

The Effectiveness of Student Centre Learning in Experiment Method on Acid and Base Solution to Increase Student Achievement

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Abstract

The purpose of this research was to know the effectiveness of student centre learning (SCL) based experiment method to increase student achievement on topic acid base solution, type of this research descriptive qualitative, this research was conducted in SMAN 16 Medan the sample that used in this experiment consist of two class which is grade XI IPA1 as experiment class that treated by using student centre learning and Grade XI IPA 2 as a control class without student centre learning based experiment method. Data in this research got from pretest which is give before treated the method and posttest after treated the method. In experimental class, the mean before teaching treatment is 34, while after giving treatment the mean is increase become 70. In controlled class, the mean before teaching treatment is 29, while after teaching treatment it is change become 42. The study concludes that the SCL based experiment method is an effective method in teaching of acid-base solution to increase student achievement.

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1. Introduction

Education is the part of the advance a country and need to create good skill for student to face the changing especially in globalisation era. This condition start from student at school, student must prepare become active, creative and innovative. Especially in science that has so many relationship in their life every day. In school science learn from elementary until senior high school. The focus of student preparation is in senior high school that continue their education to university. One of the science subject that learn at school is chemistry.

This subject student faced for reaction especially in laboratory work after they get theory from teacher, to make student interest in chemistry curriculum prepare students become a researcher and explore their thinking called Student Centre Learning (SCL), in the SCL learning strategy, meaningful students must be encouraged to have motivation in themselves then strive to achieve competence is desirable[1].

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This can be done in a way increase the time of discussion, so students are able and bold to express opinion. The hope is by applying SCL learning templates, then students can actively participate, have critical power, able to analyse and be able to solve the problem. Teacher have responsibility to change the student thinking, teacher have to have the good method that relating to the topic in teaching process, so that student will interest in the learning process [2][3].

Teacher must have strategy to make the student motivate in learning chemistry [4], as we know teacher have pedagogic competence in part of evaluation to decide the method that must be used in learning process to help student increase their achievement [5] to distributing lesson in the teaching.

During experiment student directly investigate the topic that discuss with teacher in the class to make student understand, in this case teacher act only as a facilitator that giving information and teacher bring student to think more critically. With this method student will explore their thinking and the centre of this research are student with the target is student centre learning, means student will solve the problem during experiment. The topic that used in this experiment method are acid and base solution, as we know this topic can found in our daily life for example acid can found in citrus, fruit and also in our digest, while base can be found in soap, detergent and many product. Student can found all the data from environment[6], directly student will think more critical and explore their skill because they have found all the data in their life.

Student Centered Learning is one of the approaches to teaching in education. Approach this gives freedom to students to have the opportunity and facilities to explore their own knowledge his knowledge so that deep knowledge will be gained and capable improve student quality. Learning process based on Student Centred Learning (SCL)[7]. Research conducted is about The Effectiveness of Learning by SCL (Student Centre Learning) in experiment The effectiveness of learning using SCL method are very interesting to discuss because by using the suitable ways believed can increase student achievement in teaching chemistry, especially in the acid-base topic. The acid-base topic categorized as difficult topic. The students will have bad comprehension if it is just told by conventional method. Therefore by learning using this SCL method hope can increase student achievement in learning acid-base topic. Because in this method student just not receive lesson from their teacher, but their demand to search it, find it by their self and this condition that will be make student more active in the learning process so that they will have deep comprehension about the concept and can develop their knowledge and also their ability[8][9]. SCL emphasizes student as a learner and what the students for success in learning compared to what is done by teachers. teacher-focused learning is expected to be student-centred learning is expected to encourage students to be actively involved in building management knowledge, attitude and behaviour[10]. Learning process student centred or known with the term student centred learning (SCL) will have an impact that students get opportunities and facilities to be able to build their own knowledge so that it will gain a deep understanding can ultimately improve quality the student[11]. The quality of learning process during experiment method in laboratory that used Student Centre Learning (SCL) automatically make student achievement change become good beside that the situation also they get in environment and see as a riil happen and make their thinking become critisized[7]. In other words we can said that students achievement become increase. Student become motivated become theis social in experiment more confidence to prove the theory and if they get some problem they can ask their teacher as a facilitator without hasitate if they are true or false[12].

2. Methods

Population used in this research are the student in SMAN 16 Medan, and sampel used are the student in class XI. The type of this research is descriptive quantitative. In this research used two class, the first class as experimental class and the second class as the controlled class, instrument used in this research at experimental class are the experiment tools, while in controlled class used conventional method. Research procedure are arranging of instrument, teaching treatment and the last is evaluation. Before doing teaching treatment, both of experimental and controlled class are given pretest. The aim of pretest is to know whether the topic and to know their general knowledge about the topic. After giving pretest, for experimental class then treated by SCL based experiment method and for controlled class treated by conventional method. Next, after finishing the teaching treatment in both of experimental and controlled class are give posttest to know their increasing achievement. After got the score of the student in both of pretest and posttest, then analysing the data.

3. Result and Discussion

Data in this research divided in two experiment and control class to know the increasing of student achievement. The data collected from pretest and posttest from both class. The first data that calculated in this research are from pretest as follow:

Table 1. Data Pretest in Experiment class

Interval class	f_{absolute}	$f_{\text{relative}} (\%)$
60-54	1	3
53-47	3	9
46-40	12	34
39-26	15	43
25-20	4	11
Total	35	100

From the table 1, show that with mean is 34 there are 12% respondent with high score and 34% respondent with medium score and 54% of respondent with low score. Based on the data got from the observation, where the total of respondent is 35 and the high score is 60, the lower score is 20 with mean is 34 and standard deviation 12.05.

Table 2. Data Posttest in Control class

Interval class	f_{absolute}	$f_{\text{relative}} (\%)$
50-44	1	3
43-37	10	29
36-30	12	34
29-16	8	23
15-9	4	11
Total	35	100

Based on the tabel above, show that with mean (M) 24 there are 32% respondent with high score and 57% respondent with medium score and 11% of respondent with low score. After doing treatment in the end of treatment student given posttest that showed in table 3.

Table 3. The Posttest in Experiment Class

Interval class	f_{absolute}	$f_{\text{relative}} (\%)$
90-86	3	9
85-76	5	14
75-66	16	46
65-56	11	31
Total	35	100

Based on the tabel above, show that with mean (M) 70 there are 9% respondent with high score and 60% respondent with medium score and 31% of respondent with low score.

Table 4. Data Posttest in Control class The Score Scale

Interval class	f_{absolute}	$f_{\text{relative}} (\%)$
60-54	2	6
53-47	15	43
46-40	9	26
39-26	5	14
25-19	4	11
Total	35	100

Table show that with mean (M) 42 there are 49% respondent with high score and 40% respondent with medium score and 11% of respondent with low score. Based on all the calculation above in both of experimental class and in controlled class in pretest and posttest section, can see clearly in the table 5.

Table 5.data in experimental and controlled class in pretest and posttest section

Class	Pretest	Posttest	Significant
experiment	34	70	Significant
Control	29	42	Normal

4. Conclusion

Based on the description data from this research the result showed that student centre learning able to increase student achievement that proved from pretest and posttest. In control class there is no significant different the changing of student score which is 24 become 34, while in experiment class there is significant different from 42 become 70, from the data can concluded teaching by using Student Centre Learning is more effective method compared with conventional method.

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References

- [1] Suciati Suciati, "Student-Centered Learning (SCL) untuk Meningkatkan Kreativitas Siswa Madrasah Ibtidaiyah," *Elem. Islam. Teach. J.*, vol. 4, no. 2, 2016.
- [2] D. N. Marpaung, "Implementation of Active and Creative Learning Through Multimedia on the Teaching of Solubility and Solubility Product," *J. Basic Appl. Sci. Res.*, vol. 9, no. 6, pp. 42–46, 2019.
- [3] A. A. Win, "The Effectiveness of Using Multiple Intelligences Learning Models on Biology Learning Outcomes of Class VII Students in Madani Junior High School of Makassar," *J. Appl. Sci. Eng. Technol. Educ.*, vol. 1, no. 2, Oct. 2019.
- [4] J. J. Pongkendek, J. Parlindungan, and N. Sumanik, "The Development of Direct Learning Strategies in Topic Solubility and Solubility Product," in *ICSS*, 2019, vol. 383, pp. 129–133.
- [5] J. J. Pongkendek and D. N. Marpaung, "Analisis Kompetensi Pedagogik Guru Kimia SMA di Distrik Merauke Dalam Implementasi Kurikulum 2013," *Quantum J. Inov. Pendidik. Sains*, vol. 11, no. 1, pp. 27–35, 2019.
- [6] D. N. Marpaung, J. J. Pongkendek, and L. F. Siregar, "The development of innovative learning material integrated with environmental activities to improve student learning outcomes on electrolyte and nonelectrolyte solution," in *IOP Conference Series: Earth and Environmental Science*, 2019, p. 012218.
- [7] R. R. Antika, "Proses Pembelajaran Berbasis Student Centered Learning (Studi Deskriptif di Sekolah Menengah Pertama Islam Baitul 'Izzah, Nganjuk)," *Biokultur*, vol. 3, no. 1, pp. 252–263, 2014.
- [8] L. S. Keiler, "Teachers' roles and identities in student-centered classrooms," *Int. J. STEM Educ.*, vol. 5, no. 1, 2018.

- [9] A. Ardian and S. Munadi, “Pengaruh Strategi Pembelajaran Student-Centered Learning dan Kemampuan Spasial terhadap Kreativitas Mahasiswa,” *J. Pendidik. Teknol. dan Kejuru.*, vol. 22, no. 4, 2015.
- [10] S. D. Saputro, “the Application of Student Centered Learning Through Lesson Study on Quality and Learning Results,” *ISLLAC J. Intensive Stud. Lang. Lit. Art, Cult.*, vol. 2, no. 2, pp. 84–91, 2018.
- [11] C. P. B. and Harrison J.K, David Lubinski and J. H.S., “Creativity and Technical Innovation: Spatial Ability’s Unique Role.,” *Psychol. Sci.*, vol. 24, no. 9, pp. 1831–1836, 2013.
- [12] M. H. Asoodeh, A. M. B. Asoodeh, and M. Zarepour, “The impact of student - centered learning on academic achievement and social skills,” *Procedia - Soc. Behav. Sci.*, vol. 46, pp. 560 – 564, 2012.