The trend of high school students participation behavior toward conservation of aquatic ecosystem

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Abstract. This study aims to determine 1) the trend of high school students participation behavior toward conservation of aquatic ecosystem 2) the difference in trend of high school male and female student participation behavior toward conservation of aquatic ecosystem. This research was descriptive qualitative, conducted on 33 students who come from two different schools. The number of male student samples were 16 male students and 17 female students. Data were collected by using questionnaires consisting of 25 questions. Results showed that trend of high school students participation behavior toward conservation of aquatic ecosystems included into the high category. The percentage of high school students participation behavior with high category is 57.6%. Percentage of students with low category of participation was 6.1%. From the results of the T test, it was known that the significance level was 0.767, it means there was no significant difference between trend of male and female students' participation behavior toward the conservation of aquatic ecosystems. From result of the average score, trend of participation behaviors student male was higher than that of female students, but the difference was not significant.

1. Introduction
Aquatic ecosystems have a major contribution to the biotic components productivity on the earth. About 30% of the world's primary productivity comes from existing plants in marine waters, rivers, lakes [1]. The aquatic ecosystem not only provides a source of food for living things, but also produces compounds such as phosphorus, iron, and nitrogen that play an important role for the biochemical cycle on earth. Aquatic ecosystems are generally categorized into open sea, coastal zones (in which there are estuarine habitat, swamps, mangroves, and coral reefs), lakes and ponds, rivers, and fresh water wetlands. The earth's aquatic ecosystem is the largest life buffer for all organisms, it is being the habitat of many kinds of plants, animals, and microorganisms. The process of photosynthesis also occurs within the aquatic ecosystem. The existence of aquatic ecosystems as an ecological component becomes so important. Therefore, the existence of aquatic ecosystems is very fragile and susceptible to pollution [2].

From time to time, the threat to the aquatic ecosystem is getting higher. The greatest threat to aquatic ecosystems is pollution. Sources of pollution that threaten the sustainability of aquatic
ecosystems include waste, liquid waste, solid waste, and the presence of toxic chemical wastes that have contaminated the biotic and abiotic components of aquatic ecosystems. If the aquatic ecosystem is left polluted, it can interfere with the survival of living things on the Earth, reduced levels of biodiversity, and decrease sources of oxygen for living things. We need efforts that involved all stakeholders in regulating, controlling, supervising and conserving aquatic ecosystems. One of the efforts to increase the awareness of the world community towards the conservation of aquatic ecosystems is through the education sector, especially environmental education.

Knowledge about conservation of natural resources is one of the learning material that can be taught at formal school level, namely at high school level. Knowledge of conservation includes the insights of learners to know the existence of endangered natural resources, as well as conservation efforts that can be done [3]. Education is the most significant aim of ecological conservation. In particular, the way of sustainable living is the means to conserve the ecosystem [4, 5].

The results from some studies showed that environmental education is the most appropriate way to lead the change of behavior, especially ecological and environmental conservation behavior [6, 7]. Conservation education that taught in formal and informal education can increase students' awareness to participate in environmental conservation efforts. Currently, the one of effort to increase student participation behavior toward environment is to play an active role in conserving the aquatic ecosystem [8]. Participation of the students in conservation of aquatic ecosystem can be seen from the trend of high school student behavior to take an active role in maintaining and preserving ecosystem. Students in high school are able to construct ideas and ideas to participate in conservation.

Emphasis on behavior becomes the most important starting point for environmental conservation because people interacts with its environment through behavior. Behavioral trends here refer to individual decision making, practice, and action. The behavior of individuals and social societies will shape the relationship between ecological systems and social systems. Behavior can be realized through adaptation and response of people to their ecological social environment [9]. Preliminary study showed that conservation activities involving high school students are still about forest ecosystems, coral reef ecosystems, conservation of flora and fauna, and so on. It is still rare to find conservation activities about aquatic ecosystems. Therefore, this study want to determine how the trend of high school students participation behavior toward conservation of aquatic ecosystems. By one's behavior, we can begin to identify the different social factors that influence one's actions. This can continually help us to focus on action and prioritize activities that contribute to addressing environmental issues.

2. Methods
Descriptive qualitative research was conducted on 33 students who come from two different schools. Samples consisted of 16 students from MAN 2 Bengkulu city and 17 students from senior high school 8 Bengkulu city. Sample consist of 16 male and 17 female student. Data were collected by using questionnaires with 25 questions. Questionnaire consists of 5 alternative choices of answers with a score of 1-5. Trend of student participation behavior were calculated from ideal mean value and ideal deviation standard values. The trends were categorized into high, quite high, less, and low. Having obtained the trend of high school student participation behavior in general, then T test was conducted to study the difference trend of high school male and female student participation toward conservation of water ecosystem. The T test is performed using IBM SPSS statistic 22 program.

3. Results and Discussion
3.1. Results
Based on the data about trend of student participation behavior toward the aquatic ecosystem, it obtained the lowest score and high score. The lowest score of participation behavior trend is 71 and the highest score is 114. The average score is 98.27 and standard deviation value is 11.79. The median score is 104, and the mode score is 105. The Frequency distribution can be seen in Table 1.
Table 1. The frequency of trend of student participation behavior

| Class interval | Absolute | Relative (%) | Cumulative |
|----------------|----------|--------------|------------|
| 71-78          | 2        | 6.1          | 6.1        |
| 79-85          | 6        | 18.2         | 24.2       |
| 86-92          | 3        | 9.1          | 33.3       |
| 100-107        | 14       | 42.4         | 75.8       |
| 108-114        | 8        | 24.2         | 100.0      |
| Total          | 33       | 100          |            |

High school participation trend toward conservation of aquatic ecosystems is categorized into 4 categories, namely high, high, low, and low. Based on the results of data analysis obtained, the number of high school students who have trend to participate in the conservation of aquatic ecosystems based on each category can be seen in the Table 2.

Table 2. Frequency of student participation behavior trend about aquatic ecosystems

| Category | Range            | Frequency | Percentage |
|----------|------------------|-----------|------------|
| High     | $x \geq 103.24$  | 19        | 57.6       |
| Quite High | $92.5 \leq x < 103.24$ | 3 | 9.1 |
| Less     | $81.76 \leq x < 92.5$ | 9 | 27.3 |
| Low      | $x < 81.76$      | 2         | 6.1        |
| Total    |                  | 33        | 100.0      |

The percentage of student participation behavior trend can be seen in Figure 1.

Figure 1. The percentage of student participation behavior trend on aquatic ecosystems

From 33 students, the frequency and percentage of male and female students involved in this study can be seen in the Table 3.
Table 3. Frequency and percentage of male student and female students

| Gender of student | Frequency | Percentage |
|-------------------|-----------|------------|
| Male              | 16        | 48.5       |
| Female            | 17        | 51.5       |
| Total             | 33        | 100        |

Trend high school male students participation behavior toward conservation of aquatic ecosystem can be seen in Table 4.

Table 4. Trend high school male students participation behavior on aquatic ecosystem

| Category   | Frequency | Percentage |
|------------|-----------|------------|
| High       | 9         | 56.25      |
| Quite High | 2         | 12.5       |
| Less       | 3         | 18.75      |
| Low        | 2         | 12.5       |
| Total      | 16        | 100        |

Trend high school female students participation behavior toward conservation of aquatic ecosystem can be seen in Table 5.

Table 5. Trend of high school female students participation behavior on aquatic ecosystem

| Category   | Frequency | Percentage |
|------------|-----------|------------|
| High       | 10        | 58.82      |
| Quite High | 1         | 5.90       |
| Less       | 6         | 35.28      |
| Low        | 0         | 0          |
| Total      | 17        | 100        |

3.2. Discussion

The result of T-test shows that the significance level value is 0.767. If the value of Sig: P > 0.05 it means there is no significant difference between male student and female student in high school on trend conservation behavior toward aquatic ecosystem. It was known that participation behaviors student male was higher than that of female students, but the difference is not significant. The average value of the male student participation trend was 98.31 and female student was 98.23.

Based on the result was found that trend high school students participation behavior toward conservation of aquatic ecosystems is included in the high category. In this case, high school students have a high degree to participate in the conservation of aquatic ecosystems. Forms of student participation on the conservation of aquatic ecosystems such as donating and volunteering for the conservation of aquatic ecosystems, willing to encourage family and friends not to damage the aquatic ecosystems. High school students have the idea to campaign for effective conservation of aquatic ecosystems, willing to give spare time to participate in conservation efforts. The existence of behavior patterns from high school students shows that the trend of behavior come from student actions and student ideas. [10] states that the trend to behave here refers to individual decision, exercise, and action. The behavior of individuals and social societies will shape the relationship between ecological systems and social systems. Behavior can be realized through adaptation and response of people to their ecological social environment.

Based on the results of the study, there are differences in the trend of high school student participation behavior toward aquatic ecosystems. There are students who have a high trends to participate, but there are also students with low trend to participate. The differences in the trend of students’ conservation behavior can be influenced by social factors such as knowledge, education,
social norms, law, gender, and so forth. Bruce [9] reported that behavior bridging between ecological systems and social systems to ecosystems, including ecosystem conservation efforts.

Identifying the trend of conservation behavior becomes the most important thing in nature. It can help to formulate what conservation actions can be done by certain groups of people. In this case, high school students are a group of educated people who has been able to show the behavior of participation towards environmental conservation. The existence of the high trend conservation behavior shows that high school students have good motivation, attitude and actions in the effort of conservation of aquatic ecosystem. [11] there is a positive attitude shown by high school students to conservation and environmental protection. Student participation behavior will be greatly influenced by students' knowledge and attitude toward the environment. Students' knowledge about environment can be obtained from student activities in schools, especially in outdoor learning. In addition, activities that bring students closer to nature are also factors that support environmental care. This is consistent with the opinions of [11] which suggest that activities involving student activities in the environment such as fishing and nature exploration are among the examples of activities that provide positive experiences and influences to care about the environment.

Aquatic ecosystems both freshwater waters and marine waters have abundant biodiversity and become the most important factor to support the survival of living things on earth. Biodiversity conservation is one form of conservation effort that needs to be encouraged. Initial assessment of the behavior of a person's participation as well as a group of people on ecosystem conservation can provide ideas to repair the damage and sustainability of the ecosystem. This is in accordance with the opinion of [12] which states that the assessment of conservation behavior can provide suggestion for practitioners, managers and policy makers to develop behavioral strategies for communities towards sustainable conservation. [13] states that there is a relationship between environmental attitudes and behaviors that can affect the behavior and conservation activities of high school students. The results showed that there was no significant difference between the tendency of high school male and female student participation toward conservation of aquatic ecosystem. This is supported by the opinion of [11] stating that female high school students and female high school students have the same level of care towards ecosystem protection.

4. Conclusions
High school student has a high level of the participation behavior trend toward conservation of aquatic ecosystem. There is no significant difference between male and female student in high school trend of conservation behavior toward aquatic ecosystem.

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