positive correlation of medium category, on non PjBL there is nothing relationship. Based on the results of the study concluded that PjBL on learning respiratory system significantly influence for smoking behavior and learning outcomes in student of senior high school and there is also a positive correlation with moderate category between learning outcomes and smoking behavior in the PjBL class and nothing relationship between learning outcomes and smoking behavior in non-PjBL classes.

### 1. Introduction

The causes of smoking behavior in students are motivated by several factors including family and peer group factors. The results of interviews with students showed that smoking was considered to be able to unite the group and strengthen solidarity in peer groups. The need to be accepted and efforts to avoid rejection often make students do anything including participating in smoking to be accepted in their group.

State regulation number 109 of 2012 article 21 (a) "prohibited from selling or giving cigarettes to children under the age of 18 and pregnant women". In this case it shows that the government cares for the young generation of the nation's successors to avoid the dangers of cigarettes, so that the younger generation will have a good and healthy quality of life.

The facts in the field show that there are many smokers with teenage status and students. Nearly 80% of smokers start smoking when they have not reached 19 years [1]. This means smoking has started since the age of high school. Based on questionnaire analysis with respondents from 102 high school students it was found that 17.64% of students were smokers and 9.8% started smoking at the age before high school and 90.2% started smoking at high school age. The results of the interview showed that 55.5% of students with status as smokers did not know the dangers of smoking and 44.5% knew that cigarettes were damaging to health, but the impact was ignored. Although in writing on the curriculum explicitly stated material about the dangers of smoking to health.



One of the basic abilities in respiration system learning in the 2013 Curriculum states that students are expected to be able to plan and carry out observations of the effects of air pollution and process information on some of the negative risks of smoking in adolescents to determine decisions. Therefore we need a Project Based Learning (PjBL) model. According to Perrault & Albert [2] that the application of PjBL was considered capable of improving learning outcomes, forming positive attitudes and behaviors of students towards the environment. Therefore, a study is needed to prove that respiration system learning using the PjBL model can improve learning outcomes and behavior to reject smoking, and to find out whether there is a relationship between learning outcomes and the behavior of rejecting cigarettes.

## 2. Methods

The population of this study was the eleven grade students of Rembang state senior high school with purposive sampling obtained as many as two classes of samples, namely the control class and the experimental class. In the control class expository learning and discussion were conducted, in the experimental class learning was done with PjBL. Sampling with treatment with learning PjBL as independent variables, learning outcomes and behavior of rejecting cigarettes as the dependent variable. The data in this study were collected through test methods, questionnaires, interviews, observation and documentation. Learning outcomes were analyzed using t-test and N-gain test, the behavior of rejecting cigarettes was statistically analyzed using t-test and qualitative descriptive. The relationship between learning outcomes and the behavior of rejecting cigarettes was analyzed using pearson product moment.

## 3. Result and Discussion

Learning outcomes of cognitive aspects of students in respiration system learning in the control class and experimental class were obtained from the pretest and posttest values presented in Table 1.

**Table 1.** Cognitive test results of the control and experimental classes

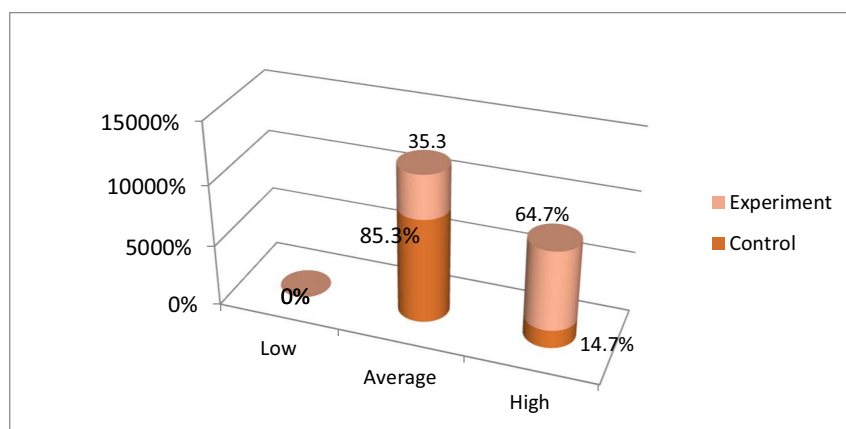
Variabel	Class	
	Control	Experiment
<i>Pretest</i> mean Value		
Lowest Value	36	32
Highest Value	68	68
Average	53.17	53.29
<i>Posttest</i> mean Value		
Lowest Value	68	68
Highest Value	92	100
Average	79.88	87.65

The posttest data were analyzed using the t test which aims to see the differences between the two classes. The results of t test calculations are presented in Table 2.

**Table 2.** Learning outcomes cognitive aspects of high school students

Data	Class	Average	Sig(2-tailed)	Information
Learning Outcomes	Control	79.88	<b>0.000</b>	There is a difference
	Experiment	87.65		

The results of the t test showed that there were significant differences in the learning outcomes of the control class and the treatment class. To find out the increase in learning outcomes carried out N-gain test The results of the N-gain test data are presented in Figure 1.



**Figure 1.** Results of the N-Gain control class and experimental class

Based on the data in Figure 1. Increased understanding in the control class 85.30% of students with moderate category and 14.70% of students in the high category, in the experimental class 35.30% students were in the medium category and 64.70% of students were in the high category. The average N-gain of the control class is 0.57, which is moderate, and the experimental class is 0.73, which is a high category.

Mastery of concepts is not only memorizing and remembering material but students are able to apply the concept to a series of problems [3] the use of project-based learning facilitates a higher level of learning and understanding of students' concepts in understanding material so as to increase learning outcomes [4,5]

The results of the questionnaire analysis revealed that there were three groups of students, namely regular smokers (2.94%), trial smokers (16.18%) and non-smokers (80.88%). Permanent smokers are those who smoke every day for three consecutive months, trial and error smokers are those who smoke more than once every week or in less than a month while non-smokers are those who never smoke cigarettes [6]. The results of the assessment of cigarette smoking behavior before and after learning are presented in Table 3.

**Table 3** Results of behavior assessment of refusing cigarette high school students

Variable	Control		Experiment	
	Score	Value	Score	Value
Pre Value				
Lowest	126	54	160	68
Highest	199	83	190	79
Average	170	7,2	175	73.4
Last Value				
Lowest	174	75	198	87
Highest	218	93	227	98
Average	199	84.2	216	92.4

The results of the t-test of smoking behavior in the control class and experimental class are presented in Table 4.

**Table 4** Results of t-Tests for behavior of rejecting cigarettes of high school students

Da	Class	Average	Sig(2-tailed)	Information
Smoking Rejecting Behaviour	Control Experiment	84.2 92.4	<b>0.000</b>	There is A difference

The data above shows that the PjBL model in respiration system learning has a significant effect on the smoking behavior of high school students. There are three aspects related to the behavior of rejecting cigarettes, these aspects are aspects of knowledge, attitudes and actions.

### 3.1 Knowledge Aspect

Lack of knowledge is received by non-PjBL class students because learning is given only based on theory without exploration. Students do not conduct investigations in response to smoking cases. Such transfer of knowledge makes students passive and knowledge about the dangers of smoking becomes very minimal.

With PjBL the teacher can facilitate as a medium of education transfer in inviting students to live healthy without smoking. The introduction of the dangers of cigarettes is not only obtained from teachers, videos, books or literature studies but also from parties that can be accounted for according to their fields. This makes students have strong guidelines in controlling themselves not to get caught up in smoking behavior that damages health. According to Kanicka et al [7] that the anti-tobacco health education program that was channeled through exposure to photos, anti-smoking films, role playing and discussions could significantly influence knowledge change in Polish students. If students are provided with the right sources of information, the process of trial and error on cigarettes can be prevented and anticipated [8].

### 3.2 Attitudes Aspect

Attitude or response of someone who is still closed to a stimulus or object. Attitudes as evaluative responses that can be either positive or negative. Evaluative response means that the form of reaction is expressed as an attitude that arises on the basis of an evaluation process in the individual who gives conclusions to the stimulus in the form of bad, positive-negative, pleasant-unpleasant, which then crystallizes as a potential reaction to the object of attitude. The attitude structure consists of 3 (three) mutually supporting components including (1) the cognitive component, which is a representation of what is believed by the individual, (2) the affective component, a feeling that concerns the emotional aspect, and (3) the conative component, which is aspects of tendency to behave in accordance with the attitudes held by someone [9].

Learning by giving a project can help students to improve their caring attitude towards health and also the environment of students can develop [10]. As many as 92.7% of students gave a positive attitude towards smoking habits where the positive attitude in question was a tendency to stay away from cigarettes. Overall the students agreed to reject the friend's invitation to smoke. This is in line with the research conducted by that students increasingly pay attention to their own health and also others to avoid smoking [11].

### 3.3 Actions Aspect

The theory of Thoughts and Feeling explains that the role of psychosocial variables shapes a person's behavior, the internal environment and the external environment will jointly shape individual behavior. Internally, knowledge, beliefs and attitudes are determinants of behavior. Conversely, external role models (friends, teachers, parents), sources of information and culture also contribute to shaping the behavior of adolescents [12].

Education is very necessary as an effort to prevent unhealthy behavior for students. In this study the Project Based Learning model is presented as one of the fun learning models and allows students to interact with other groups. The introduction of the dangers of cigarettes is not only obtained from teachers, videos, books or literature studies but also from parties that can be accounted for according to

their fields. This makes students have strong guidelines in controlling themselves not to get caught up in smoking behavior that damages health.

The high desire to stay away from cigarettes is expressed in the form of images that each aims to invite or encourage other students to be careful and stay away from cigarettes to stay healthy. This illustrates that the PjBL model influences students' ability to develop healthy living characters such as avoiding and refusing cigarettes. This statement is in line with the research conducted by Risnani et al [13] that One Man One Tree based PjBL increases students' knowledge, attitudes and behavior towards the environment.

#### 4. Conclusion

Based on the results of the study and discussion, the following conclusions were obtained.

1. The application of the Project Based Learning model in respiration system learning has a significant effect on student learning outcomes and high school student cigarette reject behavior.
2. There is a positive relationship between learning outcomes and the behavior of the medium category of cigarettes in the experimental class and there is no relationship between learning outcomes and the behavior of rejecting smoking in the control class.

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