**The Effectiveness of Contextual Teaching and Learning with Multimedia to Increase Student’s Achievement on Hydrocarbon Topic**

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## Abstract

This research has the objective to increase student achievement taught with contextual teaching and learning is better than student achievement taught with direct instruction on hydrocarbon topic, to growth characteristic of communication in learning with contextual teaching and learning is better than learning with direct instruction. to know the effectiveness of student achievement taught by contextual teaching and learning compared to student achievement taught by direct instruction. The population of this research are SMAN 16 Medan, SMAN 1 Sunggal and MAS PAB 2. The sample of this research is X grades. The study was followed by a pretest as the preliminary evaluation. then give treated Contextual Teaching Learning in experimental class and direct Instruction in the control class. And give a post-test as an evaluation test. In the pretest, the average of the pretest in the experiment class is 36.11 and in the control class is 39.11. In the posttest, the experiment class is 82 and the control class is 73.11. The comparison based on the gain of pretest and posttest data of experiment and control is 71 and 55, and the effectivity is 22.53. So, students’ achievement in-class teaching with Contextual Teaching Learning is significantly better than in control class teaching with Direct Instruction. the percentage of students’ character in the experiment class is 67.80 and control class is 58.20

**Keywords**: contextual teaching and learning (CTL), multimedia based on computer, student achievement.

## Introduction

Curriculum 2013 focused on the goal of encouraging learners or students, better able to make observations, ask questions, reasoning, and communicate (present) what they earn after receiving the subject matter. National education serves to develop and form the character and civilization of dignity in the context of the intellectual life of the nation (Republic Law number 20 of 2003 on the National Education System). Based on the functions and objectives of the national education curriculum development must be rooted in the national culture, national life today, and the life of the nation in the foreseeable future.

Chemistry is a difficult subject. That is the assumption of chemistry, which is two factors that influence to difficulty of chemistry in school. The first factor is the assumption of students that chemistry is difficult, the second factor is strategy learning using of the teacher is not suitable or makes students difficult for understanding the subject matter. Some schools have difficulty preparing media learning making teachers difficult for doing variations in learning. Exactly it makes students interested and helps students to study chemistry. The impact of less learning media creates monotonous learning and not interest for students and makes students do not motivated to study chemistry.

Contextual Teaching and Learning (CTL) help teachers relate the content to be studied and encourage students to make connections between the knowledge possessed by the application in everyday life. The CTL model is a type of learning model that is better applied to students. With this model, students will understand natural phenomena related to chemistry subject to help students see meaning in the academic material they are learning by linking academic subjects to the context of their daily lives. Contextual teaching and learning (CTL) apply chemistry to the real thing around of us. Student can conduct chemistry in their real life, so it will be more understand because not just imagine, not assume that all chemistry is abstract matter.

Computer-based instructional media that can present real subjects, as we know Chemistry is an abstract matter. We learn about knowledge around us that we see directly. With computers, we can present that subject with real pictures or real video. Hydrocarbon is about alkanes, alkenes and alkynes, a grouping of hydrocarbons based on aromatic and aliphatic, saturated and unsaturated, isomer and reaction, and uses of hydrocarbon in daily life. Many applications of Hydrocarbon in our daily lives. Contextual learning conducts chemistry in real life, so students are required to memorize and understand many concepts because students know directly in the real world.

Chemistry is an abstract matter that will be understood by students who will use modern technology that are computers, with computers we can see the material of chemistry in pictures, videos or slides which we can’t see with our eyes directly. Chemistry as a difficult subject matter will be understood by students with the use learning model (CTL), with CTL Students will understand natural phenomena or daily incidents connected to knowledge and be democratic because they work together in their group to solve the problem.

## Method

**2.1 Time and location.**

Taught in class X grade senior high school in even semester in academic year 2013/2014 in SMAN 1 Sunggal, SMAN 16 Medan and MAS PAB 1

* 1. **Population and Sample.**

The population of this research are all students X grade in SMAN 1 Sunggal there are 4 classes of X grades, SMAN 16 Medan there are 4 classes of X grades and in MAS PAB 2, there are 2 classes. The sample is X Social Class 1-2 in SMAN 16 Medan (70 students), X Social Class 1-2 in SMAN 1 Sunggal (60 students) and X Social Class 1-2 in MAS PAB (50 students). The total sample is 180 students.

* 1. **Research Procedure.**

Give treatment in class 1 using Contextual Teaching and Learning with multimedia based on computer and give treatment in class 2 using Direct Instruction. Before giving treatment, both classes give a pretest to know their initial knowledge about this topic. After we give treatment in each class, give a posttest in both of the classes. From the postest, we get the data. That data will be analysed and after we analyse it, we can conclude the result of the research. During give treatment in both classes, the observer would observe the communication of students. Both of the classes will observe. Observe student character based on the indicator in the observation sheet, every indicator has a scale. After getting data from observation, that data would be analysed to conclude the research.

* 1. **Research Instrument.**

For student achievement or learning outcomes use for postest and pretest. the number of items is 40 multiple choice but give for give to students just 25 multiple choice questions with 5 options answer choices.25 questions include 7 indicators. Before giving treatment to the class, to student gives 25 questions as a pretest and after giving treatment to the class, give 25 questions to the student as a posttest. And item has validity by 3 validators and validity in the school.

1. **Result and Discussion**

Contextual learning or contextual teaching and learning (CTL) is a concept which helps teachers learn to associate the learning material with real-world situations students and encourages students to make connections between the knowledge possessed by its application in daily life. students' knowledge and skills obtained from the students construct their knowledge and new skills when they study. Students will know of what happens in their around based on chemistry subject, learning with the real application is easier to remember because can see the real learning.

**3.1 Result of Experiment Class**

**Table. 1** Result of Experiment Class

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Note | Pretest | Postest |
| 1 | Average | 36.11 | 82 |
| 2 | SD | 7.92 | 7.75 |
| 3 | N | 90 | 90 |
| 4 | Maximum | 50 | 95 |
| 5 | Minimum | 20 | 65 |

Based on the table above get result: the average of the experiment class, in the pretest, is 36.1 and in the posttest is 82 with a total of the student is 90. For standard deviation in the experiment class, the pretest is 7.92 and in the posttest is 7.75. for the value of the maximum score, in pretest is 20 and in posttest is 95. For the minimum score, data in the pretest is 20 and in the posttest is 65.

* 1. **Result of Control Class**

**Table 2 Result of Control Class**

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Note | Pretest | Postest |
| 1 | Average | 39.11 | 73.11 |
| 2 | SD | 7.99 | 7.74 |
| 3 | N | 90 | 90 |
| 4 | Maximum | 50 | 85 |
| 5 | Minimum | 20 | 50 |

Based on the table above get the result: the average of the control class, in the pretest, is 39.11 and in the posttest is 73.11 with a total of the student is 90. For standard deviation in the experiment class, the pretest is 7.99 and in the posttest is 7.74. for value of the maximum score, in the pretest is 50 and in the postest is 85. For the minimum score, data in the pretest is 20 and in the posttest is 65.

* 1. **Discussion**

In the pretest, the average of the pretest in the experiment class is 36.11 and in the control class is 39.11. its means that initial knowledge of both classes is the same initial. After treatment in both classes, in the final meeting give post-test data. In the posttest, the experiment class is 82 and the control class is 73.11. and the comparison based on the gain of pretest and posttest data of experiment and control is 71% and 55%. So, students’ achievement in-class teaching with Contextual Teaching Learning (CTL) is higher than control class teaching with Direct Instruction.

Same as previous research (According to Mananti M Tambunan (2010) Data gain scores (the difference between the pretest and posttest) obtained results with an average value of 19.58 for experimental classes while the average value of the class controls 11.50. Hypothesis testing using test t-test (one side) . results of calculation obtained that t-count 3.07 ≥ 1.667 t table at 0.05 alpha level (5 %) df = 78. test the hypothesis obtained t greater than t-table it was concluded that the results of computer-based learning are higher than conventional teaching-based media). The effectivity of student achievement taught by contextual teaching and learning (CTL) compared to student achievement taught by direct instruction is 22.53 % from the experiment’s gain is 71% and control gain is 55 %.

**Figure. 1 Percentage of Student’s Achievement.**

Based on the data above, the hypothesis can conclude that there are significant differences in students’ Achievement taught by Contextual Teaching Learning (CTL) with multimedia based on computer compared with students’ achievement taught Direct Instruction on hydrocarbon topics in X grades.

Ha: The growth of students’ communication in learning taught by contextual teaching and learning (CTL) is significantly better than learning taught by Direct Instruction.

**Table 3. Hypothesis Test of Student’s Achievement.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | | Gain Score | | | |
| Equal variance assumed | | Equal variance not assumed | |
| Levene’s test for quality of variance |  | F-sig | | 0.790  0.375 | |  |
| T- test for equality of means |  | T  Df  Sig  Mean difference  Std. Error  Difference | | 7.896  178  0.000  0.16133  0.02044 | | 7.896  176.841  0.000  0.16133  0.02044 |
| 95 % confidence interval of the difference | Lower  upper | | 0.12100  0.20166 | | 0.12100  0.20166 |

From the data above the sig 0.000 < 0.05. this means From the data get result is sig (1-tailed) = 0.000, which means sig < 0.05 and Ha is accepted. The increasing student achievement taught by Contextual Teaching and Learning (CTL) with multimedia based on computers is significant higher than

student achievement taught by Direct Instruction.

Improvement of student’s Achievement was calculated by using an average of gain in the experiment class and the control class. Based on the calculation that contained:

Increasing in achievement taught by contextual teaching and learning (CTL) in the experiment class is 71 % Increasing in Student Achievement taught by Direct Instruction in the control class is 55 %. So the difference of improving students’ Achievement in the experiment class with the control class is 71 % - 55 % = 16 %.

1. **Conclusion**

Based on the above result, can conclude that:

1. Students’ achievement taught by contextual teaching and learning (CTL) is significantly better than student achievement taught by Direct Instruction with a sig of hypothesis 0.000,
2. The effectivity of student achievement taught by contextual teaching and learning (CTL) with multimedia based on a computer is 22.53 % compared to student achievement taught by direct instruction.

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