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COMPARISON OF ATTITUDES AND ENVIRONMENTAL BEHAVIORS OF CHEMISTRY EDUCATION STUDENTS WITH NON CHEMISTRY EDUCATION STUDENTS OF TEACHER TRAINING AND EDUCATION FACULTY OF SYIAH KUALA UNIVERSITY

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ABSTRACT: This study was aimed to find out the differences in attitudes and behaviour about the environment between chemistry education students with non-chemistry at the Syiah Kuala University Teacher Training and Education Faculty (FKIP). The type of research used was descriptive quantitative with analytical survey method. The research respondents were fourth semester students of chemistry, physics, and geography and history education study programs. The selection of the sample was used nonprobability sampling technique with the type of purposive sampling. The number of samples was 100 people. Data was collected using a questionnaire. The results showed that the attitudes and behaviour of the chemistry education student environment were lower than non-chemistry education students. This can be caused by a lack of implementation of environmental education in chemical learning materials. The chemistry education tends to strengthen the cognitive domain compared to affective (attitude) and psychomotor (behaviour).

Keywords: environmental education, chemistry students, surveys, environmental attitudes and behaviour

I. INTRODUCTION

Environmental issues are a fairly popular issue. Environmental damage that occurs in various places in the country shows that the ability of the Indonesian people to carry out environmental management or shared resources is still weak (Pranadji, 2005). This also shows that from the national to the communal level there has been a breakdown of cultural values.

WALHI (The Indonesian Forum for Environment) at the National Environment Conference in 2017 said that Indonesia is in an ecological emergency, which can be simply defined as a situation or a precarious situation due to environmental damage arising from monopoly activities of natural resource control that are carried out in an environmentally unfriendly manner and have an impact on the loss of people's access towards livelihoods.

To overcome this problem, education is one of the things that can be used as a solution. UNESCO, a UN organization that is engaged in education, science and culture takes a serious role in emphasizing the importance of developing environment-based subject matter (Sulastrı et al., 2016). It is expected that education behaviour can change behaviour. Attitudes and behaviours of caring of environment include universal moral values that all citizens of the world must have.

Eilam and Trop (2012) state that attitudes are often described as having affective and cognitive components. In addition, attitudes towards the environment are also defined as verbal or real commitments and motivations regarding environmental issues. Then behaviour is the actions and words of someone whose characteristic can be observed, described and recorded by other people or people who do it.

Besides that, it is known that environmental problems are closely related to the chemistry field. Most pollutants come from chemicals. In schools and colleges, from students to university students have been taught basic concepts of chemistry which include studying chemicals whose applications in life have the potential to become pollutants. Chemistry material taught such as hydrocarbons, refining petroleum, combustion of fuels, plastics, polymers and so on are closely related to environmental problems, from which part of the process creates various pollutants.

The problem is whether our current education, especially in higher education has been able to form students who have the right attitudes and behaviours in dealing with environmental problems, especially those who take chemistry education. According to Sulastrı (2015) based on facts in the field there are still many

attitudes and behaviours of Chemistry Department students of FMIPA UNM who have passed environmental chemistry still littering, walking on garden grass and other actions that are less sensitive to the environment.

It is truly surprising that those who have studied chemistry who are familiar with environmental issues still do such things. For this reason, an investigation was conducted in this study to see differences in attitudes and behaviour between chemistry education students with non-chemistry at Teacher Training and Education Faculty of Syiah Kuala University.

II. METHOD

This research was descriptive quantitative with a survey approach. According to Morissan (2012) the survey was an excellent method for measuring attitudes and orientation of a community through various polling activities. On the other hand it can be used as a conceptual framework for learning many variables such as understanding, awareness, willingness and participation of a group towards certain things. The survey research conducted in this study was classified as an analytical survey. In this study the researchers tried to find out how the differences in attitudes and environmental behaviour between chemistry education students and non-chemistry students.

The selection of research samples used nonprobability sampling techniques (nonprobability samples) with the type of purposive sampling (selected samples). Nonprobability sampling technique is a sampling technique based on special considerations with useful and representative assumptions (Morissan, 2012). The selection of physics study programs is due to the scientific closeness with chemistry. While the selection of 2 other study programs was conducted randomly on all non-exact study programs of Teacher Training and Education Faculty.

According to Effendi and Tukiran (2012), in the survey information was collected from samples to represent the entire population. This is different from the census whose information is collected from the entire population. The sample is aimed at fourth semester students because they are just learning basic chemistry and environmental chemistry courses. In addition, students at this stage are entering the phase of maturity.

Recorded 2016 class of chemistry education students amounted to 72 people, 64 people in physics education, 53 people in historical education and 55 people in geography education. The total population was 244 people. The selection of the number of samples using quota sampling technique, where samples were taken by setting a certain amount as a target that must be met. Then the number of samples set was 100 respondents, each study program was represented by 25 students of the 2016 class.

This research was conducted in the Teacher Training and Education Faculty of SyiahKuala University environment. The questionnaire used in the study was closed. The contents of the questionnaire were divided into two groups of items, namely attitude and behaviour items. Before the questionnaire was circulated, a validity and reliability test were first conducted. Test the validity in this study using the Pearson Correlation method. From the results of the attitude item analysis, 22 items were declared valid with a significance value <0.05. For the behavioural category of 46 items, 3 items were invalid and must be discarded, leaving only 43 items left.

In the reliability test, the Cronbach Alpha method was used. The results of the analysis showed that the attitude questionnaire items were declared valid and reliable, Cronbach Alpha's value reached 0.959. Likewise the behaviour questionnaire of all items was valid and reliable with Cronbach Alpha values of 0.938.

Table 1. Grid of Environmental Awareness Measurement Questionnaires

1	Attitude	1. Environment	2	22
		2. Global warming	5	
		3. Alternative energy sources	1	
		4. Management of waste and waste	5	
		5. Environmental care slogan / lifestyle	5	
		6. Environmental pollution by organic chemicals	4	
2	Behaviour	1. Environment	10	43
		2. Global warming	4	
		3. Alternative energy sources	3	
		4. Management of waste and waste	5	
		5. Environmental care slogan / lifestyle	18	
		6. Environmental pollution by organic chemicals	6	
Total Item				87

Questionnaire circulated using a Likert scale. The attitude response scale starts from 1 (not yet realized) to 5 (aware and ready to do), while for behaviours scale 1 - 4 is used (Never happen, always). The

results of the analysis based on the scale are expected to explain how the differences in attitudes and behaviour of the student environment.

Table 2. Description of 5 Point Likert Scale

Scale Type	Attitude	Behaviour
1	Not yet aware	Never
2	Already aware but do not have the desire to do it	Seldom
3	Realize but aren't sure can do it	Often
4	Already aware and plan to do it	Always
5	Already aware and ready to do it	

(Source: Sulastri, 2016)

Data collected from questionnaires are then processed through descriptive statistical methods, the calculations are as follows:

1. Look for an ideal score or maximum score for environmental awareness.
2. Add the scores obtained by each subject. The number of subject scores is the sum of the subject scores for each item.
3. Look for the percentage of environmental awareness scale results with the formula:

$$\text{Score} = \frac{\text{Total Score of each Subject}}{\text{Ideal Score}} \times 100\%$$

III. RESULT AND DISCUSSION

Attitudes Towards the Environment

Based on the recapitulation of attitude score data on the environment, the four study programs have scores that are quite varied. Criteria for attitude scores towards the environment of the four study programs included high. The highest attitude score was obtained from history education study programs, namely 76.29%, followed by physics education study programs (75.41%), geography (73.38%) and chemistry last (68.87%). The difference can be seen in Figure 1.

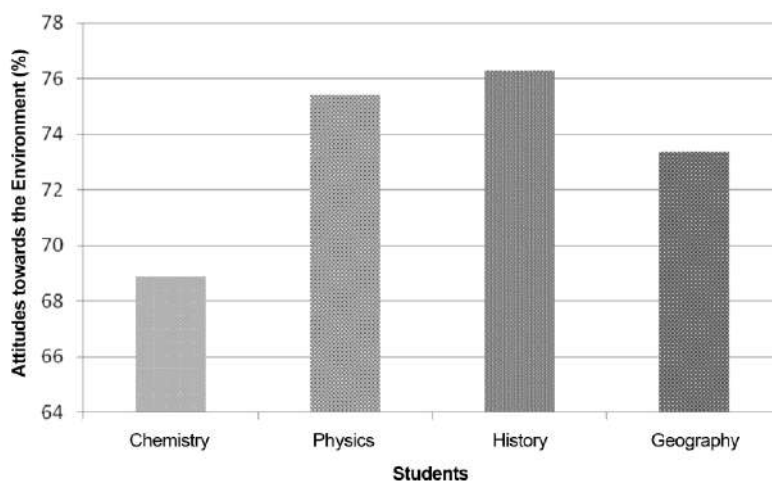


Figure 1. Differences in Attitude Category Score Levels

Regarding the tendency of respondents' answers to attitudes related to the environment, 32% or the majority of respondents answered that they were aware and had planned to do so. Then regarding the problem of global warming the majority of respondents (46%) gave answers to realize but were not sure they could do it. Furthermore, regarding alternative energy sources, the majority of respondents (32%) answered that they were aware but were not sure they were able to do so. Then related to waste management the majority of respondents (38%) answered to be aware and had planned to do it.

For environmental care slogans / lifestyles the majority of respondents (36%) gave answers to realize and be ready to do so. Finally, regarding environmental pollution by chemicals, the majority of respondents (35%) answered to be aware and ready to do so.

Behaviour Towards the Environment

Based on behavioural score data on the environment, the four study programs have different scores. The highest behavioural score was obtained in geography education study programs, namely 66.81%, then physics education study programs (64.62%), history (63.16%) and finally chemistry (62.88%). The difference in scores can be seen in Figure 2.

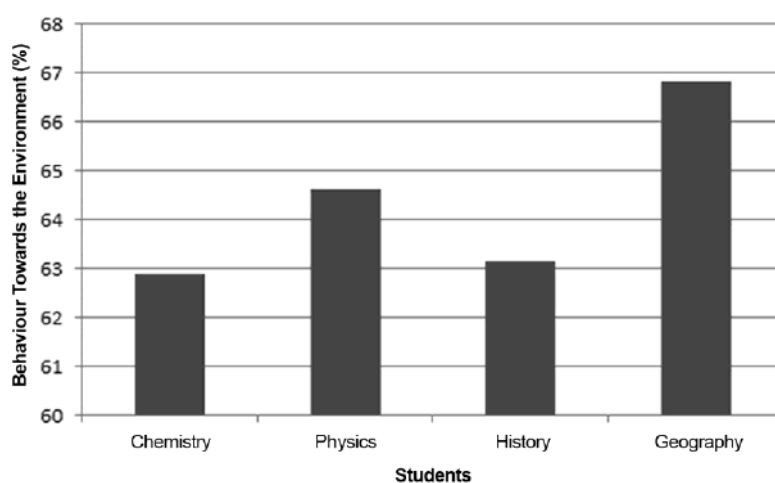


Figure 2. Differences in Behaviour Category Score Levels

Regarding the tendency of respondents to respond to behaviour related to the environment, 35% or the majority of respondents chose answers frequently. Then regarding the problem of global warming the majority of respondents (34%) gave rare answers. Furthermore, regarding alternative energy sources the majority of respondents (48%) gave answers always. Then related to waste management the majority of respondents (43%) answered rarely. For environmental care slogans / lifestyle the majority of respondents (40%) gave answers never. Finally, regarding environmental pollution by chemicals, the majority of respondents (35%) answered always.

Based on the calculation of the percentage of environmental attitudes and behaviour scores, chemistry students scored lower than other study programs. Of course this was a question and interesting to study. Actually to form the right environmental attitudes and behaviours there is a need for counselling and education. Based on the Republic of Indonesia's Ministry of Environment Report in 2013 it was found that only 2.5% of respondents received information about the environment through education in schools. Schools have not taken a serious role to foster student attitudes and behaviour (Sulastri et al., 2016).

Mangunjaya et al. (2013) said that educational institutions have not yet become the centre of character development for environmental care. This fact is directly proportional to the findings of the study, where chemistry education students who should know more about environmental issues, but the percentage of attitude and behaviour scores was the lowest among other study programs. Individuals who gain knowledge and environmental awareness, but in their attitude not yet responsible for the environment, they fails to interpret the meaning of real environmental awareness.

According to Hasan et al. (2009) awareness and understanding of the right environment will form the right attitude towards environmental issues. Nevertheless Ahmad, et al. (2013) stated that environmental knowledge does not always lead to sustainable practices, meaning that even though he has knowledge, sometimes his attitudes and behaviour do not reflect his knowledge, there are other factors that also influence. According to Boiyo, et al. (2015) problems and social responsibility also play a key role in determining the attitudes of the community environment.

Environmental education actually does not need special subjects; it only requires an active role of educators in conveying values relating to environmental care. Boiyo et al. (2015) stated that all educators must consider using methods that can develop cognitive, affective and psychomotor aspects of students related to the environment.

Sulastri (2016) mentions that the lectures in the chemistry education study program have not synergized with the achievement of teacher competency in the 21st century, namely the Millennium Development Goals (MDGs) and national education goals, one of which is preparing future teachers who are environmental care agents. Perkasa et al. (2017) said that actually learning chemistry in direct contact with the environment has a great opportunity to grow and equip students with environmental awareness. Moreover, chemical material is related to studying materials that have the potential to become environmental pollutants.

It is very important for prospective chemistry students to have more awareness in maintaining and caring for the environment. In fact in chemistry education still tends to focus on cognitive reinforcement versus affective (attitudes) and psychomotor (behaviour). The result is that prospective chemistry teachers are very skilled in knowledge but in attitudes and behaviours do not look different from others.

According to Sulastrri (2016) in his research he found that in the Basic Chemistry 2 and Environmental Chemistry courses the purpose of the lecture was still on developing aspects of knowledge and there was no explanation regarding the formation and development of student attitudes and behaviour. Of course this is in line with research findings where the attitudes and behaviour of chemistry students are lower than other study program students.

According to Wibowo (2009) having knowledge and ability is not enough, it needs to be accompanied by a desire to realize the intended action. A person's desire is strongly influenced by personality factors namely attitudes, locus of control and a sense of responsibility. Sulastrri (2016) states that prospective chemistry teachers need to be awakened to their environmental awareness by teaching utility values of the chemical concepts being studied (moral knowing), forming a moral feeling and practicing morals.

Behaviour based on knowledge, awareness and positive attitudes can last long. Conversely, if behaviour is not based on knowledge and awareness, behaviour will not last long (Rahayu et al., 2014). The lack of emphasis on the importance of environmental awareness makes students not really see the need to practice eco-friendly lifestyles that have implications for environmentally conscious attitudes and behaviours.

Adeolu, et al. (2014) mention students with knowledge and skills obtained from environmental education in fact more motivated to play an active role in environmental protection activities. Hasan et al. (2009) also stated that students who had studied environmental education were more inclined to consider and analyse the implications of their behaviour on the environment. For this reason educators of prospective education staff need to integrate character values in this context related to the environment into chemistry learning, so that chemistry students have better environmental attitudes and behaviours.

IV. CONCLUSION

Environmental awareness of chemistry education students is lower than non-chemistry students, except in the knowledge variable. This can be due to the lack of implementation of environmental education in learning materials. In chemistry education tends to strengthen the cognitive domain compared to affective (attitude) and psychomotor (behaviour). The result is that prospective chemistry teachers are very skilled in knowledge but weak in attitude and behaviour.

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