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2nd ICEL 2014

THE SECOND INTERNATIONAL CONFERENCE ON EDUCATION AND LANGUAGE

20, 21, 22 MAY 2014

Bandar Lampung University, Indonesia

PROCEEDINGS

Hosted by

Teacher Training and Education Faculty (FKIP),

English Education Study Program, Bandar Lampung University (UBL)

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THE SECOND INTERNATIONAL CONFERENCE ON EDUCATION AND LANGUAGE

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20 -22 MAY 2013

Organized by:
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PREFACE

The activities of the International Conference are in line and very appropriate with the vision and mission of Bandar Lampung University (UBL) to promote training and education as well as research in these areas.

On behalf of the Second International Conference of Education and Language (2nd ICEL 2014) organizing committee, we are very pleased with the very good responses especially from the keynote speakers and from the participants. It is noteworthy to point out that about 80 technical papers were received for this conference

The participants of the conference come from many well known universities, among others: University of Wollongong, NSW Australia, International Islamic University Malaysia, Kyoto University (Temple University (Osaka), Japan - Jawaharlal Nehru University, New Delhi, India - West Visayas State University College of Agriculture and Forestry, Lambunao, Iloilo, Philipine - Bahcesehir University, Istanbul, Turkey - The Higher Institute of Modern Languages, Tunisia - University of Baku, Azerbaijan - Sarhad University, KPK, Pakistan - Medical Sciences English Language Teacher Foundation Program, Ministry of Health, Oman - Faculty School of Arts and Sciences, Banga, Aklan Philippines - Sultan Ageng Tirtayasa, Banten, - Pelita Harapan University, Jakarta - STIBA Saraswati Denpasar, Bali - University of Muhammadiyah Yogyakarta - Ahmad Dahlan University Yogyakarta - Sriwijaya University, Palembang - Islamic University of Malang - IAIN Raden Fatah Palembang - Universitas Diponegoro, Semarang, Indonesia - Universitas Haluoleo Kendari - State Islamic University of Sunan Gunung Djati, Bandung - Tadulako University, Central Sulawesi - Sanata Dharma University - Lampung University and Open University,

I would like to express my deepest gratitude to the International Advisory Board members, sponsors and also to all keynote speakers and all participants. I am also grateful to all organizing committee and all of the reviewers who contribute to the high standard of the conference. Also I would like to express my deepest gratitude to the Rector of Bandar Lampung University (UBL) who gives us endless support to these activities, so that the conference can be administrated on time.

Bandar Lampung, 20 May 2014

Drs. Harpain, M.A.T., M.M
2nd lCEL 2014 Chairman

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BANDAR LAMPUNG UNIVERSITY
Bandar Lampung, Indonesia
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THE EFFECT OF ACTIVE LEARNING METHODS *TERJUN-TULIS-SAJI* TO THE IMPROVEMENT OF SCIENTIFIC LITERACY AND MASTERY OF BIOLOGY COMPETENCIES OF SENIOR HIGH SCHOOL STUDENTS

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Abstract

The Science Curriculum 2013 is designed to develop students' scientific literacy. Scientific literacy involves mastery of science concept, process skill, attitude, as well as writing skill. This study investigated the attainment of scientific literacy and biology competencies of 10th grade science students at SMAK Kolese Santo Yusup, Malang, Indonesia. The method of this study was quasi experiment by using nonequivalent pretest posttest control group design. Based on existing theoretical framework, assessment were developed to know the concept mastery, ability to apply biology concept to solve authentic problem, and publish the findings through on line social media. To improve student's scientific literacy, the active learning model called *Terjun Tulis Saji* (TTS) was applied. The TTS method guided the students to collect data and information based on their question or problem, analyze of the data and information to construct new understanding and thinking, represent and communicate the findings. The result of the study showed significant differences of scientific literacy and biology competencies between control and experiment group. The effect of TTS on scientific literacy and biology competencies of students in biology lesson were discussed.

Keywords: biology competencies, scientific literacy, *Terjun-Tulis-Saji*

1. INTRODUCTION

The development of education in Indonesia today is a process of development to achieve national education goals. This development process is supported by a paradigm shift in education. Indonesia's national education system implies that national education is expected to be an attempt to answer the demands of reform and gaining equal to hunt down the progress of science and the development of nations in the globalized world of the 21st century heading. Reference [1] shows the development of students' abilities can't be separated from 21st century life skills. Life skills using science, especially biology in exploring life, include 1) problem identification, formulation, and solution, 2) interpersonal and collaborative skills, 3) critical thinking and investigative experience 4) creativity and self direction, 5) communication skills, and 6) information and media literacy. Information literacy education becomes an important part of the 21st century in line with the rapid development of science and technology, because of the nature and practice of science affect the social, economic, and political [2].

Scientific literacy can combine science and technique to advance the social and cultural life, and be able to put science and technology in modern life. The implication is that scientific literacy would urge people to be socially responsible and competent as citizens. Scientific literacy is seen as a social competence necessary for rational thinking about science in relation to political, economic, social, issues that arise in life. Scientific literacy in Indonesia is still in the category of low compared to other countries. According to the PISA survey results recorded by the Agency for Research and Development (Research and Development), Indonesia is the country that has not had a good record in terms of scientific literacy as outlined in Table 1 below. Scientific literacy as measured in this survey include how students are using their knowledge and identify problems to understand the facts and make decisions about changes in the environment. The low scientific literacy owned by Indonesian students will have an impact on the social life of the community both locally and internationally.

Table 1: Indonesian Position According to PISA Science Literacy Ability

Year of Study	Average Indonesia Score	Average Interational Score	ank of Indonesia	Number of Country Parties Studies
2000	393	500	38	41
2003	395	500	38	40
2006	393	500	50	57
2009	383	500	60	65

Scientific literacy is a broad term that incorporates scientific ideas and concepts within and across various scientific disciplines, as well as scientific practices. Students can develop scientific literacy based on several indicators. National Science Teacher Association argued that a science literate is a person who uses scientific concepts, skills and values in the process of making daily decisions [3]. Indicators used to measure scientific literacy are: 1) to understand the nature of science, norms, and methods of science and scientific knowledge; 2) to understand the scientific concepts; 3) to understand the relationship of science and technology; 4) to appreciate and understand the influence of science and technology in society, 5) to link competencies in the context of science, the ability to read, write, and understand the system of human knowledge; and apply some understanding of the concepts and consider the solutions in solving everyday problems. This indicator describes the meaning of scientific literacy itself. One that has been designed so that students can perform investigative activities is learning with scientific approach. Learning the scientific approach is that the learning process is designed so that students actively construct concepts, laws or principles through the stages observed (to identify or locate the problem), formulate problems, propose or formulate hypotheses, collect data with a variety of techniques, analyzing the data , draw conclusions and communicate concepts, laws or principles found.

Learning activities can be conducted in a scientific approach through collaborative learning. One of the collaborative learning model is Think Talk Write (TTW). TTW is one of the learning strategies implemented in order to achieve the learning objectives right through the process of thinking, speaking and writing. The learning model introduced in the article entitled Talk Your Way into Writing, written by Huinker and Laughlin in 1996. The learning process model Think Talk Write consists of three steps, namely think, talk, and write [4]. TTW learning can be one of the learning activities to develop scientific literacy can be seen from the indicators that apply understanding of concepts and to consider solutions in problem solving. TTW as a learning model that trains students to think, speak, and write need to be modified with other activities, in which the activity is much more inviting other students to make observations and find problems based on facts. Observations will train students to pay attention (see, read, and hear) the essentials of an object or objects. Modifications to do is by adding the observation activities at TTW so learning models becomes *Terjun Tulis Saji* (TTS). TTS is a learning model of learning in which students are conducting *Terjun is* observation (see, read, and heard), so in this activity students will think as in TTW, but students are also expected to find the problem and ask questions related issues there and do a search for information. Student resources can be searched through direct interviews, experiments, reading textbooks, or search the internet. *Tulis* (write) is an activity in which students will be looking for answers to their questions by way of associating the information from various sources. At this writing activity, students

will write an article in the form of newspaper articles. Selected newspaper articles so that students can pour their association results into written form. At the time of this activity (write) students can conduct discussions with peers and teachers. Write activities is similar to activities of writing (Write) in TTW. The last activity of the student is to *Saji*, in which students present the results of his writings to be read and commented on by friends and teachers. This presentation is done by utilizing social media facebook as a medium of learning. Facebook will help the students to be able to access anytime and anywhere, as well as other students and teachers can also access. TTS investigation on learning activities is expected to stimulate the development of scientific literacy of students, but it also indicates that this level of understanding has also become an important concept in the development of scientific literacy.

Developing scientific literacy must be done in a way that will also improve students' conceptual knowledge to understand the relationships between the concepts and ideas [3]. Reference [5] shows that understanding is a cognitive process dimension. On the dimension of knowledge, conceptual knowledge is categorized in

the classifications and categories, knowledge of principles and generalizations, and knowledge of the theories, models, and structures. Competence is the ability, skill, or expertise that is owned by someone. Increasing scientific literacy is also in line with an increase in students' competencies, learning activities should contain help students develop and practice skills to master scientific and scientific competencies that scientific literacy is also increasing [6]. TTS learning syntax is presented in Table 2 below.

Table 2: TTS Learning Syntax

Learning Activities	Student Activities	Teacher Facilities
Terjun	1. Reading textbooks. 2. Viewing the contents of a text book. 3. Creating questions about problems that arise. 4. Seeking information. a. Other reference sources. b. Interview (speakers). c. Experimental (laboratory).	1. Gives information on the topic of learning. 2. Invites students to look for problems related to the topic of learning. 3. Invites students to discuss the results of the plunge.
Tulis	1. Associating information obtained. 2. Writing a reference source to the reference card. 3. Discussing with friends and teachers. 4. Writing a conclusion in the form of a newspaper article.	1. Invites students to associate information. 2. Invites students to write a newspaper article. 3. Observes student activities
Saji	1. Presenting newspaper articles in the media facebook. 2. Mutually commenting on articles.	1. Provides a facebook group for the presentation of the article. 2. Provides comments.

2. METHODOLOGY

The method of this study was quasi experiment by using nonequivalent pretest posttest control group design. Based on existing theoretical framework, assessment were developed to know the concept mastery, ability to apply biology concept to solve authentic problem, and publish the findings through on line social media.

The population in this study were all students of class X MIA SMAK St. Joseph College in Malang 2nd semester school year 2013/2014 consisting of 482 students. The samples in this study were students of class X MIA 3 totaling 44 students for learning TTS, X MIA 2 totaling 44 students for learning TTW and class X MIA 5 totaling for 44 students for multi-strategy class. All three classes have almost the same capabilities based on average results 1st semester biology course from the academic year 2013/2014.

Data collection instrument consists of independent variables (syllabus, lesson plan, worksheet, observation sheet by teacher and student) and the dependent variables (assessment rubric and competences test). The data obtained were analyzed using analysis of covariance (Ancova). Assisted analysis with SPSS 21.0 software for Windows and performed at a significance level of 5%. If the results of the analysis showed a significant difference ($p < 0.05$, which means that the null hypothesis (Ho) is rejected and the research hypothesis is accepted), then the process continued with the analysis of different test LSD. Prior to analysis of covariance (Ancova), normality test and homogeneity test data using Levene's Test of Equality of Errors Variances.

3. DATA ANALYSIS AND INTERPRETATION

The results of hypothesis testing the effect of TTS to scientific literacy are listed in Table 3 below.

Table 3: Summary of Test Results Ancova Scientific Literacy

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	9146,661[a]	3	3048,887	14,375	,000	,261
Intercept	19394,534	1	19394,534	91,439	,000	,428
Pretest	654,788	1	654,788	3,087	,081	,025
Class	7894,385	2	3947,193	18,610	,000	,234

Error	25876,546	122	212,103
Total	589968,000	126	
Corrected Total	35023,206	125	

a. R Squared = ,261 (Adjusted R Squared = ,243)

The results showed that learning the TTS is able to give effect to the increase scientific literacy of students. Increasing scientific literacy in learning TTS showed a significant effect compared to the class or classes multi-strategy TTW. It can be seen from the results of statistical analysis of covariance test (Ancova) obtained the value of F at 18.610 with a significance value of 0.000 is less than 0.05; thus the null hypothesis is rejected and the research hypothesis is accepted which means that there is a learning effect on students' scientific literacy.

TTS learning model suggests that scientific literacy has increased significantly compared to the class or classes multi-strategy and TTW. TTS is able to deliver better results because in the learning step involves the stages that are capable of supporting the increasing scientific literacy. There are stages in the learning TTS is observed (see, read, and heard), in which the students will be trained for the stage of searching for information that triggered the questions. The question that arises is certainly expecting an answer so that students will return to dig up information as a follow-up of asking. Extracting information that continues to be done with the experimental observations colonies of Bacteria and Protists observations also through the collection of information through the internet. Events like this will encourage students to gather more facts than just the student worksheet (LKS) exploration alone. The most important thing in improving the scientific literacy is writing activities, through student can write their ideas and observations that can be passed on to others and can tell a phenomenon that occurs, the problem is obtained, describe and explain the observations (either from reading, or viewing), and describes the data through the evidence found.

Research have examined various languange-based strategies for development of scientific understanding that begins with direct experience. The techniques include: 1) reading from scientific journals, the popular press, and the internet;2) Writing of individual student scientific journals with reflections on classroom or laboratory experiences; 3) collaborative writing about the scientific work of a group of students; 4) laboratory notebooks using templates that guide student thinking and elicit critical evaluation of evidence that supports their own or others science claims; 5) informal discourse among students for the peer exploration of original ideas;6) formal individual or group presentations of well-organized and well-defended thinking; and 7) discussion, questioning, and debate that stimulates clarification of thinking and simulates the discourse that occurs in the scientific community [7].

At the time of learning process students can use their expertise to gather facts related to the topics covered. Students are also trained not only to collect information traditionally and also utilize the technology, but when compared to TTW, students are limited to reading the reading material that is in front of students. There needs to be modified so that students are able to develop scientific literacy. So are the activities in which the student multi-strategy only with regard to the exploration worksheets with students only able to make a question similar to the question contained in the worksheets. TTS support the students to conduct scientific literacy creatively and build knowledge through a pre-existing knowledge. This supports that science by its nature creates human science and innovation through the creative process that builds prior knowledge and the application of theory to real world situations. Class TTS is able to increase the scientific literacy of students seen from the activities of the students to make inquiries prior to the collection of information through experiment or through references (library or online) then students associate the information and write the results obtained in the form of articles. The most important part is to strengthen the scientific literacy of students is the use of social media to present the results of the writing of the article. Unlike the TTW class, students also conduct writing but the written part is the answer to the questions posed in the student worksheet or discussion. Students are not challenged to do more casting ideas in writing or expanding knowledge. The use of technology in the TTW still does not appear as a step optimally structured learning without involving the Internet or social media technology. Excess TTS also indicated accommodated students to find different sources of literature/references, this will enable the student to read the latest information through an online journal that can be opened from the internet.

NTSA explain that NTSA “scientific literacy means that a person can ask, find, or determine answers to questions derived from curiosity about everyday experiences. It means that a person has the ability to describe, explain, and predict natural phenomena. Scientific literacy entails being able to read with understanding articles about science in the popular press and to engage in social conversation about the

validity of the conclusions. Scientific literacy implies that a person can identify scientific issues underlying national and local decisions and express positions that are scientifically and technologically" [8].

The results of hypothesis test mastery of competencies are presented in Table 4 below.

Table 4: Summary of test results Ancova Mastery Competence

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	8466,646[a]	3	2822,215	21,193	,000	,343
Intercept	41527,676	1	41527,676	311,850	,000	,719
Pre	5103,932	1	5103,932	38,328	,000	,239
Class	5905,875	2	2952,937	22,175	,000	,267
Error	16246,211	122	133,166			
Total	728970,000	126				
Corrected Total	24712,857	125				

a. R Squared = ,343 (Adjusted R Squared = ,326)

The results showed that the mastery of competencies graders TTS 23% higher than in the TTW class and the multi-strategy class. Ancova test showed a variable grade of F values obtained at 2952.937 with a significance value of 0.000; where 0.000 < 0.05 therefore the null hypothesis is rejected and the research hypothesis is accepted which means no learning effect on students' mastery of competencies.

Method of learning through TTS shows that this learning can improve students' mastery of competencies. TTS involves various stages of learning which can accommodate students' understanding. Students perform a series of steps by way of seeking information through reading textbooks, doing experiments, browsing the internet, doing interviews and then link the information obtained by writing the facts and opinions of students. The learning process involves students in finding information on a variety of sources to invite more students to read and analyze the information obtained.

At the time of reading and writing in a series of learning activities will condition students to explore a variety of readings and write information back to the reading results in writing. These activities can reinforce students' understanding of the concept of a particular material. Reference [9] show one of the implications of accepting a constructivist theory of learning is the recognition that each individual interprets new information in the light of their existing knowledge, interests and current purpose. This statement supports that when students read and write information obtained then the students will map acquired comprehension. This suggests that an increased understanding of the concept class obtained by TTS due to applied learning activities in the classroom.

Concepts that students become more awakened obtained by combining a variety of information obtained by students. Students perform procedural learning activities through reading, writing, and presenting the results of his writings in memory of student learning activities make the material more effectively obtained. The memory of a better acquisition of the material can be seen from the description of the implicit understanding that was written in the newspaper article.

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