The Assessment of College Students Knowledge and Practice Regarding the Application of Sustainable Consumption Patterns in Yogyakarta, Indonesia

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Abstract. The main principle of sustainable consumption is increasing the quality of life by considering environmental safety and security as well as the needs of future generations. This research assessed the level of knowledge and practice of college students about the patterns of sustainable consumption. It was conducted at one of the best private university in Yogyakarta, Indonesia. Data retrieval in this study was by using a set of validated questionnaires distributed to 397 students in prevalent proportion across the faculties at the University. In analysing, the data was using SPSS 22. The results obtained showed that most students have high knowledge regarding sustainable consumption patterns even though the level of practice shown is average. It was found that there was no significant relationship between student’s level of knowledge and the practice towards sustainable consumption patterns which value is 0.330> 0.05 based on the Pearson Chi-square test. The results of this study are intended to provide a general depiction of knowledge and practices of sustainable consumption level among students and provide broad insight for stakeholders in developing policies to achieve sustainable development.

1. Introduction
Consumption patterns that do not reflect sustainable consumption behaviours can have a negative effect towards the environment, affect the availability of limited natural resources for future generations, and generate erratic climate change [1]. Based on a release by World Wildlife Federation reported that the earth in its current conditions requires 1.6 of bio-capacity every year to meet human needs in the form of goods and services [2]. World’s large population potentially caused a limited supply of resources that will not be able to meet the needs of future generations.

The impact on environmental damage, depleted natural resources, and the drastic changes of climate caused by people’s unsustainable consumption are the biggest challenges for the world today [1], [3]-[4]. The effect of this consumption pattern slowly raises human awareness to manage their patterns into sustainable consumption [5]. The special agenda designed by the United Nations in achieving sustainable development aims to preserve the earth so that we can avoid drastic climate change, environmental degradation, even the availability of needs for future generations through the campaigns of sustainable consumption and production [6].

By the awareness of the importance of sustainable consumption patterns, many international communities conduct research to understand the sustainable consumption patterns that can be applied in human life. There is research on responsible consumption [7], ecological intelligence [8], value of
consumption [9], place identity [10], self-development [11], cognitive dissonance [12], ecological marketing [13], pro-social marketing [14], and abundance of consumption [15]. Shibin et al., [16] said that from research overall results, 50% of research topics published were related to the sustainable consumption occurred in the last 5 years. Awareness in increasing sustainable consumption is a very important thing to do through strategic policies and programs in implementing sustainable consumption [16]. The government greatly contributed in policy-making and right on target strategies to achieve production control and sustainable consumption patterns [17].

So far, researchers have not found earlier similar research about the assessment of knowledge and practices of sustainable consumption level among students in Yogyakarta, Indonesia. Therefore, the purpose of this study is to assess the extent of college Students level of knowledge and practice regarding the patterns of sustainable consumption in Yogyakarta, Indonesia. In society, students are the nation’s future generation that have a based on contribution invoicing and demonstrating the quality of healthy life and environmental safety based on behaviour that does not reflect sustainable development. Students will become leaders of nations later, thus the country must be able to contribute in sustainable development [18]. Therefore, the university as a place to study and self-development must be able to play a role in sustainable development so that our students as the nation’s future leader are able to improve the quality of life of society globally [19].

2. Research method

This research was conducted at one of the private university in Yogyakarta, involving students as the research subjects. The university was chosen based on the assessment of the Ministry of Research, Technology and Higher Education as one of the best universities among private universities in Indonesia in 2018. It has eight faculties with a total of 23,000 students in the 2017/2018 academic year.

2.1. The measurement of research samples

The determination of sample measurement in this study used Krejcie and Morgan [20], where 5% of sample measurement will be added in order to compensate incomplete questionnaires. The determination of research sample used cluster-sampling approach. There were 397 questionnaires, which were directly distributed to the respondent, in this case is students in 8 faculties. The questionnaires distributed were based on the proportion of the total population in each faculty. To fill out the questionnaires, students were done it voluntarily which responses were anonymised and kept as confidential.

2.2. Data Collection Method

The method of data collection in this study was carried out by distributing questionnaires containing the assessment of the level of knowledge and practice of sustainable consumption patterns based on the proportion of total students in each faculty at the university.

| Item                        | Number of item | Cronbach’s alpha |
|-----------------------------|----------------|-------------------|
| Sustainable consumption knowledge | 11             | 0.947             |
| Sustainable consumption practices | 19             | 0.673             |

Items used in students' knowledge and practice of sustainable consumption patterns questionnaire regarding improving quality of life, protection of the environment, efficiency of resources, and being able to meet the needs of future generations are based on previous research that was revised, adapted and developed [21]; [22]. The items chosen are in accordance with the constituents of sustainable consumption, i.e. improving the quality of life, protecting the environment, efficiency of resources, and being able to meet the needs of future generations. There are 13 items for assessing the knowledge level regarding the patterns of sustainable consumption, and 21 items for evaluating the practice of sustainable consumption patterns. The items that have been selected will be given to related academics experts in
the field of consumption to assess the item. After going through expert assessment, the reliability test in the form of a questionnaire was carried out by involving 30 respondents. Items reliability and consistency was tested by using Cronbach's Alpha. Table 1 shows the results of items reliability and consistency regarding knowledge and sustainable consumption practices, and several selected items.

2.3. Data analysis
The processing of obtained data from questionnaire results in this research used IBM SPSS version 22 software. Descriptive statistics and inferential statistics were done to analyse the data. To determine the relationship between the level of knowledge and the practice of sustainable consumption was done by using the Chi-square test with the significant P-value <0.05. The total score was categorized in groups as what was done in some previous studies, i.e. Abdullahi et al., [22] and Panigrahi et al., [23].

3. Result and discussion

3.1. Demographic characteristic
Demographic characteristic is intended to describe the demographic conditions of students as respondents. In Table 2 showed the overview of respondent demographic characteristics.

| Characteristic      | Percentage | Frequency |
|---------------------|------------|-----------|
| Gender              |            |           |
| Male                | 69.77%     | 277       |
| Female              | 30.23%     | 120       |
| Total               | 100.00%    | 397       |
| Age                 |            |           |
| 18 years old        | 20.40%     | 81        |
| 19 years old        | 25.94%     | 103       |
| 20 years old        | 31.74%     | 126       |
| 21 years old        | 13.35%     | 53        |
| 22 years old        | 8.56%      | 34        |
| Total               | 100%       | 397       |
| Year of Study       |            |           |
| 1st year            | 19.65%     | 78        |
| 2nd year            | 30.48%     | 121       |
| 3rd year            | 34.76%     | 138       |
| 4th year            | 10.58%     | 42        |
| 5th year            | 4.53%      | 18        |
| Total               | 100%       | 397       |

3.2. Level of student’s knowledge regarding sustainable consumption pattern
In assessing the level of student, knowledge regarding sustainable consumption patterns was using questionnaire, which contain 11 items. The items in the questionnaire describe environment quality, natural resources utilization, use of energy efficiency, and energy defence for future generations. In general, the results obtained showed that 98.05% of student’s answers regarding their knowledge of sustainable consumption were correct while the remaining 1.95% answered incorrectly, based on listings in Table 3 about the level of students' knowledge regarding sustainable consumption patterns. Each correct answer chosen by student gets 1 score while the wrong answer get 0 score.

There are 4 out of 11 items regarding students' knowledge of sustainable consumption patterns that gain more than 99% percentage of correct answers, they are: the quality of surrounding environment giving a direct impact for human health by 100% (n= 397); natural resources (such as fossil fuels, plants, water, minerals) are important aspect to determine human survival by 100% (n= 397); water purification, water cycle regulation, waste recycling, nature preserve/sanctuary maintenance is greatly influenced by human actions by 99, 50% (n= 395); then, natural resources such as fossil fuels, natural plants, water, minerals and coal must be maintained in order to be able to meet the needs of future generations, by
99.24% (n = 394). Whereas, the percentage of incorrect answers out of 11 items chosen by students are: natural resources (such as fossil fuels, natural vegetation, water, minerals and coal) are limited, by 5.04% (n= 20); 3R (recycle, reuse, and reduce) can significantly lessen the wasting of raw materials from nature by 4.53% (n= 18).

Based on the results shown in Table 3, the percentage of student knowledge regarding the pattern of sustainable consumption is appertaining high. University plays a very important role in giving the students insight into sustainable consumption patterns. By that means, when the student's knowledge at environmental preservation, energy use efficiency, and waste recycling utilization is not good, university thus considered failing in forming student’s mind-set for their tendencies to save lives on earth. To be clearer about the level of student knowledge regarding sustainable consumption patterns, it can be seen in Table 4 and figure 1 with the result of the classification of students' knowledge level regarding sustainable consumption patterns. The score is 1 for the answer which categorized as correct and 0 for an incorrect answer, with the standard deviation is 0.427 and mean 2.81..

Table 3. The percentage of student’s knowledge regarding the pattern of sustainable consumption

| No | Item                                                                 | A (%) | B (%) |
|----|----------------------------------------------------------------------|-------|-------|
| 1  | The quality of surrounding environment gives direct impact towards human health | 100.00% | 0.00% |
| 2  | Natural resources such as fossil fuels, plants, water, and minerals are important aspects to determine human survival | 100.00% | 0.00% |
| 3  | Water purification, water cycle regulation, waste recycling, nature preserve maintenance is greatly influenced by human actions | 99.50% | 0.50% |
| 4  | Water sources must be preserved from pollution which can contaminate it | 98.74% | 1.26% |
| 5  | The using of plastic bag needs to be minimized because it can damage environments quality | 97.98% | 2.02% |
| 6  | 3R systems (recycle, reuse, and reduce) can significantly lessen the wasting of raw materials from nature | 95.47% | 4.53% |
| 7  | Natural resources such as fossil fuels, natural vegetation, water, minerals, and coal are limited | 94.96% | 5.04% |
| 8  | Natural resources such as fossil fuels, natural plants, water, minerals and coal must be maintained in order to be able to meet the needs of future generations | 99.24% | 0.76% |
| 9  | The using of limited natural resources excessively and uncontrollably can cause supplies insufficiency for future generations | 97.73% | 2.27% |
| 10 | Energy saving product is one of the innovative ways to ensure minimal use of resources | 98.74% | 1.26% |
| 11 | 3R systems are the right way to prevent excessively using of natural resources | 96.22% | 3.78% |

*a Correct; b Incorrect

Table 4. The classification of student’s knowledge regarding the pattern of sustainable consumption

| Categories             | Percentage | Frequency |
|------------------------|------------|-----------|
| High level of knowledge| 81.90%     | 325       |
| Moderate level of knowledge | 16.90% | 67        |
| Low level of knowledge | 1.30%      | 5         |
| Total                  | 100.00%    | 397       |

Based on Table 4 about the level of student knowledge on sustainable consumption patterns classification shows that students likely have high knowledge with 81.9% of percentage (n= 325), the rest are 16.9% (n = 67) in medium level, and 1.3 % (n = 5) in low level out of 397 students total. It shows that the majority of students already know the importance of environmental preservation,
efficiency of energy use, the utilization of recycling waste, and saving limited natural resources for future generations, which is initiated through the concept of sustainable consumption.

3.3. The level of student practice on sustainable consumption patterns

In assessing the level of student practice on sustainable consumption patterns was using a questionnaire which contain 19 items that represent quality of life, environmental protection, the ability to meet the needs of future generations, and limited efficiency of natural resources. In the questionnaire, a frequency scale is used to measure the level of sustainable consumption practice (SC) which consists of always, sometimes, rarely, and never. The results of this assessment can be seen in Table 5.

**Table 5.** The level of students’ knowledge regarding the pattern of sustainable consumption

| No | Item                                                                 | A (%) | B (%) | C (%) | D (%) |
|----|-----------------------------------------------------------------------|-------|-------|-------|-------|
| 1  | I throw the garbage in littering box                                  | 72.29 | 22.42 | 4.28  | 1.01  |
| 2  | If I see illegal forest fire, I then report to the authorities to follow up | 17.88 | 21.41 | 18.39 | 42.32 |
| 3  | I spend holidays in parks, beaches or forests (i.e. hiking, recreation, camping, picnics) | 19.65 | 53.65 | 24.43 | 2.27  |
| 4  | I choose to use energy-efficient equipment with an energy-saving label (EER) on it | 22.67 | 45.09 | 23.68 | 8.56  |
| 5  | I plant potted plants in my house                                    | 46.60 | 30.23 | 14.11 | 9.07  |
| 6  | I attend seminars, conferences, or exhibitions with environmental topics | 16.88 | 24.69 | 40.81 | 17.63 |
| 7  | I make use of reused bag when shopping at a supermarket               | 13.60 | 33.25 | 38.04 | 15.11 |
| 8  | I prefer to travel using public transportation rather than private vehicles | 11.34 | 26.95 | 48.61 | 13.10 |
| 9  | Every time I travel, I bring a water bottle that can be reused        | 21.16 | 47.86 | 21.91 | 9.07  |
| 10 | I buy products that can be recycled                                   | 14.86 | 43.32 | 33.25 | 8.56  |
| 11 | I participate in environmental activities organized by particular institutions or organizations, such as tree planting activities/reforestation, beach clean-up, or doing community self-help to clean the environment | 10.58 | 49.37 | 25.44 | 14.61 |
| 12 | In my free time, I try to practice recycling my household waste       | 13.35 | 22.17 | 43.58 | 20.91 |
| 13 | Based on careful consideration, I decided to avoid excessive consumption, for example in using water or electricity excessively | 23.93 | 52.90 | 16.37 | 6.80  |
| 14 | I advise my close related people (family, friends, and relatives) to control the use of environmental resources (i.e. electricity or water) | 26.45 | 57.68 | 13.60 | 2.27  |
| 15 | I recycle disposed items so that they can be reused                   | 9.57  | 27.46 | 48.11 | 14.86 |
| 16 | Electrical appliances such as TV, refrigerator, computer or fan are in standby mode when I am not at home | 35.26 | 31.49 | 18.14 | 15.11 |
| 17 | I make use of blank pages from scrap paper                            | 22.67 | 46.35 | 20.15 | 10.83 |
| 18 | I try to avoid paper printing activities                              | 16.37 | 26.20 | 44.33 | 13.10 |
| 19 | I do laundry when dirty clothes have piled up                         | 61.71 | 22.67 | 10.33 | 5.29  |

*Always; † Rarely; ‡ Sometimes; ‡ Never

Based on the assessment results in Table 5, it shows that the level of student practice towards the pattern of sustainable consumption is still at average level. By the overall items of sustainable consumption practices, the items with the highest value are always practicing for throwing garbage in littering box at 72.29% (n = 287), sometimes practicing for throwing garbage in littering box 22.42% (n = 89), rarely practicing for throwing garbage in littering box 4.28% (n = 19), and never practicing for throwing garbage in littering box as much as 1.01% (n = 2). To interpret, it can be said that most students...
have realized how important it is to maintain cleanliness, comfort, sustainability, and also environment preservation by practicing responsibly disposed their garbage in provided littering box. Environmental damage and the decreasing quality of life can be caused by improper waste disposal. Along with 377 students (94.96%) awareness that water is one of the limited natural resources, thus the practice of minimizing use of water for continuously washing clothes that are still half or less than half. If wasting clean water is carried out, it is confirmed that the needs for clean water in future generations cannot be fulfilled. Moreover, students level of practice of recycling unused items to be reused is still rarely done, that is 191 students (48.11%), 59 students (14.86%) are never recycling, 59 students (27.46%) are sometimes recycling, while students who always recycle used items are only 38 people (9.57%).

Items with the highest percentage of never is students practice level on reporting illegal forest fire activities that appertaining very high at 42.32% (n= 168), students who rarely reported is 18.39% (n = 73), sometimes reported is 21.41% (n= 85), and only 17.88% (n= 71) who always report to the authorities if they see illegal forest fire activities. This is very concerning because most of them do not care about the pollution that is resulted from illegal forest fire activities. To classify students practice level on sustainable consumption patterns, a score of 4 to 1 is given, which 4 is for always, 3 for sometimes, 2 for rare, and 1 for never. The result of mean and standard deviation is 2.01 and 0.5. Table 6 shows the percentage results for the classification level of student practice towards sustainable consumption patterns.

| Categories              | Percentage | Frequency |
|-------------------------|------------|-----------|
| High level of practice  | 15.60%     | 62        |
| Moderate level of practice | 69.30% | 275       |
| Low level of practice   | 15.10%     | 60        |
| Total                   | 100.00%    | 397       |

The results in Table 6 show that most students categorized as average in level of practice are 275 people (69.3%). The high category are 62 people (15.6), and in low category are 60 people (15.1%). Students' knowledge regarding sustainable consumption patterns should be able to direct them to practice sustainable consumption patterns, in accordance with the results of the level of knowledge gained in Table 4.

3.4. The correlation between students’ knowledge and practice towards sustainable consumption patterns

Chi-Square Pearson test is done to determine the correlation between students’ level of knowledge and level of practice towards sustainable consumption patterns. The test results in Table 7 shows that there is no significant relationship between knowledge and the practice regarding sustainable consumption among students, with a significance value (0.330> 0.05).

The test results in Table 8 show that from 397 students, there is a high level of knowledge with high, average, and low category of practice that is 46 people (14.2%), 226 (69.5%) and 53 people (16.3%) respectively. Meanwhile, average knowledge with a high, medium and low level of practice was respectively 15 people (22.4%), 46 people (68.7%), and 6 people (9.0%). This shows that the majority of students with high level of knowledge are not in balance with their practice, but most students in the category are practicing sustainable consumption patterns. These results are not in line with Polonsky et al., [24] that when consumers obtain information or knowledge about environmental problems, so the attitudes and practices to overcome environmental problems will change according to that. It is possible for other factors to become a barrier to practice sustainable consumption patterns among students. If these obstacles can be overcome, then the tendency of student practices supported by high knowledge of sustainable consumption patterns can create nation's progress through the establishment of sustainable development.
Table 7. Chi-square test result

|                      | Value   | df | Asymp. Sig. (2-sided) |
|----------------------|---------|----|----------------------|
| Pearson Chi-Square   | 4.610*  | 4  | 0.330                |
| Likelihood Ratio     | 4.663   | 4  | 0.324                |
| N of Valid Cases     | 397     |    |                      |

Table 8. The results of relationship test between knowledge and student practice

| Practice | Low (%) | Average (%) | High (%) | Total (%) |
|----------|---------|-------------|----------|-----------|
| Knowledge|         |             |          |           |
| Low      | 20.00%  | 60.00%      | 0.00%    | 100.00%   |
| Moderate | 9.00%   | 68.70%      | 22.40%   | 100.00%   |
| High     | 16.30%  | 69.50%      | 14.20%   | 100.00%   |
| Total    | 15.10%  | 69.30%      | 15.60%   | 100.00%   |

4. Conclusion
It is a compulsion that creating sustainable development can be achieved through sustainable consumption patterns. In this case, sustainable consumption is a real step in improving the quality of life, preserving the environment, minimizing pollution and making efficient use of limited resources.

The findings in this study show that most students have a high level of knowledge regarding sustainable consumption patterns even though the level of practice is still in average category. However, it is possible that with the hard work of education institutions, government, non-government, and the community will be able to create a sustainable consumption pattern, which is shown by a lifestyle that emphasizes earth safety.

Although there is no significant relationship between knowledge and practice in sustainable consumption patterns statistically, but in reality, practice is highly depend on how high the knowledge and information obtained about creating sustainable development. In this case, educational institutions especially universities can play an active role in raising student’s awareness to preserve the environment, especially in the pattern of sustainable consumption. For further researchers, it is suggested to investigate the barriers in the application of sustainable consumption patterns and sustainable consumption patterns among our societies.

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