

# Universities Student's Participation in The Waste-To-Wealth Program

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**Abstract.** The university's activities significantly impact the surrounding environment. The sustainable development paradigm has emphasised the importance of sustainable waste management practices at all levels of institutions, including implementing Waste-to-Wealth initiatives. This study is conducted to investigate the student's level of knowledge and participation regarding Waste-to-Wealth initiatives. A convenience sampling method was employed to gather data from 368 students of Universiti Malaysia Kelantan (UMK), which was then analysed using descriptive and inferential analyses. The results showed varying levels of student knowledge based on demographics and that overall, the level of knowledge about Waste-to-Wealth initiatives was good (mean score = 3.83/6). However, most student participation in these initiatives is low (71.7%). This study revealed that their knowledge and demographic background (year of study, education background, income) influences students' participation in Waste-to-Wealth programs. These findings suggest that more effort is needed to enhance student participation in Waste-to-Wealth initiatives.

## 1 Introduction

The management of waste is a significant challenge faced by many countries around the world, including Malaysia [1]. Malaysia, a rapidly developing nation in Southeast Asia, has experienced a steady increase in solid waste generation due to population growth, urbanization, and industrialization. According to the Ismail et al. [2], Malaysia generated approximately 38,000 tons of waste per day in 2020. This alarming figure has necessitated the exploration of innovative waste management strategies to mitigate environmental pollution and promote sustainable development.

In recent years, the concept of waste-to-wealth has gained prominence as a sustainable solution to address the environmental and economic issues associated with waste management [3]. In the higher education sector, universities have the potential to play a pivotal role in fostering waste-to-wealth practices through research, innovation, and

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knowledge dissemination. Furthermore, incorporating waste-to-wealth initiatives into the curriculum and university activities can equip students and its staff with relevant skills and knowledge in sustainability and resource management.

In Malaysia, the enhancement of the sustainable campus idea is generally focused on reducing the amount of solid waste generated. However, due to insufficient ecological stewardship and a lack of commitment to environmental care among the campus community, this approach poses a risk for several universities in Malaysia [4]. As a result, Malaysia's universities are rank among the top contributors which is more than 20% of the country's annual production of solid waste [5].

The difficulty encountered by the concept of student's participation in Waste-To-Wealth program, which is frequently perpetuated by the unwillingness of certain stakeholders with an agenda to maintain a status quo that limits the involvement through centralization of authority, elite domination, poor information sharing, and a contemptuous professional attitude toward equipping locals with the necessary skills to meaningfully participate. This is due to inadequate legal and regulatory structures designed to protect and defend the interests of students to enable genuine participation in planning, development, and management.

Another major issue in the region is a lack of student's cohesiveness at the local level, which has harmed local people's interests and commitment levels to engage in various activities. The major causes for insufficient garbage disposal are financial and institutional restrictions, particularly where municipal governments are weak or underfunded and population increase is high [6]. Furthermore, lack of time is also one of the issues in lack of participation among universities students in Waste-To-Wealth initiative. Multiple risk factors, some of which may be interrelated, may frequently be experienced by young individuals [7].

The issues of ineffective Waste-To-Wealth program in Malaysia higher education is because of lack of awareness and engagement with the campus community. Waste-to-wealth initiatives require active participation and engagement from students, faculty, and staff. However, there is often a lack of awareness and understanding about the potential benefits and opportunities associated with waste-to-wealth in Malaysia's higher education institutions. This lack of engagement hinders the effective implementation and sustainability of waste-to-wealth practices [8]. Besides that, Effective waste-to-wealth initiatives require collaboration among various stakeholders, including universities, industry partners, government agencies, and local communities. However, in Malaysia's higher education system, there is a lack of structured collaboration and networking opportunities, which limits the scalability and impact of waste-to-wealth projects [9].

Waste-to-wealth initiatives hold tremendous potential for Malaysia's higher education in addressing its solid waste management challenges, reducing environmental pollution, and unlocking economic opportunities. However, the successful implementation of these initiatives requires a comprehensive approach that addresses low campus community awareness, knowledge, and participation. Therefore, this study been conducted to explore level of knowledge and examine the participation level among the students on Waste-To-Wealth initiatives.

## **2 Methodology**

### **2.1 Study area**

The study area of this research is Universiti Malaysia Kelantan (UMK) which located at the east coast of Peninsular Malaysia. The total number of students in UMK is 10,000 which

come from distinguish ethnics and states in Malaysia. UMK has three (3) campuses that located in Bachok, Pengkalan Chepa dan Jeli. Entrepreneurship is the UMK thrust where all students are equipping with entrepreneurial skills. The initiative of Waste-To-Wealth is one of entrepreneurial activity in UMK that involve students and staffs. Therefore, UMK was selected as a study area.

## **2.2 Sample size and sampling technique**

The entire population size is important before determining the sample size. In this study, a total number of 368 respondents participated which based on krejcie and morgan table of sample size [10]. Convenience sampling was adopted to select the respondents. Convenience sampling is a non-probability sampling technique in which units are chosen for the sample because they are closest to the researcher geographically, are available at a specific time, or are willing to participate in the study [11]. In this study, convenient sampling helps in achieving a relatively sample size faster than the probability sampling technique.

## **2.3 Instrument development**

The instrument design has the benefit of investigating the respondent participation in waste-to-wealth initiative. The questionnaire has 3 sections for the responder to complete. There are two types of measurement: nominal, ordinal, Nominal scale data were used to characterize the variables in terms of their category. The quantitative instrument is used to collect data through semi-structured interviews. It was performed by an interview guide who had three sections that explained the demographics, level of knowledge and level of participation [12]. The respondents were given a design question with a yes or no and an open-ended question.

- Section A: Socio-Demographic
- Section B: Level of knowledge among students
- Section C: Level of participation in Waste-To-Wealth initiatives.

### **2.3.1 Validation test**

The extent to which measuring instruments are relevant and operate as a representation of the target concept is referred to as the validity test or content validity. The validation test is carried out by submitting a sample of the questionnaire to an expert. Regarding this study, the supervisor will edit all the questionnaires to ensure that the material is specific and thoughtful enough for all the respondents. The experts have gone through all the questionnaire items to ensure their clarity, comprehensiveness, and trustworthiness before deciding which questions will be included in the final questionnaire.

### **2.3.2 Pilot study & reliability test**

A pilot study is a method for testing the questionnaire with a smaller sample size than what is anticipated which was for only 30 respondents. Pilot study conducted to assess the precision of the guidelines to be measured. After that, the reliability test was conducted by using Cronbach alpha coefficient that was most widely used for internal-consistency coefficient. It was suitable to determine whether the scale was reliable or not commonly for multiple Likert questions in a questionnaire that had a scale. If alpha was high, it indicated the greater reliability of the scale. Any measurement's reliability refers to the extent to which it is a consistent measure of concept and Cronbach's alpha is one way to measure the strength

of that consistency. In exploratory research, values between 0.6 and 0.7 can be accepted as moderately good [13]. The internal consistency can be analysed by using Cronbach's alpha in SPSS Statistics software. The level of knowledge is (0.784) and the level of participant value is (0.804) which within the acceptable range of alpha Cronbach.

### **2.3.3 Normality test**

Normality tests was applied to determine whether a data set is modelled for a normal distribution in statistics. kurtosis and skewness were adopted to determine the normal distribution by measure how differently formed a distribution's tails are from the tails of the normal distribution. Kurtosis concentrates on the tail form, whereas skewness concentrates on the overall shape. A normality test will be performed using the Skewness and Kurtosis tests to see whether the data being gathered are distributed normally across independent and dependent variables [14]. Skewness is a metric for symmetry or the lack of. A normal distribution has a zero skewness, which compares the sizes of the two tails before calculating the kurtosis. The result of skewness and kurtosis that the respondent's knowledge was approximately normally distributed for all the section in the questionnaire with a skewness value is 1.182 and -1.1017 and kurtosis value is 4.835 and 0.243 respectively which result that all is in within -2.0 until 2.0. This prove that all data collected is normally distributed.

## **2.4 Descriptive analysis**

Descriptive statistics is a tool used to summarize large amounts of data in a way easier to understand. It provides basic information regarding any quantitative data analysis and to determine a distribution's normality. Central tendency includes mean, median and mode while measures of variabilities include standard deviation and range. The descriptive analysis was used to measure the level of knowledge and participation in Waste-To-Wealth initiative among the students by adopted percentage, mean and standard deviation of each variable or components.

### **2.4.1 Determine level of knowledge**

According to Arkkelin [15], the degree of knowledge can be gauged on a 6-points, with 0-2 indicate a low level of knowledge, 3-4 a moderate level, and 5-6 is a high level of knowledge. This information was used to assess the level of knowledge of students on waste to wealth.

### **2.4.2 Determine level of participation**

Three (3) types of participation levels that use by the Arnstein Ladder [16]. The types of participation levels used are, Non-participation, Tokenism and Citizen Power. The Question Ladder Template for problems can be completed using this Arnstein theory, which can also assist highlight the question ladder's advantages and disadvantages. This question ladder's goal is to aid in asking the proper questions, and as such, it serves as one phase in a larger process of compiling and assessing data and supporting evidence.

## **2.5 Inferential analysis**

Null hypothesis for this study is there is no relationship between different socio-demographic with the participation level among UMK's student in Waste-To-Wealth initiatives. The independent variables of this study are socio-demographic factors (gender, age, ethnic, year

of study, faculty of study, and household income). Besides that the dependent variable is the participation level of UMK's student in Waste-To-Wealth initiatives.

### 2.5.1 T-test analysis

The T-test was utilized in this investigation as a statistical test. This test was used to investigate maximum 2 groupings of subjects such as the gender, age, and race of the students. This test can detect level of knowledge and level of participation. This test is meant to investigate which gender influenced the dependent variable, knowledge of Waste to Wealth. By comparing the mean between genders, they are connected. Aside from gender, the level of knowledge acts as an independent variable that influences respondents' participation of the Waste-To-Wealth initiative. It was used to measure the factors that influence the participation among students.

### 2.5.2 ANOVA analysis

ANOVA is a statistical technique used to compare the means of more than 3 categories in subjects. It is a method of comparing distinct samples in different contexts by utilizing a single dependent variable. In this study, ANOVA is utilized to compare means and highlight the association between more than two variables' groups. The outcome will accept or reject the null hypothesis depending on the circumstances. The ANOVA test is used to describe the components of respondent type and age that become variables in influencing the measured dependent variable. In this study, ANOVA was used to analyse between the students' participation of Waste-To-Wealth in University Malaysia Kelantan and the factors affecting participation.

## 3 Findings and discussion

### 3.1 Demographic profile of respondents

Table 1 shows that most of respondents is female (70.1%) with age range 20-22 years old (75%). Besides that, majority of respondents are Malay (58.7%), followed by Indian (34%), Chinese (5.7%), and Bumiputra Sabah 1.6%. Moreover, majority of respondents are in year 1 of study and they are from faculty of Earth Science and Faculty (26.9%) of Agro-based Industry (22%). 70% of respondents are come from B40 family.

**Table 1.** Socio-demographic profile of respondents, N= (368).

Demographic	Percentage (%)	Frequency
<b>Gender</b>		
Male	29.9	110
Female	70.1	258
<b>Age</b>		
19 years old	3.8	14
20 years old	35.6	131
21 years old	21.2	78
22 years old	19.8	73
23 years old	14.1	52
>24 years old	5.4	20
<b>Ethnic</b>		
Malay	58.7	216

Chinese	5.7	21
Indian	34.0	125
Sumandak	1.6	6
<b>Year of study</b>		
Year 1	45.7	168
Year 2	17.7	65
Year 3	18.2	67
Year 4	17.4	64
Year 5	1.1	4
<b>Name of Faculty</b>		
Faculty of Agro Based Industry (FIAT)	22.0	81
Faculty of Earth Science (FSB)	26.9	99
Faculty of Bioengineering and Technology (FBKT)	21.5	79
Faculty of Entrepreneurship & Business (FKP)	10.6	39
Faculty of Veterinary Medicine (FPV)	0.5	2
Faculty of Hospitality, Tourism and Wellness (FHPK)	13.0	48
Faculty of Creative Technology and Heritage (FTKW)	3.8	14
Faculty of Architecture and Ekistics (FAE)	1.6	6
<b>Household Income (RM)</b>		
B1 (less than 2,500)	54.1	199
B2 (2,501 – 3,170)	16.8	62
B3 (3,171 – 3,970)	4.6	17
B4 (3,970 – 4,850)	4.9	18
M1 (4,851 – 5,880)	7.1	26
M2 (5,881 – 7,100)	6.0	22
M3 (7,101 – 8,700)	2.2	8
M4 (8,701 – 10,970)	0.8	3
T1 (10,971 – 15,040)	2.2	8
T2 (More than 15,041)	1.4	5

### 3.2 Level of knowledge about waste to wealth.

Table 2 shows UMK's student responses to waste-to-wealth statements. Statement number one is associated with the recycling practice has potential as a side income and has received 345 correct answers from respondents (93.8%). The second statement concerning food waste composting has 348 correct answers (94.8%). 329 (89.4%) respondents are correct, and 39 (10.6%) respondent's response incorrect for statements related to selling used cooking oil. There are 348 (94.6%) answered correctly; meanwhile, the option incorrect, which was 20 (5.4%) for question number 4. Only 131 respondents (35.6%) responded correctly to the last statement that related upcycling initiatives will increase the number of solid wastes disposed of in a landfill. Most respondents, 237 (64.4%), answered incorrectly.

A sound waste management system can make valuable resources available for reuse. This may result in cost savings, new employment, and business prospects. Waste reduction, reuse, and recycling can be financially rewarding and beneficial to the environment. The study examined the knowledge concerning Waste-To-Wealth among students. The study showed that the respondent's knowledge that they engage in Waste-To-Wealth as they only know their general knowledge while applying to their lifestyle.

In contrast, some respondents do not have the basic knowledge of waste to wealth. However, developing students' knowledge to Waste-To-Wealth is necessary. Respondents recognized that attaining sustainable waste management is a joint responsibility of the government and its community members. The significant recommendations of the study are the need to put more effort into raising students' awareness through awareness programs that can bring about considerable changes in their attitude and perception of their Waste-To-Wealth [17].

The level of knowledge was determined by three -a point scale, which points high, medium, and low. This was used to understand UMK students' knowledge level in Waste-To-Wealth initiative. The descriptive statistics show knowledge of the Waste-To-Wealth initiative among UMK students. The high-level score shows that 79.9% (294) have answered correctly all the questions regarding Waste-To-Wealth knowledge. This can be summarized that higher education students know Waste-To-Wealth management, whereas 19.6% (72) showed a moderate level. This can be improvised in guiding the students to implement knowledgeable campaigns or syllabi as curricular activities.

**Table 2.** UMK Students Feedback on Waste-To-Wealth statements.

Statements	Frequency (%)	
	Correct	Incorrect
1. Glass waste and plastic waste can be recycled and sold as a side income.	345 (93.8%)	23 (6.3%)
2. Food waste can be converted to compost that is useful for plants	348 (94.8 %)	20 (5.4%)
3. Used cooking oil can be sell to vendor and can convert to useful things	329 (89.4%)	39 (10.6%)
4. I know the Waste-To-Wealth initiative gives skills and guidance to students to be creative in creating something that can be used from recycled materials	348 (94.6%)	20 (5.4%)
6. "Upcycling" initiatives will increase the number of solid wastes been disposed in landfill.	131 (35.6%)	237 (64.4%)

Very few respondents have shown a low-level knowledge; only 0.5% (2) have shown they were not used to Waste-To-Wealth initiatives. The total mean was 2.80. The students are still in the learning process. This was proven by the mean score of all items in knowledge has a mean score of 3.00 and above, meaning that their level of knowledge is excellent. According to Laor et al. [18], three demographic elements can influence the knowledge level: gender and education level. Therefore, lack of knowledge has shown lowest participation in waste to wealth. According to Sun et al. [19], Exposing young people to Waste-To-Wealth is crucial because they are more inventive and have new ideas to improve waste-to-wealth initiatives.

### 3.3 Participation level of students in Waste-To-Wealth initiative.

Table 3 shows 161 (43.8%) respondents have participated in any activity related to waste to wealth, whereas 207 (56.3%) respondents did not participate. Secondly the statement related to inform the university to organize more initiatives related to Waste-To-Wealth there are 93 (25.3%) respondents have responded Yes, and 275 (74.7%) responded No for this statement. For the statement related to participating in the university's waste-to-wealth initiative, 102 students (27.7%) responded Yes, and 266 (72.3%) answered No for this statement. For the statement "I am involved in making decisions for every activity related to Waste-To-Wealth in the University", 98 (26.6%) has responded Yes and 270 (73.4%) have responded No for this statement. Last statement related to the involvement in discussions with the university management to improve waste-to-wealth activities on the campus, a statement of which several respondents, 48 (13.0%), responded yes. Most of the answers were No compared to Yes. This shows the result is significantly low due to less participation in waste-to-wealth initiatives. To enhance the level of participation among students, staff or lecturers should devise a field trip for the students to participate. By bringing the students to outdoor activities regarding waste to wealth, they might be interested in knowing about waste to wealth.

Category participation has a total mean of 1.42/3.00. there are three category participation levels: Non-participation, Tokensim and Citizen control. Non-participation has a percentage of 71.7 (264) students, which means the students are not willing to join the waste-to-wealth program among students. It is shown low, as shown above. In addition, tokenism has shown 14.1 % (52), which is proportional to Citizen Control. This showed students are equally having the same level of participation in the Waste-To-Wealth initiative [20, 21].

**Table 3.** UMK Students feedback on the participation in Waste-To-Wealth initiatives.

Statements	Frequency (%)	
	Yes	No
I have participated in any activity related to Waste-To-Wealth organized by any agency	161 (43.8%)	207 (56.3 %)
I have informed the university to organize more initiatives related to waste to wealth	93 (25.3%)	275 (74.7 %)
I have done a Waste-To-Wealth initiative with the university and students	102 (27.7 %)	266 (72.3 %)
I am involved in making decisions for every activity related to Waste-To-Wealth in the University	98 (26.6 %)	270 (73.4 %)
I was involved in discussions with the management of university to improve Waste-To-Wealth activities at the university	48 (13.0%)	320 (87.0%)

### 3.4 Socio-demographic factors influence student’s participation in Waste-To-Wealth initiatives.

Table 4 shown that components that act as independent variable is socio-demographic. For gender  $t = (368), 5.493, P (0.01) < 0.05$  that is lower than p-value. This indicates that the gender had significant value is 0.01 meaning that is lower than p-value =0.05, so the variance is equal. This study has rejected the null hypothesis that there is significance relationship between difference gender (male and female), and participation towards Waste-To-Wealth initiatives. Statistically indicate that male has better participation in Waste-To-Wealth initiatives as compared to female students.

**Table 4.** Statistical result for socio-demographic factors influences the participation level.

Demographic	Mean (SD)	t/F value	p-value	Significant status
<b>Gender</b>				
Male	1.95 (0.83)	5.493	< 0.01	Significant
Female	0.97 (0.78)			
<b>Age</b>		10.847	< 0.01	Significant
20 years old	0.67 (1.23)			
21 years old	1.41 (1.63)			
19 years old	0.29 (0.61)			
22 years old	1.53 (1.63)			
23 years old	1.94 (1.89)			
>24 years old	2.6 (1.88)			
<b>Ethnic</b>		17.521	< 0.01	Significant
Malay	0.81 1.22			
Chinese	1.67 2.18			
Indian	2.02 1.87			
Sumandak	1.27 1.63			



<b>Year of study</b>					
Year 1	0.67	1.19	14.494	< 0.01	Significant
Year 2	1.50	1.63			
Year 3	1.72	1.75			
Year 4	2.02	1.91			
Year 5	2.5	1.00			
<b>Faculty</b>					
Faculty Of Agro-Based Industry	1.35	1.61	3.12	0.03	Significant
Faculty Of Earth Science	1.11	1.48			
Faculty Of Bioengineering & Technology	0.89	1.49			
Faculty Of Entrepreneurship & Business	1.79	1.96			
Faculty Of Veterinary Medicine	4.00	1.41			
Faculty Of Hospitality, Tourism & Wellness	1.15	1.54			
Faculty Of Technology & Heritage	2.14	1.83			
Faculty Of Architecture & Ekistics	2.16	1.83			
<b>Household Income (RM)</b>					
B1 (less than 2,500)	1.05	1.53	1.478	0.154	Not Significant
B2 (2,501 – 3,170)	1.30	1.57			
B3 (3,171 – 3,970)	1.47	1.62			
B4 (3,970 – 4,850)	2.05	1.43			
M1 (4,851 – 5,880)	1.38	1.70			
M2 (5,881 – 7,100)	1.59	2.06			
M3 (7,101 – 8,700)	2.37	1.92			
M4 (8,701 – 10,970)	2.89	2.89			
T1 (10,971 – 15,040)	1.38	2.26			
T2 (More than 15,041)	1.60	1.51			

ANOVA was conducted to identify the socio-demographic type of waste wealth initiative. Table 4 shows. analysis of variance ANOVA is performed to identify Age, Ethnic, Year of Study, Faculty, and Income. Statistical indicate that different group in age has significant influence the level of participant among UMK’s students [F=368,10.847, P (<0.01)]. The p-value is lower than  $\alpha=0.05$ , which rejects the null hypothesis that age impacts students' participation level. The much older students (>24 years old) have a higher participation level in Waste-To-Wealth initiative as compared to the young age students (< 23 years old). For ethnicity, there was a significant effect among four difference ethnicities, which were Malay, Chinese, Indian and Sumandak (F= (368,17.521, P (<0.01) p-value=0.05). This will reject the null hypothesis and show a substantial significant difference between ethnic. Indian students have better participation level in Waste-To-Wealth as compared to other ethnics.

Besides that, it showed significance when the value was 0.01, which is highly significant, and will reject the null hypothesis. The mean of Year 1 students is the lowest compared to the others, F= (368,14.494), p-value (0.01). Statistically indicate that [F= (368,3.12) p=0.0030] difference faculty influence the participation level on waste to wealth. This indicates null hypothesis has been rejected. The finding reveals that science-based faculty student have better participation level on Waste-To-Wealth as compared to art and humanities faculties. Besides that, this study found out that different household income did not significant influence the participation level among UMK’s students [F= (368,1.478, p value=0.154)].

## 4 Conclusion

Waste-to-wealth initiatives in Malaysia's higher education system hold immense potential for addressing environmental challenges while promoting sustainable economic development. However, the finding shows that the level of knowledge among UMK’s

students about Waste-To-Wealth is higher as compared to the level of participation in Waste-To-Wealth initiatives. More environmental activities or programmes need to be done in UMK to ensure the better understanding among them to manage the Waste-To-Wealth properly. Besides that, it is important to investigate the factors that might have impacted the Waste-To-Wealth initiative with an intent of improving the situation and reduce environmental threat associated with poor Waste-To-Wealth initiative. Engaging the young people to Waste-To-Wealth is crucial because they are more inventive and have new ideas to improve Waste-To-Wealth initiatives. People with higher knowledge regarding Waste-To-Wealth tend to participate in Waste-To-Wealth to know more about waste to wealth. By addressing these challenges, Malaysia's higher education institutions can contribute significantly to waste management and the transition to a more sustainable and resource-efficient society.

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