



Research Article

Comparative study between Indonesian and Thai Novice Science Teacher Students in Content of Science

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Abstract

The aim of this study was to compare the Indonesian and Thai novice science teacher students in content of science on environmental conservation based on local wisdom of Baduy's society. The subjects were 71 of Indonesian and 95 of Thai novice science teacher students. The results showed that mean score of Indonesian novice science teacher students had slightly better than those Thai novice science teacher students in content of science, but not significantly differences at .05 level of statistics. It can be concluded that there is no significantly differences between the average content of science between Indonesian and Thai novice science teacher students.

Keywords

content of science, Indonesian, Thai, environmental conservation, local wisdom, Baduy's Society

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Introduction

Currently, environmental degradation is now calling for all to create conservation campaign and implementation of sustainable development. World population is now rapidly grown, stimulated and distributed negative situations to all part of the world. We need concept and practice to learn how organisms and non-organisms live with man in balance. The local wisdom, is well known in southeast Asia to live with natures and help man survive with others and environments. People can sustain and conserve their environment and natural resources by local science knowledge (Nuangchalerm, 2006). Concept of environmental conservation is one of the experimental concepts in the integrated science learning that is a practical way. It can be measured through practicum on the concept of environmental conservation (El Islami, 2013).

Environmental conservation is not only subject to teach in the school, but also practice or act needs to be implemented. Education compromised concept in which students can know and understand, imply, and create to their real life. Difficulties in learning and using local wisdom practiced in the past are encountered in the reimplementation process. In addition, society's unwillingness to re-implement local wisdom which can be conducted through systematic approach in education system, integrated socio cultural approach and consistent government development policies (Hasbiah, 2015). Integration based on concept in science and local wisdom are alternative science education. The current situation in the world of science education has been developed through varieties of methods. That's is, students have to learn not only knowledge, but they should have what they do know ?and how do they know?. There are many goals of science education, it should be comprehensive enough to include the generally accepted aims and objectives of science teaching. It should be understandable for other teachers, administrators, and parents (Hodson, 2014; Baker, 2016).

Looking to the goals of science education, scientific knowledge is a body of knowledge concerning biological, physical, and earth systems. Scientific methods is centered on the abilities and understandings of the methods of scientific investigation. Inquiry and discovery have been used to describe the scientific methods goal for serving science process. Societal issues exists in society and should contribute to the maintenance and aspirations of the culture. It should prepare citizens to make responsible decisions concerning science-related social issues. All individuals have needs related to their own biological/psychological systems. It should contribute to an understanding and fulfillment of personal needs contributing to personal development. And career awareness, it should inform students about careers in the sciences (Bybee *et.al.*, 2008).

To meet the goals of science education, we need the way to improve science for all that scientific literacy is termed. It defined to knowledge and understanding in

science and also process of science in which required personal decision making, participation in cultures, and scientific attitudes (NRC, 1996). The scientific literacy bridges person to scientific issues and culture by expressing positions to public information. Literate person be able to evaluate the quality of scientific information on the basis of its source and the methods used to generate it (DeBoer, 2000; Millar, 2006; Toshev, 2014). Not only students know scientific literacy, but also teacher needs to know and understand more. If teachers had high level of scientific literacy, it can be predicted that students should have scientific literacy as well. This study aims to study content of science on environmental conservation of novice science teachers in science education program between Thailand and Indonesia. The findings will be described and discussed to improvements of scientific literacy.

Method

The method used in this study is cross national survey between Indonesia and Thailand. As preliminary study, novice science teachers are sampled from two universities. Participants in this study consisted of 71 Indonesian and 95 Thai novice science teacher students from year-1 and year-2 of science education program from Mahasarakham University, Thailand and Universitas Sultan Ageng Tirtayasa, Indonesia. They are asked scientific literacy through scientific literacy questionnaires, which is adopted from El Islami *et.al.* (2016). The content of science instrument can be considered in five concepts on environmental conservation; nature of light, the benefits of light, the impact of artificial chemicals, nature of air, and air circulation. These concepts are emerged from local wisdom, way of life Baduy's society.

The story of Baduy's society is an example of content in science, participants will be introduced to Baduy's society in terms of way of life, way of conservation, and way of local knowledge bridge to modern science. Then, questionnaires are sent directly to novice science teachers by researchers, they answered questionnaires independently and returned to researchers. Data are checked the completeness and filled to the statistical testing program. Descriptive statistics and Man-Whitney U test were used for data analysis.

Results and Discussion

Learning outcomes measured in five concepts on environmental conservation; nature of light, the benefits of light, the impact of artificial chemicals, nature of air, and air circulation. The results of this study is a student's content of science that is known based on the results of multiple choice tests as many as 6 questions were adopted from El Islami *et.al.* (2016). Based on our study product scale test conducted at one of the state university in Indonesia and one of the university in Thailand. The

content of science of Indonesian and Thai novice science teacher students can be found Table 1.

Table 1.

Content of Science of Indonesian and Thai novice Science Teacher Students

Topic	Indonesian (Mean) (n=71)	Thailand (Mean) (n=95)
Nature of light	65	22
Benefits of light	68	47
Impact of artificial chemicals	11	35
Nature of air	42	29
Air circulation	32	52
Total Mean score	38	37

As it shown in Table 1, We can see the variation of mean between Indonesian and Thai novice science teacher students. Nature of light and benefits of light categorized in physics, Indonesian students can make score higher than those Thai students. But, impact of artificial chemicals and air circulation, Thai students had higher score than Indonesian students. However, topic on nature of air Indonesian students well performed than Thai students. This finding can be discussed to content of science which Indonesian and Thai students might want to condense in the program of study. Light, representatives of physics indicated that Indonesian students can learn abstract as well than those concrete concepts. Students right now can access internet for studying cross culture. They can understand the different culture, but content of science is not differing from exactly concepts.

Content of science seems to be different in some topics, that is, Indonesian students understand in the concepts of physics higher than those Thai students. It may be a result of curriculum that they have just complete high school and continued to university level. Thailand might want to develop their curriculum and instruction and also in new training for instructors to facilitate the shift of instructional practices. The instructional practices should be emphasized on the aspect of inquiry-based learning which engage students to nature of science, process of science, attitude towards science, and leading students to scientific literacy (Gormally *et.al.*, 2009). It is not surprisingly considered as well as content of science based on environmental conservation, but concept in physics of Thai students lower than Indonesia, instructional practices need integrated approach helping students to connect many discipline to scientific knowledge.

However, Thai students can gain their score in the topic impact of artificial chemicals and air circulation. The finding suggest to Indonesian for stimulating curriculum and instruction for engaging students learn science from local wisdom. Baduy's society is ubiquitous culture in south of Indonesia, many research and

exploration to their way of life were reported. Mostly, investigation of environmental conservational and natural resources are investigated. Education and bridging the gap between modern science and local wisdom is less understanding. The mean score seems to be no differences in both students from two countries. However, education needs to be improved and advanced in many directions. Science educators and social supports must be understood situations and move it forwarding by multiple reinforcement. To make sure that total score and each topics are different in statistical testing. Man-Whitney U test is employed for analyzing data which can be shown in Table 2.

Table 2.

Statistical Testing In Content of Science of Indonesian and Thainovice Science Teacher Students

Aspect	Indonesian (Mean)	Thailand (Mean)	Mann-Whitney Test (α)
Content of Science	38	37	0.087 > 0.05 (not significant)

Based on the Table 2, we can see that the content of science Indonesian novice science teacher students had slightly better than the content of science of Thai novice science teacher students. The statistical testing indicated that there is no differently significance (Sig. 0,087 > 0.05) between two cohorts of participants. It is a preliminary study to start up in science education development. Also, teacher preparation program is facing with new era of change and adaptation to new learning environments. Content may be importance, but necessary skills in science learning should be implemented in the program. The study let us know situation in which teacher preparation need to develop novice science teachers in scientific literacy and content in science as much as competitive result such as PISA, TIMSS. Because other countries are not only Thailand and Indonesia are now seeking the alternative ways up rising quality of science education (Darling-Hammond & Bransford, 2007). The content of science Indonesian novice science teacher students had slightly better than the content of science of Thai novice science teacher students but there is no significantly differences.

Note

All authors have equally contributed to this paper.

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