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The implementation of SETS approach towards students achievement on the solubility material based on KKNI

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Abstract: The low students' achievement, lack of variety of teaching methods on Basic Chemistry, lack of students' engagement on teaching and learning process, misconception of Chemistry is difficult subject, and the changes of curriculum into KKNI on Industrial Revolution 4.0 that demand for the students are on the level 6 on the output based on the government legislation are the problems that need to be done on this study. This study aimed to find out the students' achievement and response during the learning process on Basic Chemistry-Solubility and Solubility Product-class by using SETS approach based on KKNI. This is a quasi experiemental study through the distance learning. The technique of collecting the data was documentation and research instruments that consist of course outlines (RPS), students' activity (observation sheet), and students' work sheets that describe the activity with SETS method, pretest and post test, and the student's questionnaire. The results showed that the implementation of SETS approach affects the students achievement thus there is enhancement on students achievement for the control and experimental class for 51.92% and the students response on the methods are 88%. The Concluded that there is an effect of Using SETS to improve student achievement and increasing student responses to learning.

Keywords: SETS, KKNI, Ksp, student achievement

1. Introduction

Process of science learning in the era of industrial revolution 4.0 and KKNI based curriculum focuses on the studens' ability to be an active one in the learning processthrough the exploration. Specifically, it helps the students to be able to manage the problem, convey an opinion, formulate the problem, formulate the hypothesis, and look for the proof. Those processes will help the students to reconstruct their critical thinking and soving the problem that can fasiltitate them in learning the science concepts (Jono, 2016; Effendi-Hasibuan et al. 2019).

The specific purposes of learning Chemistry subject are: (1) identifying the concepts related to the public life and its; (2) developing the scientific attitude that is having the logical and critical thinking, impartial, open-minded, objective, determined, and cooperative; (3) gaining an experience to apply the scientific method through trial and error; (4) developing the understanding on the importance of managing and conserving the environtment for society well-being; and (5) comprehending the chemistry's concept, principle, laws, and theory and their relation, implementatition (Binadja et al. 2008) and application in solving the daily problems. Based on those thoughts and purposes, the implementation of SETS approach on solubility and solubility product based on KKNI, is able to be one of the alternative in doing the process of learning chemistry. The obvious reality in learning chemistry is that there are many students are difficult learning the Basic Chemistry subject (Silaban, 2017; Silaban, 2021). They are tend to be difficult to understand the concepts of basic chemistry that make them hard to find the root matter for the elaboration. Whereas, this subject is the basic knowledge that should be achieve on senior high school level. Therefore, it is important to find an innovative method in teaching that subject (Ersalinda et al. 2017; Pratiwi et al. 2019).

The speed of globalization process has changed the pattern of the high competition. Particularly, for those country that comprised on Asian Free Trade Area (AFTA) (Effendi-Hasibuan et al. 2019), that competition are included in some aspects, they are the developments of science and technology and the availability of employment. Those matters has formed the Indonesian Qualification Framework (KKNI) as the efforts of competition barricade (Safarati & Rahma, 2020). The main purpose is to equalize the human resources in Indonesia and others parts of the world, in terms of education and other workshop. It caused the implementation of KKNI (Presidential Decree No. 8 on 2012 about KKNI) needs to formulate the learning outcomes to have a competitive, prime, and independent graduates that can be actively and collaboratively participated on the development of Indonesia as the form of caring and loving for homeland. This KKNI has been elaborated into 9 qualifications started from first qualification as the lowest and ninth as the highest (Permendikbud, No. 73 / 2013 about the implementation of KKNI at the university). The qualification level is the level of study performances that has been agreed on nationwide, arranged based on the result of education measurement or workshop acquired through the formal, informal, and non-formal education or workshop in her research states that the curriculum of KKNI is effective to be applied on the higher education curriculum that is KKNI in which the students as the object of the research (Siagian & Siregar 2018). This research is important to be done because it can be a reference in applying the learning methods or model based on KKNI to find out the accuracy of using KKNI in the higher education.

2. Methods

This research is the quasi experiment research through the distance learning.The population of this research was the first semester students of Mathematics Department year 2020/2021, Faculty of Teacher Training and Education, Nommensen HKBP University Medan and The sample of this research was the first semester students of Mathematics Department. The aim of this research is to find out the students' achievement and response during the learning process on Basic Chemistry-Solubility and Solubility Product-class by

using SETS approach based on KKNI. By means of this research, the researchers are able to realize, find and make the analysis of an issues on the students during the learning process of Basic Chemistry especially on Solubility and Solubility Product. Before carried out this research, the researchers done the interview and direct observation on the students through zoom application to find out the background of each students. This was done since the sample of this research was the first semester students that firstly come to the university from various kind of senior high school with different major. The researchers prepared the instrument for collecting the data that consist of students' response questionnaire, pre-test and post-test, learning outlies, and students' work sheet (Eliyanti et al. 2019). This research was done on teaching learning process in which consist of four stages, called, planning, action, abservation, and reflection. It was observed by two observers and used likert scale to make a category with Table 1.

Table 1
Catagory pretest and postest (Sugiyono, 2015)

Interval	Catagory
0–20	Very poor
21–40	Poor
41–50	Average
51–70	Good
71–100	Very good

The technique of collecting data is the most important part on this study since getting the data is the aim of this study. Without the technique of collecting data, the researcher would not be able to have a valid data. Thus, it is done by collecting the data through the instrument of the research, namely, course outlines (RPS), students' activity (observation sheet), and students' work sheets that describe the activity with SETS method, pretest and post test, and the student's questionnaire.

The analysis of students' achievement was done to find out the enhancement of the achievement through SETS approach based on KKNI. There are two criteria of mastery learning called individual and classical. The first is individual mastery. Here is the equation for the mastery:

$$\mathbf{KI} = \frac{T}{Tt}\ x\ 100\%$$

The second one is classical mastery and the equation is as followed:

$$\mathbf{KK} = \frac{ST}{N}\ x\ 100\%$$

In this research, the students can be said pass the classical mastery if ≥ 80 % students got the set score. In this part, the lecturers had set that it is complete if the students got B (minimal) for the score. The students' statements on the students' response learning questionnaire are needed to find out the students' response on the implementation of SETS method on the solubility and solubility product based on KKNI. The formula used to

define the percentage of students in giving the response on the teaching learning process is as follow:

$$\boldsymbol{RM} = \frac{F}{N}\ x\ 100\%$$

3. Results and Discussion

The result of this research is the cognitive and psychomotor ability that consist of the students' achievement data gained from the pre-test and post-test. Then this data was analyzed inferentially and descriptively. This result was supported with the percentage of students' work sheets in the form of the video of practical techinique at home and students' response. Since the Pandemic of Covid-19 out break in Indonesia, this research was done under the health protocol that proposed by the government so the face to face learning method had been changed into online one using zoom application (Safarati & Rahma, 2020).

The independent variable here is the SETS approach based on KKNI and dependent variable is the students' achievement. The test was done by giving the test and the process of non test done through an observation, distributing questionnaire, and collecting all documents needed. The test instruments had tested for its validity. The gaining data were analyzed descriptively based on the score of pre-test and post-test and students' response. The validation of learning devices was done by an experts by giving scoring and suggestion. The suggestion given is the basic to complete the learning devices, so both of the devices and research instrument are ready to be used in this research. The expert stated that the learning devices are valid based on the assessment result of the validation on learning tools of Basic Chemical-Solubility and Solubility Product- by using SETS approach based on KKNI. It used 20 valid questios with rcount = 0.534. This obtained rcount was confirmed into rtable from the table of critic product moment with n = 35, in the significant level of α = 0.05. Then it is obtained that rtable = 0.334. From the results, it is showed that rcount > rtable (0.534 > 0.334) then the question declared valid. For the test of reliability, the score of rcount = 0.757. From that result of rcount obtained the result of the critic of product moment on rtable with n = 35, with the significant level α = 0.05 And the rtable = 0.334. Since rcount > rtable (0.757 > 0.334) then the question is reliable.

The assessment result of students' psychomotor ability in the learning process of Basic Chemistry through the implementation of SETS approach based on KKNI was analyzed on descriptive quantitative method by counting the percentage of the aspects that measured by using observation sheet (Yuniastuti, 2015). The observation result showed that this learning process by implementing SETS approach based on KKNI improved. It can be seen from the beginning to the end of learning process that showed there is an enhancement of achievement through the improvement of the score after the post-test. The average score of students' achievement on the pre-test in the beginning of the learning process of solubility and solubility product are shown Table 2.

Based on the Table 2, result of the pre-test, it can be seen that the students with poor ability have the highest percentage about 55.76%. As a conclusion in the beginning of the learning that students needed a method that can enhance their ability. Then, the changes on learning styles done by the implementation of SETS (science, enviroment, technologi and

society) based on KKNI, that focus on the students' activeness by doing the 6 level task such as: routine assignment, critical book report, critical journal report, and mini project (Fidiyani, 2010; Basani, 2015). The description of the implementation on this research are as follows; In the Planning at this stage the researchers prepared some tools namely; Course outlines RPS, Students' work sheet, Pretest, Posttest, Students' response observation sheet Then, the lecturer distributed the students' work sheet that submitted on the assignment column in the google classroom. In the end of the teaching learning process that is closing the lecture, the lecturer asked one of the students to tell the conclusion of that learning process.

Table 2
Score of Pretest

Pretest Score Interval	Catagory	Number of Participants	Percentage
0–20	Very poor	9	17.31%
21–40	Poor	29	55.77%
41–50	Middle	4	7.69%
51–70	Good	7	13.46%
71–100	Very good	3	5.77%
Total		**52**	**100%**

Table 3
Score of P Posttest

Posttest Score Interval	Catagory	Number of Participants	Percentage
0–20	Very poor	-	-
21–40	Poor	-	-
41–50	Middle	7	13.46%
51–70	Good	12	23.08%
71–100	Very good	33	63.46%
Total		**52**	**100%**

The test result of the pretest above showed that the students' learning classically was 19.23%. It means there are 10 students who passed while the other 42 students are failed due to the result was under grade B that is 70 as the minimal score. It can be concluded that the studying mastery was not reached yet on the class. And then Lecturer gave the post-test in the end of learning process to the class, with the score of post – test is show ini table below. The average score of students' achievement on the post-test in the end of the learning process of solubility and solubility product are shown Table 3.

Based on the Table 3, result of the post-test, it can be seen that the students with good ability have the highest percentage about 63.46%. The result showed that there are 7 students categorized on the low score but the percentage of students that passed the subject was 86.53 %. It can be concluded that the teaching learning process was run well based on the 4 criterias that had been studied such as: the students activity which is the outcomes were reached the level 6 on the KKNI curriculum, learning process, lecturer activity in managing the learning process through zoom application and students response

on the implementation of SETS approach based on KKNI on solubility and solubility product. This related to Yuniastuti (2015), said that the advantage of learning with SETS approach compare to others is this learning are related to the daily contextual and comprehensive (integrated among 4 components of SETS).

The difference of students' outcomes between before treatment and after treatment was 19.23 % and 86.53 %. Therefore the implementation of SETS based on KKNI is proven effectively increase students' outcomes on Basic Chemistry subject of solubility and solubility product for the first semester students of Mathematics department Nommensen HKBP University academic year 2020/2021. Normality test using SPSS 17 programme for Windows shown as Table 4.

Table 4
One-Sample Kolmogorov-Smirnov Test

		Post-test
N		52
Normal Parameters[a,,b]	Mean	51.5000
	Std. Deviation	12.67294
cycleMost Extreme Differences	Absolute	.129
	Positive	.129
	Negative	-.115
Kolmogorov-Smirnov Z		.708
Asymp. Sig. (2-tailed)		.677

a. Test distribution is Normal.

Table 4
Students' Response

No	Questions	Students' Response			
		Agree	(%)	Disagree	(%)
(1)	(2)	(3)	(4)	(5)	(6)
1.	Is the implementation of SETS approach based on KKNI categorized as a new things for you?	51	98.07%	1	1.92%
2.	Do you want the implementation of SETS approach based on KKNI were applied for the next material?	45	86.52%	7	13.46%
3.	Do you think that the implementation of SETS approach based on KKNI make the learning situation be good?	45	86.52%	7	13.46%
4.	Are your thinking ability becoming more develop by the implementation of SETS approach based on KKNI?	45	86.52%	7	13.46%
5.	Does the learning process with the implementation of SETS approach based on KKNI make you discussed actively in the group though zoom application?	48	92.30%	4	7.69%

6.	Does the implementation of SETS approach based on KKNI make you to interact easily with your friend when you need to do the physical distancing?	43	82.69%	9	17.30%
7.	Does the implementation of SETS approach based on KKNI increase your interest and motivation in learning?	46	88.46%	6	11.53%
8.	Does the implementation of SETS approach based on KKNI help you to facilitate the teamwork with your friend to comprehend the solubility and solubility product	50	98.03%	2	3.84%
9.	Does the learning process through the implementation of SETS approach based on KKNI can help to increase your understanding on learning?	44	84.61%	8	15.38%
10.	Do you understand the curriculum of KKNI after studing the solubility and solubility product?	40	76.92%	12	23.07%
	Total	**880.64**		**121.11**	
	Average	**88%**		**12%**	

The result of processing SPSS , showed sign. = 0.677. Since the sign is > α (0.677 >0.05), then it can be conclude that the data of the post-test on the class are normally distributed. The data analysis for the students' response on the implementation of SETS approach based on KKNI for solubility and solubility product material is as follow for Table 5. Based on the Table 4 above, the students who give their agreement as the response is 88 % while those who gave the disagreement as the response is 12 %. It can be concluded as that the students have their own interest on the implementation of SETS approach based on KKNI on the solubility and solubility product material.

4. Conclusion

There is a difference of students' outcomes during the learning process that could be seen from the result of before and after class. The result 19.23% dan 86.53% for each class. The percentage of the students' response to the implementation of SETS approach based on KKNI on solubility and solubility product material is 88 %. It showed that the students were interesting in the implementation method.

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