

College Student Knowledge in Waste Management at Semarang State University

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Abstract---Waste management in Semarang State University (UNNES) environment has been carried out by cooperation from various parties. College student knowledge about waste management becomes very important, because college students are one of the campus residents who produce a lot of waste. The purpose of this study was to determine college student knowledge about waste management that occurred in UNNES campus environment, while the intended waste management was 3R-based waste management consisting of (reduce, reuse, and recycle). This study uses a quantitative approach with percentage descriptive analysis techniques. The population in this study were UNNES college students consisting of 8 faculties and 1 postgraduate program. The sampling technique uses proportional random sampling technique. Data collection techniques using questionnaires, observations and documentation studies in the form of previous research related to this research. The results showed that, 1) The college students' knowledge about sorting waste between organic waste and inorganic waste was at a high criterion with an average score of 20,79. With a breakdown of the causes of the difference in knowledge they get is due to the amount of information and level of education obtained. 2) College students' knowledge about waste management based on 3R, namely reuse is included in the high category, reduce is included in the high category, then recycle is included in the high category.

Keywords: college student's knowledge, waste management, UNNES

I. INTRODUCTION

In a book published by WHO entitled, "What a Waste: Global Solid Waste Management Review" states that in 2025 it is estimated that the world's waste will increase by 70% from 1.3 billion tons per year to 2.2 billion tons per year (Setyaningrum, 2015:186). The increase in waste makes waste a global problem, Alex (2013:46) states that waste is a global problem that needs attention from all parties, because it can cause various diseases and interfere with environmental aesthetics.

Indonesia is a country that is still struggling from environmental problems and climate change, one of which is the problem of waste. Data obtained from the BPS states that, in 2017, the high level of solid waste production per day occurred in Java, including Surabaya producing 9,896.78 m³ of waste per day, Jakarta totaling 7,164.53 m³ per day, and Semarang

as much as 5,163,72 m³ per day (BPS, 2018).

Waste is a consequence of human activity. The volume of waste is proportional to the level of human consumption of goods (materials) that are used daily. The type of waste also depends on the type of material consumed. In general, the types of waste are classified into two types namely organic waste commonly also called wet waste and inorganic waste called dry waste. Wet waste is rubbish that comes from living things, including leaf litter and kitchen waste including food scraps. Dry waste, among others: paper, plastic, cans, bottles, iron, and various metals. Inorganic waste cannot be degraded, whereas organic waste can be degraded and destroyed naturally (Banowati, 2012: 12).

Higher education is one of the contributors to the waste which consists of organic waste and inorganic waste. Waste that is usually produced in educational buildings such as the campus is in the form of organic waste, rubbish that can be recycled and rubbish cannot be recycled. Organic waste comes from food scraps or snacks from college students or food scraps from the canteen / food stalls and grass waste from plants in the campus environment (Fadillah, 2011: 62).

The amount of waste that is increasing due to increasingly consumptive human activities needs special handling in the form of waste management. The concept of waste management which refers to reduce, reuse, and recycle (3R) still relies on an economic orientation, but it has not been significant in reducing the volume of waste and has not been ecologically oriented in favor of total environmental conservation (Banowati, 2012: 12).

The sustainability of waste management depends on people's awareness to move. Without the agreement of community leaders, waste management policies are not possible. Waste management policy will succeed if there is good leadership, and is fully supported by community leaders, vision, mission and clear organizational goals (Mulasari, 2014: 408).

Semarang State University is one of the state universities in the city of Semarang that also has the potential to produce waste. In accordance with its development UNNES declared itself as a conservation university as a way to contribute to environmental management and also in order to enter the ranks of world-class universities (Setyowati, 2014: 40).

Semarang State University declared the Conservation University on March 12, 2010, and formed a team in an effort to realize UNNES as a Conservation University. In 2011, based on the Regulation of the Minister of National Education of the Republic of Indonesia Number 8 of 2011 concerning the Statute of Semarang State University, the vision of UNNES as a Conservation University became even more assertive. Since then UNNES has a vision of "becoming an international, healthy, superior and prosperous conservation university in 2020". Conservation University Development Agency as an agency that plays an important role in realizing the vision of UNNES (Bangvasi UNNES, 2014: 25).

Knowledge is the result of knowing and this happens after the person senses an object. Most of human knowledge is obtained through the eyes and ears (Soekidjo, 2003: 121). The knowledge of the population towards waste management is part of the realization of a clean, healthy and beautiful environment. Knowledge of waste management such as knowing what rubbish is, how to understand the types of waste, knowing the characteristics of waste, applying waste management properly (Silaban, et al, 2018: 179-180).

Understanding of the knowledge that college students have about the types of waste, sorting waste, up to waste management, is in fact still very minimal. College student knowledge about the type of waste and waste sorting is still experiencing errors, so far there are still many college students who cannot distinguish between organic waste and inorganic waste (Observation results, 2019).

The level of higher education that is owned by college students, but has poor knowledge of waste processing, this can be caused by individual internal factors namely the lack of concern for environmental cleanliness so that there is no desire to know how to behave properly. This description is in line with research which states that not all who have a good level of knowledge will have good waste management behavior (N.A & Mulasari, 2017: 25).

College students need to have good knowledge in waste management so that the quality and beauty of the campus environment can be maintained. The knowledge they have can be their provision when they are in the community. Based on these problems, researchers are interested in examining **“College student Knowledge in Waste Management at Semarang State University”**.

The main objective in this study was to determine the knowledge of UNNES college students in waste management. Specific objectives to be achieved are to find out college student knowledge about the types of waste, waste segregation, and waste management.

II. METHODS

This research is a descriptive research (description research) which means describing a thing or an event

that occurred in the field, in this study the event under study is about the description of student knowledge in waste management. The population in this study were UNNES students consisting of 8 faculties and 1 postgraduate program.

Data collection techniques in this study used proportional random sampling technique, because the total number of each faculty was not the same, the research subjects in this study were 63 students consisting of 8 faculties and 1 postgraduate program.

The method of collecting data in this study is to use a questionnaire, observation, and study documentation in the form of previous research that is relevant to this research. The data collection method using a questionnaire was conducted to find out the average description of students' knowledge about waste management, the observation method was used to see and know the extent of understanding students' knowledge about waste management, and the documentation study method was used as reference material in this study.

The data analysis technique used is descriptive analysis technique. Descriptive analysis is used to find out and analyze data about the knowledge of students who have filled in the questionnaire about waste management which includes waste segregation, reuse of waste, reducing waste, and recycling.

III. RESULTS

3.1. Overview of Research Locations

The location of this research is on the Semarang State University Campus, which is located at Sekaran Campus, Sekaran Village, Gunngpati District, Semarang City.

Semarang State University has 8 faculties including the Faculty of Social Sciences (FIS), the Language and Arts Faculty (FBS), the Faculty of Education (FIP), the Faculty of Sport Science (FIK), the Faculty of Mathematics and Natural Sciences (FMIPA), the Faculty of Engineering (FT), Faculty of Economics (FE), Faculty of Law (FH), and Postgraduate Programs (PPs).

The number of active students registered at UNNES is 27,524 while the number of permanent lecturers is 1,139 (Forlap Ristekdikti, 2019).

3.2. Student Knowledge about Waste Sorting

College students' knowledge on waste management is part of the realization of a clean, healthy and beautiful environment. Knowledge of waste management begins with knowing the types of waste, how to separate waste and how to manage waste, such as the results of Silaban's research (2018: 179-180) that knowledge of waste management such as knowledge of what is garbage, how to understand the types of waste, knowing the characteristics of waste , and apply proper waste handling.

The knowledge possessed by students about the types of waste and sorting waste is at a high criterion, the results of the study are also supported by similar research which states that knowledge about waste segregation in the community in sorting organic and

inorganic waste generated by the community before waste is disposed of and the percentage of cleaning house behavior is 63.25% (high) (Silaban, 2018: 180).

The results of research understanding college students' knowledge about waste segregation as a whole can be seen in Table 1.

Table 1. College Student Knowledge about Waste Sorting

Criteria	Score	Frequency	Percentage (%)
Very High	21-25	23	36,51
High	16-20	28	44,44
Medium	11-15	11	17,46
Low	6-10	1	1,59
Very Low	1-5	0	0
Amount		63	100
Average Score = 20,79 (High)			
Lowest Score = 10			
Highest Score = 25			

Source: Processed Research Data, 2020.

The average score about the knowledge of college students regarding waste sorting was 20.79 meaning that the knowledge was at a high criterion. The difference in knowledge is caused by the information obtained by each college student is different. Because the higher the level of mother's education and the amount of information media she has, the higher the knowledge of housewives in waste management.

With the increasing amount of information and the more sources of information obtained in general can increase the knowledge of housewives in general and in the management of household waste in particular (Irawati, 2012: 7).

3.3. College Student Knowledge about 3R Based Waste Management

The method of waste management can be done through several stages. Waste management efforts that can be done are by reuse, reduce, and recycle (3R) is an activity to treat waste by reusing, reducing, and recycling (Law No. 18 of 2018 on Waste Management).

The principle is the management or recycling of something that has been used by using 3R, namely Reduce, Reuse, and Recycle. Reduce is an act of reducing waste, Reuse is reusing something that can still be or is feasible to use, and Recycle is the act of recycling back something that has no value until it has a return value.

3.4. College Student Knowledge about Reuse

The use or reuse of waste is an effort to prevent the accumulation of waste by reusing a type of product repeatedly (Yunitasari, 2016: 53). Communities can reuse goods that are not used with the same or different functions is a way to extend the life of the product and prevent the accumulation of garbage (Herlambang, 2010: 147).

The knowledge of the reuse of waste with the same function has been widely shared by some students, this can be seen from their behavior in using bottled mineral water that is reused to be refilled directly with tap water in the campus environment (Observation results, 2019).

Understanding of college student knowledge regarding the reuse of waste is in the category, the difference in knowledge is caused by differences in the provision of information through information media and the socialization process carried out by the University (Observation Results, 2020).

The overall results of the study can be seen through table 2.

Table 2. College Student Knowledge about Re-Use

Criteria	Score	Frequency	Percentage (%)
Very High	13-15	17	26,99
High	10-12	32	50,80
Medium	7-9	9	14,28
Low	4-6	1	1,59
Very Low	1-3	1	1,59
Amount		63	100
Average Score = 11,57 (High)			
Lowest Score = 3			
Highest Score = 15			
Total Score = 729			

Source: Processed Research Data, 2020.

UNNES college students' knowledge in reusing waste is at very high criteria, these results indicate that students are very knowledgeable about reuse-based waste management, such as reusing plastic bottles repeatedly with the same function or using plastic bags repeatedly. (Research Data, 2020).

As stated by Alex (2013: 47-48) that in applying the principle of reuse of waste by using or reusing items that can be reprocessed, the use of environmentally friendly materials does not use plastic bags.

The average understanding of knowledge possessed by UNNES students about the principle of reuse can be concluded to be at a very high criterion with an average score of 12.6.

3.5. College Student Knowledge about Reducing Waste

Knowledge about waste reduction can be achieved in three basic ways, namely (1) reducing the amount of material used per product without compromising product function, (2) increasing product life span, (3) eliminating the need for products (Fadhilah et al., 2011: 66). Knowledge in waste reduction is realized in the implementation of a ban on the use of plastics and the development of organic and inorganic waste processing to deal with waste and the community around the UNNES campus.

Ministry of Research, Technology and Higher Education Instruction No 1 / M / INS / 2019

Regarding the Prohibition of Use of Disposable Plastic Drinking Water Bottles and / or Plastic Bags in the Ministry of Research, Technology and Higher Education is used as a legal basis in the process of implementing the reduction of waste (UNNES Sustainable Conservation, 2019: 26).

This knowledge turns out to have been widely socialized at the University, by providing drinking water faucets / dispensers in every room, lecture building, PKM, auditorium, space or other buildings that are often used for activities, in addition UNNES residents must have a tumbler and bag that can be reused (UNNES Sustainable Conservation, 2019: 27).

The knowledge they get through these regulations is indeed very helpful for students in increasing their knowledge, but not all students get the same thing considering the socialization process carried out in each faculty has not been comprehensive. The overall research results can be seen in detail through table 3.

Table 3. College Student Knowledge about Reducing Waste

Criteria	Score	Frequency	Percentage (%)
Very High	5	11	17,46
High	4	27	42,86
Medium	3	17	26,99
Low	2	5	7,93
Very Low	1	2	3,17
Amount		63	100
Average Score = 3,59 (High)			
Lowest Score = 1			
Highest Score = 5			
Total Score = 226			

Source: Processed Research Data, 2020.

Table 3 shows that the average level of campus residents' knowledge about waste reduction is in the high criteria with an average score of 3.59..

The difference shows that the understanding obtained by students regarding waste management by reducing waste is caused by students' concern for the campus environment and the surrounding environment. Because reducing waste is the principle of managing waste at the highest hierarchy. By applying the principle of reducing waste, it is hoped that there will not be as much waste production now (Herlambang, 2010: 147)

In applying the principle of reducing waste by students and the entire academic community of UNNES, the goal of UNNES's sustainable conservation development to be free of waste by 2020 can be realized.

3.6. College Student Knowledge about Waste Recycling

UNNES as a community has declared as a

conservation university in waste management done by providing trash bins for temporary collection purposes. Trash bins are designed as a pair (twin) for organic and non-organic waste, placed strategically in each place / area of activity (Banowati, 2012: 14). Waste management has been done a lot by the campus environment-conscious community at UNNES, as a conservation-oriented campus UNNES always tries to carry out its role in creating environmental sustainability.

The process of collecting waste before being recycled is under the coordination of the UNNES Household Head of Subdivision, detailed as follows. Cleanliness management within the Faculty is the responsibility of the Faculty; transportation to TPS is the responsibility of the Household; and management of the university's environmental waste, such as roads, auditoriums and central buildings in general is the responsibility of the UNNES Household Section.

Table 4. Composition of UNNES Waste per Day (kg) in June-July 2011

No	Type	Weight Average (kg)	Percentage (%)
1	Wood leaf and Twigs	83	62,88
2	Leftovers	32	24,24
3	Papers	7	5,3
4	Plastics	3	2,28
5	Others	7	5,3
Total		132	100

Source: Head of Subdivision of Households, 2011.

Table 4. shows that the composition of waste produced by the Head of Subdivision of households is dominated by wood and twigs that are in parks in each faculty. The recycling process that has been carried out by UNNES is the process of composting organic waste, students' knowledge of recycling is still at a high criterion. The knowledge they have is obtained through general courses (MKU), namely Environmental Education (PLH) courses. The course is given with the aim that students have a high environmental care attitude and as an effort to foster a culture of conservation for students and the academic community of UNNES (Conservation Cadres Training Objectives, 2019).

Recycling, namely the reuse of waste through a certain process in order to convert waste into useful goods (Hardati, 2016: 54). Through the campus environment care community, the knowledge that has been obtained can be realized through programs held by the community, such as training in making plastic-based handicrafts and workshops on the process of recycling organic and inorganic waste, because UNNES as a tertiary institution has strategic functions that always prioritize and pay attention to the principles or insights of conservation (Bangvasi UNNES, 2019: 25).

Understanding of college students' knowledge about recycling waste is at a high criterion, although there are still many students who have never made a recycling product from waste (Observation Results, 2020). The results of this understanding in detail can be seen in table 5.

Table 5. College Student Knowledge about Waste Recycling

Criteria	Score	Frequency	Percentage (%)
Very High	5	11	17,46
High	4	24	42,86
Medium	3	18	26,99
Low	2	7	7,93
Very Low	1	3	3,17
Amount		63	100
Average Score	= 3,59 (High)		
Lowest Score	= 1		
Highest Score	= 5		
Total Score	= 226		

Source: Processed Research Data, 2020.

Table 5 shows that the average score of college students' knowledge about waste recycling was 3.59 or was at a high criterion with 63 college students.

IV. CONCLUSIONS

The knowledge possessed by UNNES students in waste sorting as well as waste management methods which include reuse, reduce, and recycle, can be concluded as follows: 1) College Student knowledge regarding waste segregation between organic and inorganic waste is at a high criterion with an average score that is 20,79. With a breakdown of the causes of the difference in knowledge they get is due to the amount of information and level of education obtained. 2) College Students' knowledge about waste management based on 3R, namely reuse is included in the high category, reduce is included in the high category, then recycle is included in the high category.

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