Context of Science on Environmental Conservation: Comparative Study between Thai and Indonesian Novice Science Teacher Students

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Abstract

Environmental conservation is now rapidly distributed into educational sector. Two prongs of development need to describe in science education. This study aimed to study context of science in which Thai and Indonesian novice science teacher students expresses to Baduy's society. Seventy one of Indonesian and 95 of Thai novice science teacher students were surveyed in January-February 2018. Context of science of novice science teacher students were studied. Thai novice science teacher students had mean score higher than Indonesian novice science teacher students, but statistical testing revealed that there was no significantly differences at 0.05. The context of science Thai novice science teacher students had better than the context of science of Indonesian novice science teacher students but there is no significantly differences.

Keywords:Context of Science, Indonesian, Thai, Environmental Conservation, Local Wisdom of Baduy's Society

INTRODUCTION

The term of local wisdom is widely used in Southeast Asian countries for describing how people construct and used their knowledge to have alive with nature. Local wisdom is emerged by the way of life, way of thinking and doing in natural balance, and way of sustainable development. Nature and people cannot be separated by nature because people is a part of nature and live with nature. On the other hands, science cannot be discriminated from those natural phenomena. We employed science to explain how nature works and its correlational patterns, that is, science can explain and predict natural phenomena.

Science will be friendly natural interacted with world of human capital due to science is a resulting production from discovery. However, local science or local wisdom is also emerged through the way of life and knowledge implication. Science help us learn about the organisms and phenomena, we observe and explore the experiences which scientific investigations are conducted (Bonney, *et.al*. 2009). The local wisdom help us bring about the societal changes and products of science, conservation need to be more proactive, provocative, and purposeful in increasing environmental literacy for all (Lee & Roth, 2003; Bickford *et.al*., 2012). We can not separate science from our life even though some phenomena seems to be supernatural, but science can answer based on scientific process and its explanation.

Local wisdom can link modern science by various methods of perception, science will not be stranger to local people. If scientific literacy is implemented and accepted to all, it makes skeptic behavior and process of learning in natural phenomena. Local knowledge, especially natural conservation is closed to daily life for sustaining organisms and its necessary factors to survive. It can influence to local people in terms of natural balances. These let local people to have argumentation, it is elaborated from scientific data, common ideas and epistemological and strategic considerations. If local knowledge introduce to the classroom, students' social interactions influenced the patterns of argumentation elaborated within the group discussions (Albe, 2008).

Scientific literacy will be increased through the process of learning. Education management should engage scientific literacy to all students. However, teachers should have it before transfer or change students to meet the goals of science education. Novice science teacher students are primarily indicated to key person of scientific

literacy and they are also engage science education in the future classroom. If they had no or less, science literacy as well as context of science will not be success. This study aims to study context of science in which Thai and Indonesian novice science teacher students expresses to Baduy's society. Many local wisdom of Baduy's Society on environmental conservation. El Islami, et al (2018) explain three aspects of local wisdom of Baduy's Society such as sanitation system; rubbish management; and using the nature resourches in daily activities. Many previous study about Baduy's society such as Saefullah, et al (2017) using the local wisdom of Baduy's society in the clasroom for environmental theme learning, the results shows that the guided inquiry learning model can improve the scientific literacy of students. But the research about the comparative study of context of science on environmental conservation them not done yet. So the researchers do the research about context of science of novice science teacher student between Indonesian and Thailand. The comparative study helps us to know and understand novice science teachers. Because they are key person incubate or implement scientific literacy to their students as well.

METHOD

The method used in this study is a cross survey between in Indonesia and Thailand in January-February 2018. Data were collected through novice science teachers, were sampled from two state universities between Thailand and Indonesia. Participants in this study consisted of 95 Thai and 71 Indonesian novice science teacher students from year-1 and year-2 of science education program from one of the state university in Thailand and one of the state university in Indonesia. They are asked 9 questionnaires, which is adopted from El Islami, *et.al.* (2016). The context of science instrument can be considered in three contexts on Baduy;s house position; Baduy habits in daily activities, and Baduy's house form. These contexts are emerged from local wisdom, way of life Baduy's society.

The local wisdom of Baduy's society is an example of context of science. The questionnaires are answered by novice science teacher students. The different culture may be verified by fact of science. Even though Thai novice science teacher students did not familiar with Baduy's culture, but the research focuses on scientific literacy based on cultural phenomena. Data are checked the completeness and filled to the statistical testing program. This study use

descriptive statistics and Man-Whitney U test for data analysis.

RESULTS AND DISCUSSION

Learning outcomes measured in three contexts on environmental conservation based on three local wisdom of Baduy's society; Baduy's house position; Baduy habits in daily activities, and Baduy's house form. At the first context of science explain that the Baduy's house is not allowed to face west or eastward. This is to avoid exposure to direct sunlight. At the second context of science explain that the Baduy habits do not allow the use of artificial chemicals in daily activities. For example, the use of soap for bathing, soap for washing, and so forth. Instead, the Baduy tribe uses natural chemicals available in nature. For example, leaves "honje" for the purpose of brushing teeth this habit helps the Baduy tribe in maintaining the environment to avoid river water pollution. The third context of science explain that the house of Baduy tribe is in the form of a stage house whose floor uses woven bamboo slats. The selection of houses on stilts is the right thing. In addition to the air circulation path from the bottom, also to avoid the coldness of the soil directly. So it will be more secure in terms of health for the people who are above it.

The results of this study is a student's context of science that is known based on the results of multiple choice tests as many as 9 questions were adopted from El Islami *et.al.* (2016). Based on our study product scale test conducted at one of the state university in Thailand and one ofthe state university in Indonesia. The context of science of Thai and Indonesian novice science teacher studentscan be found Table 1.

Table 1. Context of Science of Indonesian and Thai Novice Science Teacher Students

Context	Thai (Mean) (n=95)	Indonesian (Mean) (n=71)
Baduy's house position	48	55
Baduy habits in daily activities	50	39
Baduy's house form	57	48
Total Mean score	*52*	*47*

We can see the variation of mean in context of science between Indonesian and Thai novice science teacher students from Table 1Indonesian students can make score higher than those Thai students in the context Baduy's house position. But, Thai students had higher score than Indonesian students in the context Baduy habits in daily activities and Baduy's house form. This finding can be discussed to context of science which Indonesian and Thai students. The

context of Baduy;s house position ask students to know how they can implement the physics, chemistry, environmental concept in daily such as light and vitamin D and Table 1 shows that Indonesian students can learn as well in the physics and chemistry concept than those Thai students in the context Baduy's house position.

The context of Baduy habits in daily activities ask students to know how they can implement the chemistry and biology concept in daily such as soap and water river and Table 1 shows that Thai students can implement as well in the chemistry and biology concept than those Indonesian students in the context of Baduy habits in daily activities. The context of Baduy;s house position ask students to know how they can implement the physics concept in daily such as air circulation and Table 1 shows that Thai students can implement as well in the physics concept in daily than those Indonesian students in the context of Baduy's house form. According to discussion we can conclude that Thai and Indonesian novice science teacher students has some ability in implement the physics and chemistry concept in daily life, but in implement the biology concept in daily life Thai novice science teacher students had better than Indonesian novice science teacher students.

The natural science divide to the life science and the physical science, the life science is biology and the physical science is chemistry, physics, earth science, and astronomy. From the discussion we can see that in implement the biology concept in daily life Thai novice science teacher students had better than Indonesian novice science teacher students, so Thai novice science teacher students had better than Indonesian novice science teacher students in implement the life science, but both of them can implement the physical science in daily life. The finding suggest to Indonesia for stimulating curriculum and instruction for engaging students learn life science based on local wisdom such as Baduy's society. To make sure that total score and each context of science are different in statistical testing. The kolmogorv-Smirnov test showed on Table 2 that the data of context of science of Thai and Indonesian novice science teacher students are not normal and the Lavene test showed on Table 3 that the data was homogeny. So, to know the difference of Indonesian and Thai Novice Science Teacher Students use Man-Whitney U testMan-Whitney U test is employed for analyzing data in Table 4.

Table 2. Kolmogorv Smirnove in context of science of Indonesian and Thai novice science teacher students

Data	Kolmogorv Smirnove Test (α)
Indonesian	0.000 > 0.05 (Not Normal)
Thailand	0.000 > 0.05 (Not Normal)

Table 3. Statistical testing in context of science of Indonesian and Thai novice science teacher students

Aspect	Lavene Test (α)
Homogenity	0.7 > 0.05 (Homogeny)

Table 4. Statistical testing in context of science of Indonesian and Thai novice science teacher students

Aspect	Indonesian (Mean)	Thailand (Mean)	Mann-Whitney Test (α)
Context of Science	47	52	0.068> 0.05 (not significant)

Based on the Table 4, we can see that the context of science Thai novice science teacher students had better than the context of science of Indonesian novice science teacher students. The statistical testing indicated that there is no differently significance (Sig. 0,068 > 0.05). Yuenyong and Narjaikaew (2010) explain that Thai science education emphasize the scientific knowledge, the nature of science, and the relationship between science technology and society. Some school science curricula and teaching and learning has tried to organize Thai context in science learning. Indonesia has new national curricula namely K-13 and it's based on contextual learning, but Indonesian teacher not yet effective in using K-13 in the class. Ruslan *et.al.* (2016) explain that obstacles experienced by teachers in one of the school is the many aspects that must be assessed in the assessment Curriculum 2013. Second, the assessment is done simultaneously with the learning process, thus making the learning process becomes less effective. Third, teachers feel burdened because they have to add up the value of each student as a whole and then describe the value obtained per subject.

Based on Table 2 the score of context of science give the suggestions to both of countries to develop novice science teachers in context of science. Gilbert (2006) identified four models for the development of context-based curricula in learning, where context is used as the direct application of concepts in daily life when teacher teach students in the class, as reciprocity between concepts and applications in daily life, as provided by personal mental activity or as the social circumstances narratives by

personal mental activity. When a context is used as the direct application of a concept in learning, it is an abstract concept learned first then the context is presented as an example after. In the second model context is used as a vehicle to relate a concept to its applications in daily life. Applications are influence on the meaning of a concept, not only used as examples. In the third model contexts are the narratives by personal mental activity about scientific concepts. In the fourth model which Gilbert describes the context as a social dimension. Four models in developing the context based learning can be modified by including the local wisdom such as way of life of Baduy's Society, so teacher of both of countries can develop the context of science of novice teacher science students.

CONCLUSION

The context of science Thai novice science teacher students had better than the context of science of Indonesian novice science teacher students but there is no significantly differences.

REFERENCES

Albe, V 2008, 'When scientific knowledge, daily life experience, epistemological and social considerations intersect: Students' argumentation in group discussions on a socio-scientific issue', *Research in Science Education*, vol. 38, no.1, pp.67-90.

American Association for the Advancement of Science 1994, *Benchmarks for science literacy*. Oxford University Press, UK

Bickford, D, Posa, MRC, Qie, L, Campos-Arceiz, A, & Kudavidanage, EP 2012, 'Science communication for biodiversity conservation', *Biological Conservation*, vol. 151, no. 1, pp. 74-6.

Bonney, R, Cooper, CB, Dickinson, J, Kelling, S, Phillips, T, Rosenberg, KV, & Shirk, J 2009, 'Citizen science: a developing tool for expanding science knowledge and scientific literacy', BioScience, vol. 59, no. 11, pp. 977-84

Gilbert, JK 2006, 'On the nature of "context" in chemical education', *International journal of science education*, vol. 28, no. 9, pp. 957-76.

El Islami, RAZ, Hakim, L, Berlian, L, Rakhmawan, A, Saefullah, A, Rohimah, RB. Hasan, A, & Firdaus, BF 2016, *Pengembangan Model Pembelajaran Inkuiri Terbimbing Berbasis Kearifan Lokal Masyarakat Suku Baduy dalam Meningkatkan Literasi Sains Mahasiswa*. Report of Result, Faculty of Teacher Training and Education, University of Sultan Ageng Tirtayasa, Indonesia.

El Islami, RAZ, Hakim, L, Berlian, L, Rakhmawan, A., Saefullah, A, Rohimah 2018, *Sebuah Kajian Literasi Sains Masyarakat Suku Baduy*, Untirta Press, Serang.

Lee, S & Roth, WM 2003, 'Science and the "good citizen": Community-based scientific literacy', *Science, Technology, & Human Values*, vol. 28, no.3, pp. 403-24.

Ruslan, T, Fauziah, and Alawitah, T 2016, 'Kendala Guru dalam Menerapkan Penilaian Autentik di SD Kabupaten Pidie', *Jurnal Ilmiah Mahasiswa Pendidikan Guru Sekolah Dasar FKIP Unsyiah*, vol. 1, no. 1, pp. 147-57.

Saefullah, A., Samanhudi, U, Nulhakim L, Berlian, L, Rakhmawan, A, Rohimah, B, El Islami, RAZ 2017, 'Efforts to Improve Scientific Literacy of Students through Guided Inquiry Learning Based on Local Wisdom of Baduy's Society', *Jurnal Penelitian dan Pembelajaran IPA*, vol.3, no.2, pp. 84-91

Yuenyong, C & Narjaikaew, P 2009, 'Scientific literacy and Thailand science education', *International Journal of Environmental and Science Education*, vol. 4, no. 3, pp. 335-49.