Proceeding

The 4th International Seminar on Science Education

Bandung, 30 October 2010

"Curriculum Development of Science Education in 21st Century"

Science Education Program
School of Postgraduate Studies
Indonesia University of Education

ISBN: 978-979-99232-3-3

Proceeding

The 4th International Seminar on Science Education

Bandung, 30 October 2010

"Curriculum Development of Science Education in 21st Century"

Editor

Prof. Dr. Liliasari, M.Pd
Dr. Agus Setiawan, M.Si

Dr. Agus Setiabudi, M.Si.

Dr. Ari Widodo, M.Ed

Dr. Ijang Rohman, M.Si.

Sukisman Purtadi, M.Pd.

Drs. Sutopo, M.Si
Wulan Tias GA, M.Pd.

Science Education Program
School of Posgraduate Studies
Indonesia University of Education
Bandung, 2010

PROCEEDING
ISBN: 978-979-99232-3-3

Foreword of Chair of Science Education Program

The fourth International Seminar of Science Education is conducted to fulfill annual agenda of the School of Graduate Studies, Indonesia University of Education.

The seminar theme "Curriculum Development of Science Education in the 21st Century" is chosen emerge from many problems of science education in Indonesia. One of them is the overstuffed condition of science curriculum that affected from rapid development of information in this era. Besides, there are challenges of Indonesian people in facing against global competition. To win the competition they have to think critically. Therefore many massages have to cover by science curriculum caused it overloaded and difficult to be implemented.

We are not able to overcome the problem ourselves. We need input of information and experience from many researchers all over the world. Therefore this seminar hoped to be an exchange experience to solve the problem and lead to the discovery of science curriculum to enhance Indonesian science education quality.

I would like to express my special gratitude to Prof Dr Bruce Waldrip from Monash University, Australia; Prof Dr Russell Tytler from Deakin University, Australia; and Dr. Benny H.W.Yung from The University of Hongkong; who are specially come here to be key note speakers. Thank you for sharing the result of your latest result with us.

Finally I would like to thank to the committee who have been working hard to prepare the seminar and publish the proceedings. Last but not least thank you for all speakers and participants of your contribution today.

Bandung, 31 October 2010
Chair of Science Education Program
School of Postgraduate Studies
Indonesia University of Education,

Prof.Dr.Liliasari,M.Pd

PROCEEDING
ISBN: 978-979-99232-3-3

PROCEEDING
ISBN: 978-979-99232-3-3

Table of Content

Front Page i

Editor ii

Foreword of Head of Science Education Program iii

Table of Content v

Keynote Speaker

1. **Effective Science Teaching and Learning through reasoning**
   Bruce Waldrip, Monash University - Australia A1
2. **Exploring the Australian Science Curriculum: A way forward?**
   Russell Tytler, Deakin University- Australia A2
3. **Preparing Teachers for Teaching Ideas about Science: A Video-based Approach**
   Benny H.W.Yung, The University of Hongkong A3
4. **Redesigning indonesian science curriculum based on generic science skills**
   Prof. Dr. Liliasari A4

Biology Education

Authentic assessment competence of high school biology teachers in Central Java
Alif N. Hidayati 1, Nuryani Y. Rustaman, Sri Redjeki, Ahmad Munandar B1

The use of interactive e-book to promote constructivist learning environment in biology lessons
Ari Widodo, Imron Nugraha, Rinrin Tresnawati, Annisa Nurbaety, and Bian Biana B2

Study on learning process of prospective biology teacher in microbiology
Baiq Fatmawati, Nuryani Y. Rustaman B3

Development of *pedagogical content knowledge* (PCK) training program of genetic concept for biology teacher in highschool
Dida Hamidah, Nuryani Rustaman, I Made Alit Mariana B4

Local wisdom of the community around the Ulu Masen forest
Evi Apriana, Achmad Munandar, Nuryani Y Rustaman, Hertien Koosbandiah Surtikanti B5

Profile of biology teachers task in development of an integrated science-learning based on environment (Case studies in secondary school of "X" in Bandung City**)**
Meilinda and Rahmi Susanti B6

PROCEEDING
ISBN: 978-979-99232-3-3

In service training study program "MIVI" for science teacher to improve result study at special needs

Mia Nurkanti, Nuryani Y Rustaman, Zaenal A, Suroso A Y B7

Prospective teachers preconceptions on vascular tissue of seed plants

Purwati K. Suprapto, Nuryani Y. Rustaman, Sri Redjeki , Adi Rahmad B8

Profile material difficulty level of plant physiology according to prospective biology teachers

Rahmi Susanti, Nuryani Y.Rustaman, and Sri Redjeki B9

Argumentation skill of prospective biology teachers on the concept of neural system

Roshayanti Fenny , Rustaman Nuryani Y. Barlian Anggraini, Lukmana Iwa ***B10***

Problem based interactive e-module to improve student's generic science ability in nervous system concept

Sihombing, Rosita B11

Effort of debriefing biotechnology pedagogical content knowledge (PCK) through mastery basic concepts for biology teacher candidate

Widi Purwianingsih, Nuryani Y. Rustaman, Sri Redjeki B12

Using quest on weblog: How in service teacher perceive instructional framework?

Yanti Herlanti B13

Implementation deductive inquiry model to increase student critical thinking skill and concept attainment in genetics

Zulfiani B14

Preliminary Profile of Tutor's Ability in Managing Practical Work on Plant Physiology Through Peer Assisted Learning (PAL) Program

Sariwulan Diana and Nuryani Rustaman B15

Effectiveness of Cooperative Learning Model Type STAD and TPS Against the Results of Student Learners : Case Studies in senior high school in Madura City

Yenny Anwar B16

Analysis on Practicum Based Learning to Improve Students' Critical Thinking And Scientific Attitude in University

Fransisca Sudargo T., Berti Yolida, Eka Ariyati, Sri Sukaesih B17

Preparation of assessment peripheral bases on competence for health analyst at field work

Rudy hidana, Nuryani Y Rustaman, I.Nyoman P. Aryantha, Fransisca Sudargo T B18

PROCEEDING
ISBN: 978-979-99232-3-3

Performance analysis of teaching temporary substitution biology teacher at junior and senior high school in aceh province

Hafnati Rahmatan B19

Chemistry Education

The use of interactive laboratory simulation in enhancing critical thinking skills of senior high school students in chemical equilibrium learning concept

Budhi Sagita Wiratama, Liliasari C1

Representational competence's profile of pre-service chemistry teachers in chemical problem solving

Ida Farida, Liliasari, Dwi H. Widyantoro and Wahyu Sopandi C2

Profile of generic science skills in the assessment of practical inorganic chemistry

Ramlawati, Liliasari, Muhamad Abdulkadir M., and Ana Ratna Wulan C3

Identification of problem difficulty in learning chemistry at Class XI of high schools in Lampung Province as input for LPTK (Especially Chemical Education Study Program of Lampung University)

Sunyono C4

Local Culture Based Guided Inquiry Laboratory Activity In Enhancing Students' Critical Thinking Skills

I Nyoman Suardana1, Liliasari2, Omay Sumarna2 C5

Tematic Learning the Influence of Aditive Food Toward Human Healthy with STL(Scientific and Technological Literacy) Approach to Increase Science Literacy

Mulyitno, Ahmad Mudzakir dan Anna Permanasari C6

Development Of Argument-Map-Based-Chemistry Workbook At Thermochemistry Topic

I Wayan Redhana C7

The Effectiveness of Natural Based Contextual Approach on Student's Chem Learning Outcome and Scientific Attitude

Rr. Lis Permana Sari, Sukisman Purtadi C8

Teaching Of Science For Athelets Students In Sport Senior High School Sidoarjo

Erman C9

Feasibility and Readability Test of Contextual Teaching and Learning-Oriented Chemistry Textbook

Indarini Dwi Pursitasari C10

PROCEEDING
ISBN: 978-979-99232-3-3

Physics Education

Multiple representations skills and its influenced toward students' critical thinking disposition using a virtual laboratory activity

Abdurrahman, Liliasari P1

The relationship of between spatial ability, mathematics performance and kinematics graph interpretation skills of pre-service physics teacher students

Suhandi, Hikmat, Samsudin P2

The development of problem solving skills through instruction in optic for physics education student

Eko Swistoro, Nuryani Y. Rustaman, and Agus Setiawan P3

Using virtual laboratory to increase students' understanding on modern physics

Gunawan, Agus Setiawan P4

Characteristic of mechanics teaching materials for increasing students of physics teacher candidates representation ability on verbal, mathematical, picture, and graphic

I Ketut Mahardika, Agus Setiawan, Dadi Rusdiana, A. Rusli P5

The phenomenon based learning in heat concept to improve problem solving skills junior high school students

Lasma Br Hotang, Dadi Rusdiana and Ida Hamidah P6

The amazing physics interactive multimedia support for eyes learning as a part of optical instrument in Junior High School

Sardianto Markos Siahaan P7

Development of assessment isomorphic problem model at subject matter wave

Sudarto and Liliasari P8

The use of spreadsheet software in waves learning

Muh. Tawil, Liliasari, Benny Suprapto Brotosiswojo, and Dadi Rusdiana P9

Developing students' metacognitive skills inscience teaching and learning : *From theories into practice*

Tomo Djudin P10

Development of learning creativity sheet, as performance assessment in learning dynamic fluid concept of high school students

Viyanti , Undang Rosidin P11

PROCEEDING
ISBN: 978-979-99232-3-3

The usage of generative learning model within the learning of light refraction to increase student's physics learning achievement

Wiendartun, Heni Rusnayati, M. Nana Agustian *P12*

The implementation of problem based instruction model to improve students learning achievement and find out students learning motivation in learning physic

Wiendartun, Parlindungan Sinaga, M. Taufiqurrohim Syah *P13*

The use of blog as subject matter in the lecture of basic physics to improve teacher candidates on biology students in the mastery of motion concept

Toto *P14*

Integrated science competence using inquiry approach of science education undergraduate student

Insih Wilujeng, Agus Setiawan , Liliasari *P15*

The ways the physics teachers solve a multifaceted real-world problem relates to the behavior of gas

Sutopo *P16*

Minimizing misconception of physics teacher with through simulation on the topic of electricity and magnetism

Mursalin and Agus Setiawan *P17*

The Development of "Educative Game Kit" Based Puzzle and Card Game for Learning of Science-Physics in Elementary School

Joni Rokhmat *P18*

Needs analysis of chemistry teachers to curriculum material with "atk" model and "adir" educative framework

Momo Rosbiono *P19*

The Content of Physics Lecture Courses to Support the Competence of Energy Conversion Techniques Graduates at Bandung State Polytechnic

I Gede Rasagama1, Agus Setiawan, Liliasari, and Hermagasantos Zein *P20*

Development of Creativity and Generic Ability Through Project Based Learning in Wave Subject

Kartini Herlina, Nengah Maharta *P21*

A Proposed Curriculum Content about the Earth and Space Science in Pre-university Level

Moedji Raharto *P22*

Anaysis of Students' Capabilities in Earth Science TIMSS with Curriculum in Indonesia

Winny Liliawati, Ridwan Efendi *P23*

PROCEEDING
ISBN: 978-979-99232-3-3

Science Education

The application of classical test theory to determine item characteristic of scientific literacy in context of balinese culture

A.A. Istri Agung Rai Sudiatmika G1

The development of competency based training program for improving primary school science teacher's professional competencies using/with "science by inquiry" learning modules

Didin Wahidin, Nuryani Y. Rustaman G2

The *Predict-Observe-Explain-Write* (POEW) model of learning is to enhance critical thinking skill of SMA Student

Heppy Samosir, Agus Setiawan, and Ida Kaniawati G3

Improving Science Teacher Competencies Through Lesson Study Workshop

Renny Sofiraeni, Sumar Hendayana , G4

4th International Seminar of Science Education

"Curriculum Development of Science Education in 21st Century"

Bandung, 30 October 2010

PROCEEDING
ISBN: 978-979-99232-3-3

The Effectiveness of Natural Based Contextual Approach on Student's Chem Learning Outcome and Scientific Attitude

Rr. Lis Permana Sari[*)] and **Sukisman Purtadi**
Faculty of Mathematics and Natural Sciences, Yogyakarta State University

Abstract

This research is experimental research that has an aim to know the effectiveness of nature-based contextual approach application for the scientific attitude and chemistry learning achievement. The effectiveness investigated was seen from some aspects: (a) the students' chemistry attitude achievement (b) the students' chemistry learning achievement. The subject in this research is the students of seven grade of Junior High School 1 Klaten in academic year 2008/2009 consisting 72 students from the chosen class that had been done. The data analysis of the chemistry learning achievement had been done by using one way covarian analysis statistic test (anacova) and using controlled variable with prior knowledge of chemistry. The students' chemistry attitude can be got by using the questionnaire on the beginning and the end of the treatment and then the data would be analyzed statistically by using same subject T-test. The result from anacova test was Fo=70,352 (p=0,000). This result was shown that there was a significant difference between the students' achievement chemistry learning that had been treated using nature-based contextual approach and the comparator class. The average score from the test of learning achievement from the treatment class was 70,250 and this score was better than the controlled class (62,333). The effectiveness for the scientific attitude achievement was shown from the result of same subject T-test and the achievement of average score (gain) of students' scientific attitude. There was an increase in value of scientific attitude from the treatment class from 155,722 became 158,417. The result of this research shown that the application of nature-based contextual approach can increase the students' scientific attitude and chemistry learning achievement. Even though this research was only applied in the research condition, but this research can be a model that can be developed by the teachers as the alternative in chemistry learning in Junior High school on the certain principal material.

Keywords: *contextual, nature-based, scientific attitude, chemistry learning achievement*

Background

The effort to reach the aim of national education can be done by doing some improvement on the aspects in the educative process. Those aspects are: learners, teachers, environment, curriculum and learning result assessment. Curriculum is the vital aspect to decide the policy in the learning process. School based curriculum was developed based on the educative national standard that had been set by BSNP. This curriculum leads a learning process centered on the learners and life skill reference.

The aim of science learning is not only mastering the knowledge including the facts, the concepts, or the principles but also the process of inventing (www.bnsp-ind.org/standar-isi.php). Some of the problems in science learning are the lack of method variation and learning process which tents to teacher center and make the learner become passive. The use of inappropriate method in science learning makes the learners have to memory the materials which are very factual without connect it with the application of problem solving in the daily life. It can make the superficial knowledge understanding and an opinion which says that the materiel was difficult. For this it can impact the learning result to be less from the minimum score criteria.

It becomes the challenge for the teachers to create the learning process that gives many direct experiences of learning and focuses on problem solving. The learning process that focused on the mastering of materiel was succeed in short term memorizing competition, but it didn't work well to give information for the learners to solve the problem in long term living. Recently, it is a possibility to go back to the idea that learners will learn better in natural environment. Learning process is more meaningful when the learners also have a direct relation with materiel and not only knowing the

materiel. The appropriate approaches for this paradigm are Contextual Teaching and Learning (CTL), Science, Environment, Technology and Society (SETS) and the learning process with process skill approach (Pusat Kurikulum, Balai Penelitian dan Pengembangan, 2006).

Science learning needs a new approach to make learning process become more meaningful and develop the cognitive, affective and psychometric competency (thinking, working and acting scientifically). This research reviews the effectiveness of nature-based contextual approach to learn science. This approach was chosen because it was appropriate approach to lead student center principle and science characteristic. The learning process using nature-based approach was the learning concept that helps the teachers to connect the materiel and the real situation around the learners and makes the learners' environment as the object, medium and learning resource and also involves it whether directly or indirectly in the learning process. It encourages the learners to make the connection between the knowledge learned and the application in the daily life. For this, the learning concentration will increase and the material understanding will be better, so the learning achievement will increase.

The components which are integrated in nature-based contextual learning are: inquiry, constructivism, and the people who learn how to connect the nature by giving the direct experiences in learning process. This condition supports the increase of the scientific attitude as the affective competency of the learners to the object or the material learned.

Essentially, learning is the interaction between people and the environment or between stimuli and response so that make the change of behavior. Nature-based leaning is the learning process that integrates environment elements in the learning process and has an aim to help the learners get the meaning of leaning process. So that it can make the learners to have an environmentally consciousness, realize the change that have happened and can solves the problem in the environment.

Environment involves anything around human being. Learning environment consist of: social environment, personal environment, cultural environment, natural environment (physical) involving the natural resources that can be used as the learning resources. Based on Sukisman Purtadi (2006), some ways that can be used to involve the environment (nature and the product) into the learning process are: (a) bringing the environment in pure form, (b) bringing the environment in the analogy form, (c) bringing the environment in the form of direct object, (d) bringing the environment in the form of stop and motion picture.

The scientific attitude can be said as the attitude that has the big attention to the knowledge or scientific thinking behavior (Mulyati Arifin (1995 : 177). Scientific learning should develop the scientific attitude such as curiosity, respect for evidence, flexibility, critical reflection, sensitivity to living things and environment. For this, learning scientific attitude becomes one of the factors that influent the learning process in the class.

This condition makes the teachers to apply the nature based contextual approach that was considered as the learning concept that can help teachers connect the material taught and reality world condition of the learners and support the learners to make a connection between the knowledge learned and the application in their live as a family member and citizen. Nature based contextual approach has been chosen because by using this approach, the result of the learning process supposed to be more meaningful for the learners. Learning process takes place naturally in the shape of students' activities which are working and having an experience but it is not transferring the knowledge from the teachers to the learners. The learning strategy is more important than the result. In the contextual class, the teachers' role is helping the learning to reach the aim of the learning process. The role is to manage the class to be a team that work together to find something new for the learners (http://www.dikdasmen.org).

Besides that, the reason why this research has chosen this approach is that this method gives the learning atmosphere in which the learners can understand appropriately by themselves from the new experience from the environment. Because of it, it is very necessary to have a research for the effectiveness of nature based contextual approach application to increase the scientific attitude and the chemistry learning achievement.

Research problem: How does the effectiveness of nature based contextual approach application for (a) the students' scientific attitude and students' chemistry learning achievement in SMP N 1 Klaten?

Method

This research is the experimental research, with *rambang lugas* design. The population of this research are the learners seven grade of SMP N 1 Klaten in the academic year 2008/2009 consisting of six class with 222 learners. The amount of the sample has taken from 2 class, they are seven grade of SMP N 1 Klaten consisting 72 learners. According to Gay, the amount of the sample in the experimental research should be at least 30% from the total population. Sample collection technique has been done by using purposive cluster sampling, it means that the sample collection is fully decided by the researcher I order to reach the certain purpose in which the sample consists of the students in a group or class (Rr. Lis Permana Sari, 2007 : 37). In this case, the researcher takes two classes that have almost the same score average of background knowledge.

The variables that had been measured were: (a) independent variable was giving the treatment to the treatment class that applied the chemistry learning process by using nature based contextual approach. (b) Dependent variable in this research is the achievement of the chemistry learning and students' scientific attitude. Chemistry learning achievement was the result of chemistry learning in a shape of result score of answering the questions of chemistry learning achievement that had been validated in the class besides the treatment class and the control class. The students' scientific attitude was measured by using the validated questionnaire. (c) Variable that had been controlled in this research was the students' chemistry background knowledge.

The instruments that had been used in this research were:

a) Lesson plan.

Lesson plan is an instrument to give the treatment to the sample. In this research there were two types of lesson plans that had been used, the first one was lesson plan for the treatment class using nature based contextual approach and another one was the lesson plan for the control class. The lesson plans were completed by students' worksheet.

b) Achievement Test

The instrument of chemistry test were multiple choices. The questions were logically and empiric validated. To full fill the logical validated, the questions arrangement must be firstly started by composing the question draft. The result of reliability test of learning achievement test was got by using formula KR-20 is 0,806 it mean that this instrument was reliable to take the data of learners' chemistry learning achievement.

c) Questionnaire of Scientific Chemistry Attitude

The questionnaire of scientific attitude was an instrument which was used to measure the attitude of someone who interest to some scientific activities. It consisted of thirty nine points which created five based scientific attitudes, there were acceptation, curiosity, responses, problem solving, organizing, characteristic, and re evidence approval. This questionnaire had full filled construct validity and the content with reliable price (r Alpha Cronbach) 0,91.

Table 1. Scientific Attitude Instrument

No.	Indicator	Statement Number	Total
1	Critical Thinking	1, 2, 6, 8, 12, 13, 14*, 15, 16*, 22, 23, 38, 39	13
2	Strong want learning	21, 24, 26, 30	4
3	Strong want learning	10, 11, 29, 34, 36	5
4	Accurate	5*, 17*, 18, 35	5
5	Respecting other people	7, 9, 25, 31	4
6	Give opinion in the forum bravely	3*, 4*,19, 20, 27*, 28*, 32, 33, 37	9
Total			39

Note = (*) : Negative statement

Analysis data technique to the chemistry learning achievement was done by using covariant analysis (Anakova) with chemistry early knowledge as controller variable. The increasing of learner scientific attitude could be showed by using questionnaire which is given to the learner before and after that action and it's analyzed by using same subject T-Test. Before using it, firstly it's used hypothesis requirement test. All of them are used SPSS

Result and Discussion

a) Learning Achievement Data

Table 2.The Data of Prior Knowledge (X) and Chemistry Achievement Learning (Y)

	Experiment Class (A1)		Comparison Class(A2)	
	X1	Y1	X2	Y2
Total of Participant	36	36	36	36
The Highest Value	89	96	91	85
The Lowest value	51	55	41	52
The Average Value	68,167	70,250	66,167	62,333

The data analysis was done by using the SPS program Sutrisno Hadi and Yuni Pramardiningrum edition. From these calculations it can be got the result like the summary in table 3.

Table 3. The summary of Anakova Test result

Class	n	X	Y	$\hat{Y}$	Fo	p
A1 (treatment)	36	68,750	70,250	69,694	8,984	0,004
A2 (control)	36	66,167	62,333	62,889		

Based on the learning schievement data analysis using one line anakova test, Fo = 8,984 and p = 0,004 on db 1/69. The score of p(0,004)<0,05, it mean Ho was refused and could be concluded that statically it was a significant positive difference of the learners'chemistry learning achievement which followed the learning process used nature based contextual approach and the learners which followed the conventional approach when the background knowledge was controlled statistically.

b) Scientific attitude data

The scientific attitude data had been got by using the questionnaire of scientific attitude. The measured aspects were critical thinking, learning will, cooperation will, accurately, respecting others and delivering the opinion in the forum. The summary of learners' scientific attitude data can be seen on table 4.

Table 4. The summary of learners' scientific attitude data

Group	Average	Gain
Treatment	before : 155,722	2,694
	after : 158,417	
Control	before :159,444	0,778
	after :160,222	

Based on the scientific attitude data analysis using T-test from the SPS program in computer Sutrisno Hadi and Yuni Pramardiningrum edition shows that T-test same subject in the treatment class has score t = 1,497 ($p<0,05$). It mean that it was an enhancement of the learners' scientific attitude which follow the learning process use nature based contextual approach, and also the numeric number showed that it was an enhancement of the scientific attitude that can be seen freom the average score 155,722 becomes 158,417.

c) Discussion

In the learning process using nature based contextual approach the instruments and the materials that have been used for the practicum are those things from the environment, in spite some of them are the chemistry instruments or the material in the laboratory. In spite of this, the instruments and the chemical materials used are familiar things and often be met. In the application step, the teachers have a job to observe and help the learners that meet a difficulty in the practicum.

One of the criteria of nature based contextual approach can be considered effective when this approach can improve the learners' chemistry learning achievement. The process of nature based contextual approach refer to seven components, these are constructivism, inquiry, questioning, learning community, modeling, reflection and authentic assessment. Some more important things are nature and environment that have been used as an object, learning resources and learners' learning materials whether these are direct or indirect. The learners are taken to the real environment or the environment that have been served in the classroom while the learning process is happening. This atmosphere makes the learners find the new knowledge using the interesting way and makes the learning process becomes more meaningful and dynamic.

The material used in the learning process whether in the treatment class or in the control class is the characteristic of the changing of acid alkali and substance. The researcher uses hand out in the learning process of this material. This hand out helps the researcher to extent the material faster. The hand out consist of the explanation of the substance changing material that has been adapted using the standard of competency and the basic competency.

On the first meeting in the treatment class, the researcher explains a learning concept using nature based contextual approach. Each meeting the researcher explains the aim or the learning competency that should be mastered by the learners after the learning process. There are some groups which comprise 9-10 learners. This distribution has an aim to apply the learning society aspect and these groups are bounded by the learning activities. Study in group is better than study alone. The learners are intended to have a discussion to obtain the opinion and idea to solve the problem.

The learning process is begun using apperception to encourage the learners' curiosity and give them a chance to ask. This activity has an aim to create the basic concept of the learners as the background knowledge to explore the new knowledge that will be got in the observation and the treatment process. The sub materials that will be learnt is the definition of the characteristic and the changing of the substance, the chemical changing that brings the change of the temperature and color.

Observation is the activity to observe the learning process object to get the information in order to obtain the new knowledge. Observation is done around the school. In the group itself, the learners do the observation to the objects chosen by the researcher. The objects observed are not only from the environment around, but also can be the objects that have been taken by the researcher. The result of this observation is written on the observation sheet served by the researcher.

The researcher becomes the director and the facilitator when the observation is happening. For instance from the observation in iron trails or garbage made from iron, the learners are aimed to identify the chemistry and physic characteristic, then the teacher points the learners' attention on the new iron nail and compare it with the iron trails before, from this activity the learners are expected to make a prediction the process of changing of the substance around them.

On the beginning of this observation, many learners confuse because this is the first time for them to do the outdoor observation. Most of the learners are attracted to follow the outdoor learning process and they can find the new information. In other hand, there are some students feel happier to have a class inside the room. Then, the observation result is discussed in the class. The observation data from each group are discussed together, and the researcher acts as the guide to correct the mistakes. After they get the concept and the new knowledge from the observation, then the researcher and the learners conclude the knowledge learnt together. Each of the ends of the learning processes the researcher gives a group

assignment that is to bring the materials around the learners to be made as an object for the learning process for the nest meeting.

The second meeting discusses the sub materials of the chemistry changing which causes the arising of gas and sediment. The method used is the simple experiment using the substances brought by the learners such as lime-water, tube, candle or palm leaf rib, matches and soon. The researcher also brings the substance that are only used to be demonstrated such as HCl metal and HCl solution to explain the process of chemistry change that produces gas. Using the simple reaction:

$$Fe(s) + 2HCl(aq) \rightarrow FeCl_2(aq) + H_2(g)$$

Each of the groups does the same experiment then discusses the result of this experiment in group. Then, the teacher guides the discussion among the groups to conclude the result of the learning. The evaluation is done in the end of the meeting using the tournament among the groups and individual evaluation use the written question. The meeting is closed by giving the learners an assignment to bring the materials from their environment as the experiment object and learning object for the next meeting.

The third meeting discusses the characteristic of the alkali acid of the substance and the clarification process. This meeting is done by using the observation method. The learners are asked to bring the materials from their home and try to identify it by knowing the characteristics without using an indicator. After that, the teacher explains the classification of alkali acid. The next assignment is that the learners should bring the household materials that can be considered as acid or alkali.

In the fourth meeting the teacher explains the indicator of alkali acid and pH. Then the learners have an experiment to decide alkali acid characteristic from the materials taken from their home by using the litmus-paper and universal indicator. Each of the groups discusses the result of the experiment and presents it in front of the class. Then the teacher explains more and gives the example of the nature material that can be used as the indicator of alkali acid. The learners are guided to make alkali acid nature indicator. Then, the teacher explains the nature phenomenon connected with alkali acid.

By giving the assignment for the learners have an aim to make the learning process happens continuously. Besides the resource of the learning, in the learning process, the teacher acts as the learning strategy planner, facilitator and motivator.

The good responds from the treatment class is good enough and it can be seen from questions made in every learning process. The condition which is representative and the good facilities support the learning process run well. The effectiveness of nature based contextual approach application for the learning achievement can be known from the learning achievement test done after the materials have been taught.

The learning process using a conventional approach is done in the control class. This process tends to have a lecturing method, catechize, and answering the questions. There are some activities that are absolutely different between the control class and the treatment class. The treatment class is more dynamic than control class. The giving of the direct learning process for the learners dominates the activity so that the learning process is student centered process.

Nature based contextual approach application is easy because there are some real learning objects in spite it needs more time rather than the conventional approach. Moreover, the researcher must arrange the well done learning process scenario to make the well organized material so that it can be understood easily and in time. During the learning process, researcher must manage the class to be controlled, and it becomes conducive class and also he/she can attract the learners' attention and more focused so that the surfeit of the learners can be avoided. In the control class, the interaction only happens between the learners and the researcher, because the method used tends to teacher centered. This method limits the learners to develop the affective psychometric competency.

The result of the learning between the control and treatment class has a significant number of differences. The average score of treatment class is 70,250, and for the control class is 62,889. From the background knowledge between the classes, the learners in treatment class experiences the increase level of chemistry learning achievement, in other hand, the control class experiences the reduction level. The reduction of the score average from the control class can happen because the method used tends to monotone one. The learning process in the control class is more complex than the treatment one so that it is very possible for the control class to get the better result than the treatment class. It means that the factors influencing the result are not only come from the materials and the background knowledge of the learners but also from the psychology or emotion, the learning environment.

The learning process which tends to be lecturing method and catechize will be more monotone less challenging and so boring. It makes the respond, curiosity and the concentration level for the material will decrease. The materials given are factual and informative. When the materials can not attract the learners' attention so that the materials cannot be understood well, the materials will only be memorized without the connection process with the background knowledge.

The learning achievement data got are in shape of learning achievement test score. Taken from one line

anacova test the score of Fo = 8,984 on p = 0,004, because the score p<0,05 so that Ho is refused and Ha wasaccepted. It can be concluded that there are positive and significance differences from the learners' chemistry learning achievement from the nature based contextual approach class and the conventional class.

Nature based contextual approach was success because the learners try to be active in learning process. The openness attitude of the learners for nature based contextual approach that wasfirstly got gives the facilitation for the researcher in learning process. Moreover, the choosing of the method influences the learning process fluency. To make more effective learning process, the learners should be given an extra assignment to do at home so that the learners will understand deeper the materials taught.

The enhancement of chemistry learning quality in SMP N 1 Klaten can be seen from the enhancement of the learners' scientific attitude that can be known from T-test toward the questionnaire of A1 students' scientific attitude (treatment class) and A2 students (control class). The treatment class has the beginning score average 155,722 and the end score 158,417. The result of same subject T-test of A1 students (treatment class) shows to = 1,497 so that it can be concluded that it has a positive difference of the learners' scientific attitude before and after following the learning process using nature based contextual approach and it has an increase number of numeric for the scientific attitude achievement.

It shows that the learners are already able to have an active learning process maximally. The learners' scientific attitude has already turns up and it can be seen from the anxiety of the learners toward the nature. Beside T-test, the activeness in learning process, the curiosity of the materials taught by asking the materials which are difficult, the discussion in a group to solve the problem, doing the experiment by themselves in the laboratory to know the fact learnt show the significant differences of learners' scientific attitude.

Nature based contextual approach applied in this research was effective in increasing the chemistry understanding and learners' scientific attitude because: (a) encourages the learners to make a connection between the material learnt and an understanding of the material (b) creates the dynamic learning process condition so that the learners are motivated to study. (c) Involves actively the learners in the learning process by using the cognitive, affective and pshycomotoric by giving the direct experiences. (d) makes the positive responses from the learners so that the learning process runs well.

The advantages of nature based learning process are: (a) the learning process was realistic because it comes from the real experiences of the learners and it was useful for their living. (b) Increasing the cooperation and integration between the learners and nature. (c) It was one way in learning process which demands the creativity and the activeness from the learners in constructing the knowledge. The disadvantage from this approach comes from how o manage the learners in doing the outdoor observation.

The result of this research shows that the application of nature based contextual approach can improve scientific attitude and chemistry learning achievement of the students. Even though this research was only applied in the research condition, but this research can be a model that can be developed by the teachers as the alternative way in chemistry learning in Junior High school on the certain principal material.

CONCLUSION

Based on this research, the conclusions are:

a) There are some significant differences of the learners' chemistry learning achievement before and after the learning process between the learners which follow nature based contextual approach and the learners in control class.

b) There are some enhancements of learners' scientific attitude toward the chemistry learning process before and after follows nature based contextual approach.

Acknowledgment

The researcher want to say thank to Aprilia Puji Astuti and Justina Dura that had helped in doing this research and observation.

References

BSNP.(2006). *Panduan Penyusun Kurikulum Tingkat Satuan Pendidikan Jenjang Pendidikan Dasar Menengah*. Jakarta : BSNP

Burhan Nurgiyantoro dkk. (2000). *Statistik Terapan untuk Penelitian Ilmu-Ilmu Sosial.* Yogyakarta : Gajah Mada University Press.

Depdiknas. (2002). *Pendekatan Kontekstual (Contextual Teaching and Learning-CTL)*. Jakarta : Direkorat Jenderal Pendidikan Dasar dan Menengah.

Mulyati Arifin. (1995). *Pengembangan Program Pengajaran Bidang Studi Kimia.* Surabaya : Airlangga University Press.

Puskur Balitbang Depdiknas. (2006). Diakses pada bulan Februari 2009. <www.bnsp-ind,org/standar -isi.php.>

Rr. Lis Permana Sari. (2007). *Statistik Terapan (Untuk Analisis Data Penelitian Pendidikan Kimia).* Yogyakarta : FMIPA UNY.

Sukisman Purtadi. (2006). "*Pendidikan Berorientasi Lingkungan Pergeseran Peran Bahan Alam sebagai Media Pembelajaran Kimia."* Makalah Seminar Nasional FMIPA UNY.