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Student Response on Solving Waste Problem in Department of Biology through Conservation of Natural Resources and Environment Course

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***Abstract*—Conservation of Natural Resources and Environment (CNRE) is mandatory course to be taken by all student in Faculty of Mathematics and Natural Sciences. Main learning outcome of this course is for students to be able to solve problem relating to application of natural resources and environment conservation in community. The purpose of this study was students could solve waste problem in Biology campus area. Problem was solved by zero waste program in Biology program, with options; (a) No greaseproof paper, no plastic bag, no paper and plastic food wrap, no straw, no styrofoam, no sanitary pads waste or (b) No greaseproof paper, no paper food wrap, no styrofoam, no plastic, and no sanitary pads waste. Method used in the study was opinion polling. Study target was students in Biology study program taking CNRE course in the even semester of academic year 2018/2019. Total number of corresponding students were 140. Results indicated that 94% students chose (a). Conclusion of this study was that students still needed plastics for their daily life, such as plastic bottle and glass for mineral water. Waste problem was solved by cooperation through dividing tasks.**

***Keywords*—conservation of natural resources and environment, student response, zero waste**

I. INTRODUCTION

Conservation of Natural Resources and Environment (CNRE) is general mandatory course to be taken by all students attending study programs in Faculty of Mathematics and Natural Sciences, Universitas Negeri Surabaya. Study programs in this faculty including Mathematics, Physics, Chemistry, Biology, and Science teacher program, in addition to teacher program of Mathematics, Physics, Chemistry, and Biology, respectively.

Learning outcomes of CNRE courses are students (1) to have knowledge on principal of conservation, natural resources, and environment, (2) to understand application of CNRE concept and the relevant technology in managing natural resources and environment, (3) to be able to apply life-long learning in their capability of obtaining more knowledge on CNRE and continue their education to higher level, (3) to be able to solve problem in community in relation of applying basic CNRE knowledge, and (4) to acquire independent and eco-friendly characters through CNRE course to develop ecopreneurship.

Course description of CNRE is to discuss: (1) scope of conservation including definition, purpose, benefit and efforts of natural resources and environment conservation, (2) environmental ethics, including its definition, paradigm, and main principles, (3) natural resources, including its definition, types, and benefits, 4) local culture, including its definition, approach, challenge, and its presence in the community future, 5) management and problem of natural resources and environment, consisted of its issues, 6) concern on conservation, including fundamental consciousness on natural resources and environment conservation, eco-campus, and conservation campus. Course is conducted student-centered through discussion, observation, project tasks, and presentation to develop ecopreneurship characters.

In the 5th and 6th course description, students are required to solve environmental problem and be conscious of natural resources and environment conservation. Based on those description, this study was designed to evaluate: (1) zero waste choice emphasized by Biology students programming CNRE, and (2) methods to perform the aforementioned zero waste.

II. PURPOSE OF STUDY

The purpose of this study was to evaluate students' choice in solving waste problem in the campus area of Department of Biology [1]. Students were given the following choices: (a) No greaseproof paper, no plastic bag, no paper and plastic food wrap, no straw, no styrofoam, no sanitary pads waste or (b) No greaseproof paper, no paper food wrap, no styrofoam, no plastic, and no sanitary pads waste.

III. METHODS

Method used in the study was opinion polling with target of Biology study program students taking CNRE course in the even semester of academic year 2018-2019. Total number of correspondents were 140 form 5 class; distinguished class of Biology Teacher (24), A-class of Biology Teacher (32), B-class of Biology Teacher (32), D-class of Biology (33), and E-class of Biology study programs (29). Each class was assigned to building in Department of Biology. Students of distinguished class observed waste condition in 2nd floor of C9, A-class in 2nd

floor of C3, B-class in 2nd floor of C10, D-class in 1st floor of C10, and E-class in the greenhouse.

Subsequently, corresponding students were asked to choose between two following options: (a) No greaseproof paper, no plastic bag, no paper and plastic food wrap, no straw, no styrofoam, no sanitary pads waste or (b) No greaseproof paper, no paper food wrap, no styrofoam, no plastic, and no sanitary pads waste.

In addition, students were also asked for their input on how to conduct their choice by answering the following questions: (1) how to monitor zero waste program of your choice (please elaborate how academic community should be involved; CNRE students, other students, Zero Waste study group, Biology students association, department employees, lecturers, cleaning service employees, and waste collector employee).

IV. Result and Discussion

A. Zero-waste Program

Result showed that 94% corresponding students chose (a) option, which No greaseproof paper, no plastic bag, no paper and plastic food wrap, no straw, no styrofoam, no sanitary pads waste. Number of students choosing either option was presented in Table 1.

TABLE I. Percentage of Zero Waste option chosen by students.

Option	Response of Class (%)					*Mean (%)*
	Disting.	*A*	*B*	*D*	*E*	
(a)	93	95	95	93	94	94
(b)	7	5	5	7	6	6

This zero-waste choice was expected to be able to reduce or even eliminate dangerous product made of substances difficult to be naturally decomposed, such as plastic and styrofoam.

B. Implementation of Zero-Waste program

The opinion of respondent in implementing zero-waste program was through regulation, legalization, and monitoring of zero-waste program [2]. Academic community or organization should be involved in the program as following.

1) Coordinator CNRE course acts as person in charge of zero-waste program successful implementation
2) Students programming CNRE course act as main driving force by reminding other Biology member misconducting zero-waste in class
3) Coordinators of another courses support and assist CNRE coordinator in performing their task
4) Zero Waste study group act to supervise zero waste program
5) Biology student association act as main driving force by reminding other Biology member misconducting zero-waste in class
6) Department employees apply zero-waste program in daily life and remind misconducting
7) Lecturers apply zero-waste program in daily life and remind misconducting
8) Cleaning service employees understand and apply zero waste in performing their task
9) Trash collecting employees understand and apply zero waste in solving waste problem and report waste condition in each building to Zero Waste study group.

Character building was implemented by disciplining respective roles, in addition to emphasizing to all Biology department members to not bring plastic bags to campus area and substitute it with eco-friendly reusable bags. Straws use also should be limited.

Community participation in Department of Biology is important for the success of zero waste program. Community participation in the preparation of a program can assure the reflection of community priorities and needs. This is because communities themselves know best what their needs and problems are. Therefore, Subash [4] argues that program design should assure to reflect and integrate demand and priorities of the community that it serves.

There is no single definition for community participation. Many researchers interpret community participation based on their own views. Waste defines community and community participation as – "A community consists of people living together in some form of social organization and cohesion. Its member share in varying degrees of political, economic, social and cultural characteristic as well as interest. Community Participation - is the process by which individuals and families assume responsibility for their own health and welfare and for those of community and develop the capacity to contribute to theirs and the community development.

Many of the options identified during this research complement each other and if used in combination may see large steps taken towards Zero Waste [3]. This is difficult to achieve without a holistic approach to waste generation, collection, treatment and disposal. Key findings from this research are to switch the focus from recycling to reuse and waste prevention, alongside increasing education and behaviour change programs for householders. Additionally, the potential value of separately collecting food waste, with a recognized high potential yield, must be explored to ensure meeting targets set in the zero-waste program and the requirements of the Landfill Directive.

V. Conclusion

Conclusion of this study was that students still needed plastics in their daily life in campus, such as water plastic bottles and glasses. Principle of problem solving should be implemented in cooperation. Each organization of community in Department of Biology should be involved in solving waste problem.

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