

The Influence of Contextual Teaching And Learning (CTL) towards Chritical Thinking and Problem Solving Ability on Skeletal System Materials

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Abstract. This research was to determine (1) the influence of the use CTL approach on chritical thinking ability students, (2) the influence of the use CTL approach on problem solving ability, and (3) the relationship between chritical thinking and problem solving ability. Design of the research was a quasi-experiment using a pretest posttest control group design. The population in this research was all 11th grade in Prambanan Senior High School State consisted of 6 classes. The samples were taken two classes based on random cluster sampling technique, those class were XI MIPA 1 as control class and XI MIPA 4 as a experiment class. Experiment Class used Contextual Teaching and Learning (CTL) Approach in learning process and control class use non Contextual Teaching and Learning (CTL) Approach. The instrument of this research was an observation sheet of implementation CTL, the pretest and posttest to determine the chritical thinking ability and problem solving ability. The data were analysed with MANOVA and Pearson correlation. The results showed that (1) CTL had positif influences on chritical thinking ability, (2) CTL had positif influences on problem solving ability, and (3) there was a corelation between chritical thinking ability with the problem solving ability, the better chritical thinking ability, the higher problem solving ability.

Keywords : Contextual Teaching and Learning, Chritical Thinking, Problem Solving

INTRODUCTION

A school teaches in three ways: by what it teaches, by how it teaches, and by the kind of place it is (Joyce, 2009: 164). In learning activities teachers should use the appropriate learning approach so that learning was not boring for students. Teachers must have high creativity in choosing a model or approach to manage learning activity in the class. This research was conducted in Prambanan Senior High School State. The researcher observed Biology lesson and the researcher found that students had low critical thinking skills. This was evidenced by few students who asked questions when the teacher showed a case in the student's work sheet. Another fact was that students were less active in expressing opinions, when students were asked by teachers to express their knowledge about the objects presented by teachers in front of the class in implementing 5M (observing, questioning, Collecting data, make association, and make conclusion) in the curriculum 2013. Students were still silent and they do not respond to what the teacher asked about the object of learning .

The results of interviews with teachers showed that the students critical thinking skills were still low. Students were less active to ask questions and express opinions in a problem. In this case the researcher conducted an interview with one of the teachers in Prambanan Senior High School State which was about what biological material was less making students active and less varied learning. Skeletal System material was a difficult materials and teacher must be smart get the model that suitable with the material.

The student's score on the skeletal system was also low. This was evidenced by the average of test score is still poor. Related to this, then the teacher allows researchers to conduct research on appropriate learning approaches that can improve critical thinking skills and problem solving ability. Teachers feel helpful if there was a research on learning model that could make students active and happy especially in Motion System material.

Contextual teaching is teaching that enables learning in which the student of the world, both alone and with others. By looking at the considerations of the theory of CTL. So the learning approach was chosen to be able to develop the ability of critical thinking and understanding of student concepts is the approach of learning CTL. CTL proves good in improving the critical thinking and problem solving ability as suggested by many theories, that make the teacher will be greatly helped to develop the learning. CTL approach was supported constructivism learning theory. Constructivism is a broadly supported learning theory that rests on the idea that students build their own knowledge within the context of their own experiences. The possibility of conveying ideas, listening to other people's ideas, and reflecting on one's own ideas on others' ideas, is a form of individual empowerment experience. According to Richmond & Striley 1996 (Mahanal, 2009: 3) interactive process with colleagues it helps the process of knowledge construction (meaning-making process). According to this view social transactions play a very important role in the formation of cognition. From the background, the researcher took the title of the thesis "The Influence of Contextual Teaching And Learning (CTL) Approach toward Critical Thinking Ability and Problem Solving Ability.

RESEARCH METHODS

Research Design

This type of research is Quasi Experiment Research. The research used was pretest-posttest control group design. This study uses two sample classes. The class are experimental class and control class. Students in the experimental class were given treatment with Contextual Teaching and Learning Approach.

Time and Place of Study

This research was conducted in November 2017 until January 2018. The research is located in SMA Negeri 1 Prambanan.

Population, Sample, and Sampling Technique

Population in this research is all class 11th grade in SMA Negeri 1 Prambanan which consist of 4 class. The sample in this study was determined using cluster random sampling technique. The classes is chosen to be the research sample are class 11th one science class and 11th four science class. 11th four science class as experimental class and 11th one science class as control class.

Research variable

The independent variable in this research is the application of the Contextual Teaching and Learning in the experimental class as X variable. The control variable in this research is the teacher, the subject matter, and the time. The dependent variable in this study is critical thinking ability and problem solving ability.

Instruments for Collecting Data and Analyzed The Data

The data of this study include the result of student critical thinking ability and problem solving ability, and CTL implementation. The Instrument in this research is CTL implementation sheet and Question to measure critical thinking ability and problem solving ability. The data obtained from the study were analyzed using SPSS 16. The data were tested for prerequisite using normality and homogeneity test, then the data was analyzed by different test with MANOVA and analyzed by correlation test with pearson correlation.

RESULT AND DISCUSSION

The main data used in this study to test the hypothesis was the data of postes of critical thinking ability and postes data of problem solving ability. The following table represents the acquisition of students' ultimate critical thinking skills for the control class and the experimental class.

Table 1. Values of Critical Thinking Skills of Student Control Class
and Experiment Class

Type	Postes Result Chrritical Thinking Ability	
	Control Class	Experiment Class
Mean	60,54	75,18
Maksimum	80	90
Minimum	32	52
STDV	12,73	9,71

And then the following table represents the earning value of the final student problem solving ability for the control class and the experimental class.

Table 2. Student Problem Solving Value of Control Class and Experiment Class

Jenis	Kemampuan Pemecahan Masalah Akhir	
	Kelas Kontrol	Kelas Eksperimen
Mean	50,56	70,54
Maksimum	76	80
Minimum	32	56
STDV	10,51	6,82

This hypothesis test was using MANOVA test. The assumptions used in this MANOVA test are normally distributed data variables and variance between groups of homogeneous data. The following was the result of MANOVA test analysis of critical thinking ability and problem solving ability.

Table 3. MANOVA Multivariate Tests Analysis test results

Effect		Value	Sig.
Intercept	Pillai's Trace	.986	.000
	Wilks' Lambda	.014	.000
	Hotelling's Trace	72.272	.000
	Roy's Largest Root	72.272	.000
Pendekatan	Pillai's Trace	.570	.000
	Wilks' Lambda	.430	.000
	Hotelling's Trace	1.326	.000
	Roy's Largest Root	1.326	.000

From table 3 of MANOVA analysis we can see the results of multivariate test from Wilk's Lamda shows the value of F equal to 19.010 and the significance of 0.000. If significance <0,05 it can be concluded that there was influence between approach of learning with critical thinking ability and problem solving ability. If significance > 0,05 it can be concluded that there was no influence between learning approach with critical thinking ability and problem solving abilit. Significant result was 0.000 then significance value <0,05. So it can be concluded that there was influence between learning approaches to critical thinking skills and problem solving skills.

Table 4. MANOVA Test Result Test Between Subjects Effects

Source	Dependent Variable	Mean Square	F	Sig.
Corrected Model	Kritis	2474.584	18.954	.000
	Pemecahan	4674.045	57.949	.000

Intercept	Kritis	215875.776	1.654E3	.000
	Pemecahan	171629.619	2.128E3	.000
Pendekatan	Kritis	2474.584	18.954	.000
	Pemecahan	4674.045	57.949	.000
Error	Kritis	130.556		
	Pemecahan	80.658		

From table Test Between Subjects Effects above can be seen that the value of probability or significance between the learning approach with the ability to think critically was 0.000. Decision-making was based if $p > 0.05$ H_0 was received, whereas if $p < 0.05$ H_0 is rejected. If we see the significance of the learning approach with the critical thinking ability of $0.000 < 0.05$ then the null hypothesis was rejected. The conclusion is that there was a difference of critical thinking ability and problem solving ability between classes using Contextual Teaching and Learning approach and non Contextual Teaching and Learning approach. The value of the experimental class has a capability value.

1. The influence of Contextual Teaching and Learning (CTL) on Critical Thinking Ability

The results showed that students' critical thinking ability in experiment and control class were the same value when given pretest before the learning. The result of critical thinking ability after learning of experiment class student is higher when compared with control class. It can be seen in the graph of critical thinking ability value below.

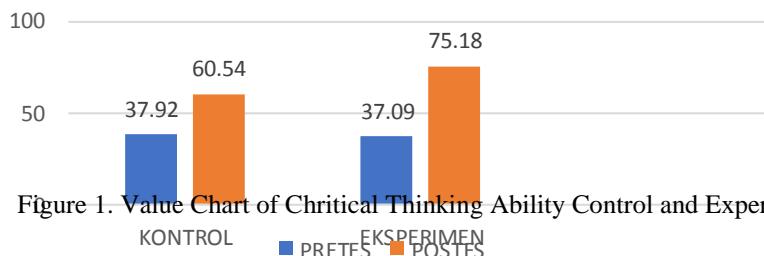


Figure 1. Value Chart of Chritical Thinking Ability Control and Experiment Class

The diagram shows that the value of critical thinking ability of control class and experiment after learning is different. The test results with MANOVA show that the value has a probability 0.000. This means that if $p < 0.05$ the two values are very different. The difference because in conventional learning students are only faced with the material in writing, so students are only required to memorize not think in a higher level. And in CTL learning students are faced with real world conditions in deepening the material., This is suitable with Johnson's theory that "To help students develop their intellectual process, CTL teaches steps that can be used in critical and creative thinking and provides an opportunity to use this higher level of thinking skills in the real world (Johnson, 2009: 182)".

This system of teaching and learning with CTL is a system of intellectual achievement derived from active participation and meaningful experiences. Meaningful experiences commonly experienced by students on daily activities associated with knowledge to be learned will make students more accustomed to critical thinking. Contextual Teaching and Learning approach in this experimental class using 7 CTL standards in the learning process of each meeting are constructivism, questioning, modeling, learning community, inquiry, authentic assessment, and reflection. At the beginning of the learning the students construct their experiences with the lessons to be discussed by performing the CTL principles of constructivism and questioning.

By linking materials and activities that students normally do students will be encouraged and interested to think more deeply. The next CTL principle is learning community. Students are required to explore what students have built through the learning community. So in this case because learning in groups of students are required to express

their ideas related to the practicum that will be done, then with these activities students will be required to think critically and think more diligent in solving problems in the practicum activities.

The next CTL principle is inquiry. Inquiry is the process of finding a concept. In this principle is done LKS workmanship in the form of experiments with chicken bone, students will be guided by the practicum they will find how the bones, bone structure, and find bone function. This causes students to think deeper and construct the experience the students have with regard to the experiments that will be carried out as well as to learn from their peers about the concept of what is being learned.

The next CTL principle is authentic assessment. Authentic assessment is an assessment of what students do. Making the report will make students work together and exchange ideas and dare to express their opinions when creating reports, students will unify the various opinions and find the right concept using the ability to think critically. Making the report will get a lot of feedback opinions and ideas, then students should be able to unify opinions and equate perceptions so that reports can be arranged properly. The process of sorting out ideas and equating opinions requires critical thinking. CTL approach aims to train students to be able to think critically and skillfully in processing knowledge in order to discover and create something that is beneficial to the students themselves and others.

2. The Effect of Contextual Teaching and Learning (CTL) on Problem-Solving Ability

Results of students' experimental class problem solving skills were higher when compared to the control class.

This can be seen in the figure 2.

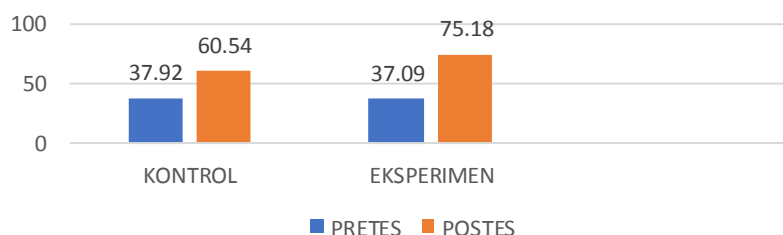


Figure 2. Value Control Ability Chart of the Control and Experiment Class Problem Solving

The test results with MANOVA show that the value has a probability of 0.000. This means that if $p < 0.05$ then the two values are very different. CTL approach is significantly better than conventional approach in improving problem solving ability in motion system material.

In CTL the principle of constructivism is that students are invited to discover their own knowledge from their experiences in everyday life. Students are invited to link their knowledge of the environment of daily life and school lessons. With students integrating experiences in everyday life combined with their knowledge, students will find it easier to deal with teacher-given times, in which case the motion system will be discussed in the group. Contextual Teaching and Learning (CTL) as one learning strategy that can help improve students' ability in problem solving ability.

Problem solving measured in this study has several stages of identifying problems, formulating problems, making hypotheses (temporary answers based on problem formulation), mentioning alternative solutions for each subject matter, and selecting the best solution alternative. Contextual Teaching and Learning in the stages of learning community requires students active in learning both physically, mentally, intellectually, and emotionally in order to achieve optimal learning outcomes. Physical activity means that students are actively involved in speaking, writing, and assisting their group in material matters as well as personnel in completing tasks and practicum in CTL learning activities. Active mental, emotional, and intellectual means students will actively engage in thinking, seeking answers to tasks, solving problems during lab work, discussing, arguing and unifying opinions.

Small group discussions provide greater participation opportunities for each member so that each student feels involved and satisfied with his learning. At this stage students also think together solve the task, membelajarkan between members to understand the material, and prepare yourself to present the answer. Improved student problem-solving skills can not be separated from the students' active role in learning and teacher performance in teaching. In CTL the principle of constructivism is that students are invited to discover their own knowledge from their experiences in everyday life. Students are invited to link their knowledge of the environment of daily life and school lessons. With students integrating experience in everyday life combined with their knowledge, students will find it easier to deal with teacher-given times, in which case the motion system will be discussed in the group.

The above explanation is supported by the theory that CTL leads to a problem-solving learning experience that is learning at the level of the environment that allows the flexibility of exchanging opinions and ideas as well as the uniqueness of each learner as a result, in addition learning CTL can improve the ability and individual skills as a learning effect where the difference situations and problems are the ability to cooperate with other group members (Alavi, 1995: 12). In addition, CTL is a learning approach that uses real-world problems as a context for learners to learn about critical thinking and problem-solving skills, and to acquire essential knowledge and concepts from subject matter.

3. Relationship of Critical Thinking Ability with Problem Solving Ability

The result of correlation test between the ability of critical thinking and problem solving ability show the significance of 0,017. The value is smaller than 0.05. This value indicates that there is a positive relationship between critical thinking skills and problem-solving abilities in the experimental class. In search of correlation value in excel also got value 0,50 which mean correlation value is. A positive relationship shows that if the ability to think critically increases then the problem-solving ability also increases. The better the critical thinking ability the better problem-solving ability.

The problem-solving ability is the applicative skill of the concept to some new insights. In solving the problems faced, the ability to think creatively and critically, in order to make decisions reflectively. The CTL component is to enable students to use critical, critical thinking to analyze, do synthesis, solve problems and make decisions with logic and evidence (Johnson, 2009: 94). The result of research that there is correlation correlation ability of critical thinking and problem solving ability according to above theory. That if someone has good critical thinking skills then they will be able to solve the problem well too. It is supported by another theory that critical thinking is a directional and clear process used in mental activities such as solving problems, making decisions, persuading, analyzing assumptions, and conducting scientific research (Johnson, 2009: 183).

Critical thinking allows students to systematically study the problem and design solutions from problems well. Therefore, if the ability to think critically good, then the ability to solve the problem will be good too. A person who is used to critical thinking will be easy to solve a problem and find a realistic solution.

CONCLUSION

The conclusion of the research is :

1. CTL had positive influences on critical thinking ability.
2. CTL had positive influences on problem solving ability
3. There is a correlation between critical thinking ability with the problem solving ability, the better critical thinking ability, the higher problem solving ability.

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