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THE EFFECT OF DIFFERENT LEARNING MODELS ON STUDENTS' SCIENTIFIC ATTITUDES AND CRITICAL THINKING SKILLS

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This research aims to analyze (1) the influence of SETS and Contextual learning models on the Scientific Attitudes of students of class XI SMK Negeri 1 Telen and SMK Negeri 2 Bengalon, and (2) the influence of sets and contextual learning models on the critical thinking skills of students of class XI SMK Negeri 1 Telen and SMK Negeri 2 Bengalon, (3) the influence of sets and contextual learning models on scientific attitudes and critical thinking skills of students of class XI SMK Negeri 1 Telen and SMK Negeri 2 Bengalon simultaneously. The hypotheses tested were: (1) SETS and Contextual learning models affect the Scientific Attitudes of students of class XI SMK Negeri 1 Telen and SMK Negeri 2 Bengaland on, (2) SETS and Contextual learning models have an effect on the critical thinking skills of students of class XI SMK Negeri 1 Telen and SMK Negeri 2 Bengalon, (3) sets and contextual learning models affect scientific attitudes and critical thinking skills of students of class XI SMK Negeri 1 Telen and SMK Negeri 2 Bengalon Simultaneously. This type of research includes Quasi-Experimental Design. The target population is all students of class XI SMK Negeri 1 Telen and SMK Negeri 2 Bengalon Year of Study 2021/2022, the number of research samples as many as 77 students. Research instruments use scientific attitude questionnaires and tests of critical thinking skills. Research data were analyzed using MANCOVA's One Way statistical test. The results showed that: (1) There was no effect of sets and contextual learning model on the scientific attitude of students of class XI of SmK Negeri 1 Telen and SMK Negeri 2 Bengalon with partial eta squared value p2 = 0.3%. (2) There is an influence of sets and contextual learning models on the critical thinking skills of students of class XI SMK Negeri 1 Telen and SMK Negeri 2 Bengalon with partial eta squared values p2 = 86.61%, and (3) There is an influence of sets learning model and on scientific attitudes and critical thinking skills of students of class XI SMK Negeri 1 Telen and SMK Negeri 2 Bengalon simultaneously with partial value eta squared p2 = 76.90%.

Keywords : SETS Learning Model, Contextual Learning Model, Scientific Attitudes, Critical Thinking Skills.

This attitude problem also occurs in the learning process. Most students are less enthusiastic in reading and studying the material being taught, embarrassed to ask about material they do not understand and do not dare to express opinions. In addition, the sense of responsibility and cooperation in students is still lacking. This can be seen when given the task of discussing, only a few people are involved in the discussion while other students are busy with other activities besides learning activities. This shows that the level of accuracy in work and student discipline is still lacking. Furthermore, when the teacher gives an evaluation or daily test, there are still many students who cheat on their friends' answers, this shows that students' self-confidence is lacking. Because of this scientific attitude problem, it is clearly illustrated how important the teacher's role is in cultivating and developing scientific attitudes towards productive learning in accordance with skill competencies.

The development of students' critical thinking skills is very important at every level of education. Students' critical thinking skills need to be constructed through activities and experiences through learning

activities in schools, including productive learning of plant growing requirements. The results of the PISA (*Program for International Student Assessment*) survey conducted by *the Organization for Economic Cooperation and Development* (OECD) in 2015, Indonesia was ranked 69th out of 76 countries with a Science score of 403 and still below the OECD average. Based on the results of the *Trends in International Mathematics and Science Study* (TIMSS) survey conducted by *the International Association for the Evaluation of Educational Achievement* (IEA) in 2015, Indonesia was ranked 45th out of 48 countries with a score of 397. This shows that students' thinking skills are still low which leads to low student learning outcomes. Based on the survey results, it can be said that the majority of Indonesian students only have *low* -level thinking skills *Order Thinking Skills* (LOTS), not *High Order Thinking Skills* (HOTS).

Based on the results of observations with teachers at SMK Negeri 1 Telen and SMK Negeri 2 Bengalon, it is known that learning is still *teacher-centered* , so that in learning students become passive and even many students do not pay attention to the delivery of material by the teacher. Learning activities should often apply *hands on activity,* which involves students digging for information by asking questions, doing activities and finding, collecting data and making conclusions. students are given the freedom to construct thoughts and findings during activities so that students do it themselves without a burden, fun and high motivation. The learning process is not merely a *transfer of knowledge* where knowledge is simply transferred from the teacher to students, but rather the provision of stimulants to students to be able to develop their thinking skills such as critical thinking and become *problem solvers* (Permendikbud, 2013) .

As one solution to overcome this problem is to maximize the learning process in the classroom based on *Student Center Learning* . What teachers can do as educators is to apply a learning model that can cooperatively foster scientific attitudes and students' critical thinking skills so that they can improve their achievement or learning outcomes. According to Sani (2017: 76), there are several learning models with a scientific approach that can be implemented in accordance with the 2013 curriculum, namely, inquiry and *discovery -based learning* , *problem-based learning* , *project-based learning, contextual learning* and environmental and community-based learning models. (SETS) .

Learning activities at SMK Negeri 1 Telen and SMK Negeri 2 Bengalon on the material requirements for growing plantation crops still use the traditional learning style, learning is limited to lecturing activities, memorizing, recognizing and explaining facts. According to Browne and Keeeley (2018), when students are accustomed to being passive learners only by memorizing and remembering information, it will be difficult to involve students in learning situations that require critical thinking skills. When students are given the opportunity to acquire problem solving skills, it will stimulate students' critical thinking skills (McDonald, 2017: 79). Therefore, learning the requirements for growing plantation crops related to real problems in the surrounding environment can train and improve critical thinking skills and behave scientifically.

Critical thinking skills cannot appear by themselves in learning. Students need to be trained to use their thinking skills by applying the SETS learning model and the contextual learning model. This SETS model combines the thinking of STS (*Science* , *Technology* and *Society*) and EE (*Environment)* . *Education*) by providing a new philosophy in it. Basically it can be said that through the SETS model it is expected that students will have the ability to view things in an integrated manner by paying attention to the four elements of SETS bringing the message that to use Science (S) technology is formed (T) in meeting the needs of society (S). implications for the environment (E) physically and mentally (Sutam, 2004) .

In addition , other appropriate learning models, namely by applying the learning model contextual. According to Wina (2012) in Ariani (2014) , the contextual learning model in principle emphasizes more

on the process of full student involvement to be able to find material that learned and relate it to real life situations so as to encourage students to be able to apply it in their lives. The contextual learning model is assumed to be able to fully organize students in study groups so as to provide complete space for students to explore their own knowledge of material concepts in accordance with their expertise competencies.

According to S. Masfuah (2011) Based on the results of research and data analysis, it was concluded that the critical thinking skills of students who were taught with the SETS-visioned pair exchange model were better than the critical thinking of students who were taught the SETS-visioned classical discussion model. Research by Ariani (2014), based on the results of data analysis found that (1) There are differences in learning outcomes and critical thinking skills of the contextual learning model with the direct learning model, significance <0.05 (2) There are differences in learning outcomes between the contextual learning model and the direct learning model. direct learning ($F= 277.337$; $p < 0.05$). (3) There are differences in critical thinking skills between students who study with a contextual learning model with a direct learning model ($F = 20.838$; $p <0.05$).

In several previous studies, there were many assumptions which stated that student learning outcomes could be improved through the application of learning models and the results of these studies significantly stated that the learning model that was set influenced learning achievement. The learning model that is generally applied is a learning model based on *student center learning* or student-centered learning. So that the conventional learning model seems to have no effect on student achievement.

This article is entitled " The Effect of Differences in Learning Models on Scientific Attitudes and Critical Thinking Skills for Class XI Students at SMK Negeri 1 Telen and SMK Negeri 2 Bengalon on Plantation Plant Growth Requirements". The independent variable of learning model differences in this study is limited to the use of the SETS learning model and the contextual learning model as categorical variables.

The SETS learning model and the contextual model indirectly influence students' habituation to behave scientifically and students' skills in critical thinking even though the effect is very small when compared to the application of other learning models as described by several previous educational studies.

So the formulation of the problem is as follows;

Is there any effect of SETS and Contextual learning models on the Scientific Attitudes of XI grade students of SMK Negeri 1 Telen and SMK Negeri 2 Bengalon? Is there an influence of the SETS and Contextual learning model on critical thinking skills of class XI students of SMK Negeri 1 Telen ? and SMK Negeri 2 Bengalon ? Is there an influence of the SETS and Contextual learning model on scientific attitudes and critical thinking skills of class XI students of SMK Negeri 1 Telen and SMK Negeri 2 Bengalon simultaneously ?

METHOD

quasi-experimental research *or Quasi Experimental Design.* In this design, using two experimental groups and one control group then given a *pretest* and given treatment, at the end of the study, the experimental group was given a *post-test* to measure the degree of change. The research design can be seen in table 3.1 below: (Sugiyono, 2015:110).

Table 3.1. Research design

GROUP	PRETEST	TREATMENT	POSTTEST

A	E_1	X_1	E2 _
B	E_1	X_2	E2 _
C	E_1	-	E2 _

Source: (Sugiyono, 2010)

This research was conducted at SMK Negeri 1 Telen and SMK Negeri 2 Bengalon . This research was carried out in November – December 2021, namely at the end of the Odd semester of the 2021/2022 Academic Year. The population of this research is all students of class XI SMK Negeri 1 Telen and SMK Negeri 2 Bengalon in the academic year 2021/2022, totaling 77 people who are distributed into several study groups as shown in table 3.2 and table 3.3 below:

Table 3.2. Data on the Number of Class XI Students of SMK Negeri 1 Telen
By Gender

No.	CLASS	L	P	AMOUNT
1	XI ATP	14	13	27
AMOUNT		14	13	**27**

Source: Archives of Deputy Head of Student Affairs
SMP Negeri 1 Telen

1. The sample in this study was selected using a *purposive sampling technique.* Research in the experimental class was carried out by researchers by applying the SETS (*Science, Environment, Technology and Society*) learning model at SMK Negeri 1 Telen and 2 classes at SMK Negeri 2 Bengalon by applying the contextual learning model while for the control class applying conventional learning the lecture method. **Research** Variables Independent Variables (independent), Bound Variables (dependent), Covariate Variables. **Types** of Data Quantitative data is data obtained from the results of questionnaire scores to measure students' scientific attitudes through *pretest* and *posttest* and critical thinking skills test results *pretest* and *posttest* to measure critical thinking skills covering all material that has been taught from the first meeting to the last meeting and done at the end of the lesson. Qualitative data obtained from the results of observations and analysis of the equivalence test before the study was carried out using data on the results of the daily assessment of students in each school before this research was carried out.

Implementation stage

a. Determine the class that will be used as the research sample.
b. The treatment (presentation of material) uses the SETS learning model and the contextual learning model.
c. Observations of students' scientific attitudes and critical thinking skills are carried out when learning takes place both in class and in laboratories and the school environment.
d. Giving *pretest* and *posttest* before and after treatment.

Final stage

The activities carried out at this stage are processing and analyzing data using analytical techniques through the SPSS version 24 program, then the results of data analysis are used to conclude the research results.

Results and Discussion

Results

After all the assumption tests of the analytical requirements were met, the research process continued with research data analysis, namely by conducting a series of tests on the proposed hypothesis through the *One-Way Mancova statistical analysis technique* and *the Test of between Subject Effect*. *One-Way Mancova* is used to analyze differences in scientific attitudes and critical thinking skills between students who follow the SETS learning model, Contextual model and Conventional learning. The test was carried out with the help of the SPSS 24 *for. program Windows* at the 5% significance level. If the significance value is less than 0.05, then H0 is rejected, which means that there are differences in students' scientific attitudes and critical thinking skills taught using the SETS model, Contextual model and Conventional model.

The research hypotheses that have been described previously, then analyzed the testing of the three hypotheses. This analysis test was conducted by applying the MANCOVA statistical test which was based on the *Multivariate Test* and the *univariate test* .

Univariate test *test* is used to test the first and second hypotheses. *Univariate* test *The test* is based on *the Test of between Subject Effect* . The complete analysis results can be seen in appendix 19. To make it easier to interpret the results of the *univariate test analysis* , a summary table is made which can be seen in table 4.2 below:

Table 4.2 ***Univariate Test Hypothesis Test***

Independent Variable	**Dependent variable**	**Price F**	**Df hypothesis**	**mean**	**Sig.**	**Partial Eta Squared**	**Decision**
Differences in Learning Models	Scientific Attitude	0.111	2	0.008	0.895	0.003	H1 rejected _
	Critical Thinking Skills	71.266	2	8434,077	0.001	**0.866**	H_0 rejected

The *Test of between Subject Effect table* above shows that the difference in learning models causes **no significant difference in the student's scientific attitude** variable , this is indicated by the value of F(2, 77); F = 0.111; **p=sig=0.895 0.05** ; eta squared $p^2 = 0.003$ thus it can be assumed that **no There is a significant effect** of the independent variables of SETS, Contextual and conventional learning models **on students' scientific attitudes** . However, the **critical thinking skills variable** shows that the difference in learning models causes a significant **difference in the students' critical thinking skills** variable , this is indicated by the value of F(2, 77); F = 71.266; **p=sig=0.001 0.05** ; eta squared $p^2 = 0.866$. Thus, it can be assumed that **there is a** significant effect of the independent variables of SETS, Contextual and conventional learning models on students' **critical thinking skills.**

The *Multivariate Test table* was used to test the third hypothesis, namely to analyze the significant difference between the dependent variable of the experimental class and the control class simultaneously. The MANCOVA analysis used in this study is based on the *Wilks' Lambda test* because there are only two independent variables and the prerequisites for the *variance-covariance homogeneity test are* met. The results of the complete SPSS output analysis can be seen in appendix 19.

In order to make it easier to interpret the results of the analysis, a summary table is made, which can then be seen in table 4.3 below:

Table 4.3 ***Multivariate Test Hypothesis Test***

Test Analysis	Score	Price F	Df hypothesis	df error	Sig.	Partial Eta Squared	Decision
Wilks' Lambda	0.326	27,053	4	144	0.001	0.769	H_0 rejected

Multivariate test results the *test* above informs that there is a significant difference between the variables **of critical thinking skills and scientific attitudes** that get learning with different learning models after controlling for the students' **daily assessment variables** obtained F(4, 144) = 27,053; p=sig=0.001; *Wilks' Lambda* = 0.326; *partial eta squared* $p^2 = 0.769$. So it can be assumed that there is a significant effect of independent variables on critical thinking variables and scientific attitudes after being taught using certain learning models, or 76.9% of the variance that occurs in the variables of scientific attitudes and students' critical thinking skills caused by differences in the SETS learning model and the Contextual model. experimental class and control class with conventional learning. The *partial value of eta squared is* included in the medium *effect size category* . The complete Multivariate test results can be seen in Appendix 21 **.**

The MANCOVA test can only give a conclusion about the existence of a significant difference between the treatments being tested so that as a follow-up to the MANCOVA test, the LSD (*Least Significance Different*) test or the BNt test (smallest significant difference) . The results of the analysis test above inform that the difference in learning models causes **no significant difference in the student's scientific attitude** variable , so that only the student's **critical thinking skills variable** needs further testing. The *Pairwise Comparison* and *Estimates* output table of SPSS is used as a reference in making a summary table of the results of the LSD further test by giving the LSD further test notation in the form of letters.

Descriptive Statistics

	Learning model	mean	Std. Deviation	N
Scientific Attitude	SETS models	20.1481	2.17863	27
	Contextual Model	19.4400	2.50133	25
	Conventional Learning	17.8000	1.32288	25
	Total	19.1558	2.26568	77
Critical Thinking Skills	SETS models	83.7037	4.56420	27
	Contextual Model	80.5200	7.22911	25
	Conventional Learning	46.4800	16.93645	25
	Total	70.5844	19.97390	77

Pairwise Comparison

Dependent Variable	(I) Learning Model	(J) Learning Model	Mean Difference (IJ)	Std. Error	Sig. [b]	95% Confidence Interval for Difference [b]	
						Lower Bound	Upper Bound
Critical Thinking Skills	SETS models	Contextual Model	8.186 *	1,557	.000	5.083	11.288
		Conventional Learning	8,847 *	1,714	.000	5.432	12,262
	Contextual Model	SETS models	-8,186 *	1,557	.000	-11,288	-5.083
		Conventional Learning	.661	1,655	.691	-2,637	3.959
	Conventional Learning	SETS models	-8,847 *	1,714	.000	-12,262	-5.432
		Contextual Model	-.661	1,655	.691	-3.959	2,637
Scientific Attitude	SETS models	Contextual Model	-.011	.075	.879	-.160	.137
		Conventional Learning	-.038	.082	.644	-.202	.125
	Contextual Model	SETS models	.011	.075	.879	-.137	.160
		Conventional Learning	-.027	.079	.737	-.185	.131
	Conventional Learning	SETS models	.038	.082	.644	-.125	.202
		Contextual Model	.027	.079	.737	-.131	.185

The summary table can be seen in table 4.4 below:

Summary Table of LSD Advanced Test Results

BINDING VARIABLE	MODEL	CORRECTED AVERAGE	SD	LSD NOTATION			Sig.
Critical Thinking Skills	*Conventional Laerning*	46,48	16.93	**a**			0.691
	Contextual Learning	80.52	7.22		**a**		0.001
	SETS *Learning*	83.70	4.56			**b**	0.001

The principle of reading letter notation is based on the corrected *mean value* for each treatment followed by the same letter notation, it is stated that there is no statistically significant difference and the corrected *mean value* for each treatment followed by a different letter notation is stated that there is a

difference statistically significant. Based on the summary table of LSD test values by sorting the *mean values in the statistical descriptive* table above, it provides information that:

1. **There** is a significant difference in students' critical thinking skills with the SETS learning model or it can be assumed that there is an effect on the application of the SETS learning model on students' critical thinking skills.
2. **There are** significant differences in students' critical thinking skills to the Contextual model or it can be assumed that there is an effect of applying the Contextual model to students' critical thinking skills.
3. **There is no** significant difference between students' critical thinking skills with conventional learning or it can be assumed that there is no effect on the application of conventional learning on students' critical thinking skills.

Discussion

Based on the data analysis and hypothesis testing that have been described previously, the following discussion is presented about: (1) There is an influence of the SETS and Contextual learning model on the Scientific Attitude of XI grade students of SMK Negeri 1 Telen and SMK Negeri 2 Bengalon, (2) There are the influence of the SETS and Contextual learning model on the critical thinking skills of class XI students of SMK Negeri 1 Telen and SMK Negeri 2 Bengalon , (3) There is an influence of the SETS and Contextual learning model the learning model on scientific attitudes and critical thinking skills of class XI students of SMK Negeri 1 Telen and SMK Negeri 2 Bengalon simultaneously.

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Univariate test The *test* is based on *the Test of between Subject Effect* which has been described previously. It shows that the difference in learning models causes no significant difference in the scientific attitude variable. student at the level of testing **p = sig = 0.895 0.05** so that $H_{0\ is}$ accepted and H_{1} is rejected, it is concluded that there is no significant effect of the independent variables of SETS, Contextual and conventional learning models **on students' scientific attitudes** . Referring to the results of the statistical analysis, it is generally stated that the scientific attitude of a student is created naturally which is reflected in the personality of the student himself, the student's learning environment only has a relatively small effect on changes in his scientific attitude. Differences in learning models applied in classroom learning have not been able to significantly control changes in students' scientific attitudes. However, in learning conditions that collaborate students' critical thinking attitudes and habits simultaneously can shape changes in students' scientific attitudes through the application of SETS and Contextual cooperative learning models.

The results of this study are in line with the theory proposed by Lestari, (2009). Attitude is a person's internal state that influences choices for personal actions he does. Attitudes are formed and changed in line with individual development or in other words attitudes are the result of individual learning through social interaction. This indicates that attitudes can be formed and changed through education. A positive attitude can turn into a negative if you don't get good coaching. Because attitudes have levels, positive attitudes can also be increased to be very positive, so that in a position like this lies the role of education in fostering one's attitude. The concepts that students build to understand their learning environment are constantly changing in line with the addition of new experiences and evidence that often contradict previously held concepts.

In addition to measuring students' critical thinking skills, scientific attitudes were also measured through a scientific attitude questionnaire with the indicators measured consisting of 5 aspects, namely:

honest attitude, curious attitude, critical attitude, diligent attitude, and the attitude of being able to cooperate with others distributed. into 10 validated statement items.

Measurement of scientific attitude in this study was carried out at the beginning before the learning activities began. The results of the scientific attitude scores are then combined and averaged according to the indicators and sub-indicators of the critical thinking skills test. The results obtained indicate that the scientific attitude of the honest aspect has a score of 3.60 or 90.10% in the very good category, the curious attitude has a score of 3.73 or 93.49% in the very good category, the critical attitude has a score of 3.80 or 95.09% in the very good category, diligent attitude has a score of 3.76 or 94.10% in the very good category, the attitude of being able to cooperate with others has a score of 3.39 or 92.30% in the good category.

Based on these values, it can be assumed that the different learning models applied in the classroom only have a slight influence on the growth of scientific attitudes in each student, but the SETS learning model and the contextual learning model can encourage the creation of habits of processing reasoning power to think critically and creatively during the learning process. learning. The best hope that should be obtained during the learning process by applying the learning model as a learning strategy is that students with good scientific attitudes will develop good critical thinking skills as well. However, after analyzing the results of this study, it turns out that the scientific attitude of students has not looked good with the application of certain learning models. Based on this, the linguistic factor in the context of the questionnaire items needs to be improved, making it easier for students to understand the meaning of the statements and questions in the questionnaire. Students' misunderstanding of this caused some students to choose the wrong answer because it was in the form of a Likert scale.

Suyitno (1997) that scientific attitude is a product of learning activities, scientific attitude is obtained through experience, learning, identification, role behavior (teacher-student and parent-child). Because scientific attitudes are learned, scientific attitudes can be modified and changed so that constant learning experiences can influence scientific attitudes, make scientific attitudes change, intensive, weak or vice versa. The same thing was also expressed by Yul (2004) that scientific attitudes arise through experience, not brought from birth , so attitudes can be strengthened or changed through the learning process .

The value of students' scientific attitudes obtained from the results of research for three times of learning is quite good and has increased, but there are some students whose values of scientific attitudes increase but are irregular and there are even some students who experience a decrease in scientific attitudes on the final test of learning activities. This is due to the misunderstanding of the students in giving the scientific attitude questionnaire scores given before the learning activities because when the researcher explained the procedure for filling out the questionnaire, some of the students entered the class not on time so they did not listen to the instructions that had been explained by the teacher. In addition, another factor is that there are still students who tend to be passive, indifferent, do not care about learning so that in giving questionnaire scores and answering environmental knowledge tests they do it by guessing. The indifference of these students has a bad impact on their learning outcomes.

This is in line with the theory put forward by Astuti (2014) that students who have a high scientific attitude will have fluency in thinking so that students will be motivated to always excel and have a strong commitment to achieve success and excellence. Based on this assumption, it can be assumed that the scientific attitude of students will be related to the learning outcomes obtained by these students during the learning process.

The Table *of Test of between Subject Effects* to test the hypothesis that was carried out on the data with a sample of 77 distributed in 3 (three) classes with 2 (two) learning models and 1 (one) control class with conventional learning, it was found that there was no significant effect of the variable free of SETS

learning model, *Contextual* and *conventional* learning **on students' scientific attitudes** . However, the results of the *Multivariate* test *Wilks' Lambda test* confirmed that there was a significant effect of critical thinking skills and scientific attitudes in the classroom that applied the SETS, Contextual and conventional learning models. The influence given to the data variance is 86.6%, this shows that there is a difference in the contribution of 13.4%. total variance is influenced by other variables that are not predicted in this study. One of them is the motivation variable. Learning motivation in students can increase when the teacher in the learning process uses a model or learning approach that is in accordance with the teaching material so as to create a comfortable and not boring learning atmosphere. As stated by Hamalik (2005) that motivation is a change in energy in a person (personal) which is characterized by the emergence of feelings and reactions to achieve goals. Likewise with the opinion of Mc. Donald in Sardiman (2010), motivation is a change in energy in a person which is characterized by the emergence of *feeling* and preceded by a response to the existence of a goal. So with a strong motivation will encourage students to be serious in the learning process which is very helpful for students in achieving the ultimate goal of learning, namely increasing optimal learning outcomes. Based on this description, it can be assumed that in addition to the lack of scientific attitudes possessed by students, the learning model applied in this study is also one of the variables that can affect students' attitudes and skills because it contributes to student learning motivation.

One of the determinants of good learning outcomes is that teachers in their learning activities use good learning approaches and methods as well. In this study, the researchers chose to use the SETS model and the Contextual model in learning activities as well as conventional learning as comparisons and controllers. This is in accordance with the results of research conducted by Benneth (2005), reporting that the SETS approach is a context-based approach that has a very important role in motivating children and developing their scientific literacy based on the results of research conducted on capable boys and girls. low.

The selection of the contextual model and the SETS model was carried out because it referred to the theory put forward by several previous researchers which were considered to be able to significantly support the achievement of good students' critical thinking skills for the scientific attitude of students, namely: (1) Poedjiadi, (2005) stated that the main goal of SETS is to form individuals who have scientific and technological literacy and have concern for community and environmental problems, (2) Utomo (2008) in his theory also suggests that SETS education will essentially familiarize students to think globally and act locally and globally through guidance so that students have sensitivity to problems in society and play an active role in finding solutions, (3) Rusmansyah (2003) in Aisyah (2007), the SETS approach is based on three important things, namely:

1) There is a close relationship between science, technology and society.
2) The teaching-learning process adheres to a constructivist view, which basically describes that children form or build their knowledge through their interaction with the environment.
3) In his teaching there are five domains, which consist of the realm of knowledge, the realm of attitude, the realm of the scientific process, the realm of creativity, and the realm of relationships and applications.

Scientific attitude in learning is needed by students because it can motivate their learning activities. In the scientific attitude there is a picture of how students should behave in learning, responding to an environmental problem, carrying out a task, and developing themselves. This of course greatly affects the results of student learning activities in a positive direction. Through the cultivation of a scientific attitude in learning, students have the possibility to learn to understand and discover. These things can help students learn scientifically, structured, and independently.

Critical thinking skills in this study were measured using a critical thinking skills test. The test consists of 4 categories of critical thinking skills (category of providing simple explanations, building basic skills, concluding and making further explanations) which is divided into 5 indicators and their respective aspects of the 15 test items, namely 1 indicator item focusing on questions, 3 indicator items analyze arguments, 2 indicator items whether the source is reliable or not, 3 indicator items analyze and consider induction, 2 indicator items make inductions and consider induction results and 4 indicator items make and determine the results of considerations. This critical thinking skill test is then distributed into 3 learning activities. This critical thinking skill test is given at the beginning of each learning activity for 3 meetings in each school, namely, SMK Negeri 1 Telen and SMK Negeri 2 Bengalon. The results obtained show that the value of students' critical thinking skills after the application of the SETS learning model is 68.48% with a good category. While the value of students' critical thinking skills after applying the contextual learning model is 64.94% and the value of students' critical thinking skills after applying the conventional learning model is 37.48%.

The data above is also strengthened by the results of statistical hypothesis testing as seen in the *multivariate test* based on the *Pairwise Comparison table* and the *Estimates* output of SPSS. The *mean value* in the statistical descriptive table looks very low in the application of the conventional learning model compared to the *mean value* in the class that applies the SETS and Contextual learning model. Descriptively, the SETS learning model has a greater influence on students' critical thinking skills than the contextual and conventional learning models.

The results of this study are in accordance with the theory put forward by Utomo (2008) which states that the nature of SETS in education reflects how to do and what can be achieved by SETS education. SETS education must be able to make students who study it, both students and members of the community, really understand the relationship between each element in SETS. The inseparable relationship between science, the environment, technology and society is a two-way reciprocal relationship that can be assessed for the benefits and losses generated. In the end, students are able to answer and overcome every problem related to the wealth of the earth as well as social issues and global issues, until in the end it comes down to saving the earth.

The results of other studies that are in line with the results of this study were put forward by Tristar (2013), concluding that the SETS learning model made a positive and significant contribution to students' critical thinking skills. The same thing was also expressed by Fardani (2016) that there was a positive and significant influence between the SETS learning model and the Inqury learning model on students' critical thinking skills in the cognitive realm. The magnitude of the influence of critical thinking skills on student learning outcomes in the cognitive domain if written in percentage is 60.3%.

This is in accordance with the criteria for the strength of the relationship between variables proposed by Sarwono (2012) as previously written, so based on this, it can be said that between critical thinking skills and the application of certain learning models has a strong, significant and unidirectional relationship strength.

The weakness of students' critical thinking skills is caused by internal and external factors of students. In learning activities, students tend to be accustomed to memorizing subject matter without knowing what the implied meaning of the subject matter is. Another cause is assumed that in every learning activity students are rarely actively involved in learning activities so that students tend to be passive and reluctant to train their thinking power to solve a problem related to the concept of the material being taught. The student's age factor is also assumed to have an effect on the weakness of students' critical thinking skills in

learning activities where the sample in this study is students aged around 12 to 13 years who can be categorized in the first-level middle class.

This statement is reinforced by the theory put forward by Pillow (2002) in Latipah (2014) which states that critical thinking skills appear slowly from childhood to adolescence. The same thing was stated by Schommer-Aikins (2001) in Latipah (2014) which states that often students at all grade levels simply swallow the information they read in textbooks, advertisements, television and so on, without being critical. Students are more likely to look critically and analytically at new information if they believe that a topic will continue to evolve or change as new evidence emerges. On the other hand, students tend to be less involved in critical thinking if they believe that knowledge is an absolute and unchanging entity.

One of the factors causing the increase in students' critical thinking skills in every learning activity, is influenced by the student's learning atmosphere. A comfortable learning atmosphere and adequate learning facilities as well as interesting learning media should be prioritized that must be met by educators before carrying out learning activities in the classroom. Students will feel more comfortable if the environment outside the classroom is used as a place to learn so that students feel closer to nature and are more familiar with the real environment because they can come into direct contact with environmental problems and social problems that are being faced. Students with a vocational or vocational education background tend to have 80% of the learning process taking place in practical areas and in direct contact with practical equipment and materials in the form of agricultural machinery. Student competence in learning activities like this is needed as a place to improve critical thinking skills better.

With the creation of a comfortable learning environment, it is hoped that students can actually apply their vocational competencies and at the same time get used to practicing their thinking skills, so that imagination that is merely imaginary about environmental problems can be minimized in each student.

Rusyna (2014) in his theory says that effective thinking skills are a characteristic that is considered important by schools at every level, even though these critical thinking skills are rarely taught by teachers in class. Teaching critical thinking skills must be done through exercises that are appropriate to the child's cognitive development stage. These stages include: (1) identification of procedural components (2) direct instruction and modeling (3) guided exercises and (4) free practice. At this fourth stage, the teacher designs activities in such a way that students can practice their skills independently, for example in the form of creativity in carrying out the practice of identifying plantation plant growth requirements.

The research was conducted using the SETS model and the contextual model, researchers also carried out free exercises as stated in the theory, namely students were given independent tasks in the form of direct observations and observations in the student's immediate environment on land conditions adapted to the requirements for growing plantation crops. Students independently identify climatic conditions, soil moisture, simple observations of the dryness of the land, and other growing conditions. The results of simple observations made by these students were then analyzed on the types of plant commodities in accordance with the results of observations in the field. So with this it is expected that the concept of creative, critical and collaborative thinking from students becomes more nurtured and indirectly has a positive impact on learning outcomes.

Based on the above and reinforced by the theory put forward by Potts (1994) in Rusyna (2014) which states that there are three strategies that teachers can use when deepening students' vocational competence based on critical thinking skills, namely: (1) building categories (*building categories*), (b) finding problems (*finding problems*), and (c) improving learning environment facilities (*enhancing the environment*). This theory supports the research results that the environment and community-based learning model can have implications for students' critical thinking skills because researchers in learning activities use contextual

models and the SETS model which outlines the learning steps as stated in the theory. In the SETS model and the contextual model, the researchers designed learning environment facilities such as the use of powerpoint learning media and using practical land in schools (outside the classroom) as a place of learning. With a pleasant learning environment for students, their critical thinking skills can be realized so that it has implications for their learning outcomes.

One of the research hypotheses that have been prepared previously, namely the researcher wants to determine the effect of the SETS learning model, Contextual model and conventional model together (simultaneously) on scientific attitudes and critical thinking skills. Based on the analysis of the research data, it was obtained that the *partial value of eta squared* $p^2 = 0.866$ or 86.60% of the differences in the applied learning model affected students' critical thinking skills and scientific attitudes. This achievement indicates that in general scientific attitudes and critical thinking skills have grown and developed in each student through the learning process using the SETS model and contextual model, so that they can have a good influence on students' vocational competencies. However, there are still other factors outside the independent variables of the study that are likely to affect the dependent variable. Other variable factors that may have an influence on students' scientific attitudes and thinking skills can be in the form of: learning motivation, understanding of students' initial concepts, students' intelligence (IQ) level, family socioeconomic level, teacher quality, and parental attention. This is in line with the theory put forward by Paulina (2005) that the factors that influence students' scientific attitudes and creative thinking skills include factors of freedom, responsibility, decision making, self-direction, psychology, physical, memory, motivation, and level of education. social and emotional intelligence.

In addition to the coefficient of determination from the results of statistical analysis carried out, based on the MANCOVA table the LSD further test or the smallest Significant Difference test was obtained that there was no significant difference between the differences in learning models on students' scientific attitudes so that the LSD test could only be performed on the critical thinking skill variable by adding notation LSD to the *mean value.* The results of the LSD test analysis assume that there is no effect of applying Conventional learning to students' critical thinking skills, meanwhile the application of Contextual models can have a good influence on students' critical thinking skills, while critical thinking skills that apply the SETS learning model have a very good influence. on students' critical thinking skills.

The results of the study can give us an idea that the accuracy of the selection of learning models on learning materials can have a positive influence on students' critical thinking skills which are better through the SETS and contextual models compared to conventional learning methods. The right learning model will be an effective bridge to students' competencies in order to improve skills in using digitalization-based technology as an implication of the development of science and technology.

Conclusion

Based on the objectives, hypotheses and research results that have been described previously , several conclusions can be drawn as follows:

1. There is no effect of SETS and Contextual learning models on the Scientific Attitudes of XI grade students of SMK Negeri 1 Telen and SMK Negeri 2 Bengalon with *partial eta squared* values $p^2 = 0.003$ or 0.3% .
2. There is a spirit of learning model _ _ SETS and Contextual on the critical thinking skills of class XI students of SMK Negeri 1 Telen and SMK Negeri 2 Bengalon with partial value of eta *squared* $p^2 = 0, 866$ or 86, 6 1% .

3. There is an influence of the SETS and Contextual learning model on scientific attitudes and critical thinking skills of class XI students of SMK Negeri 1 Telen and SMK Negeri [2] Bengalon simultaneously with *partial* value eta squared ηp 2 = 0, 769 or 76.9 0 % .

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