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Procedia - Social and Behavioral Sciences 59 (2012) 644 – 649

Procedia
Social and Behavioral Sciences

UKM Teaching and Learning Congress 2011

The challenges of e-waste management among institutions: a case study of UKM

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Abstract

As institutions are committed to practice sustainable development, the management of e-waste has recently become an important aspect of the sustainability goal. This paper is designed to identify and discuss on e-waste management challenges among institutions through a case study at Universiti Kebangsaan Malaysia (UKM). A checklist was initially designed to identify issues related to e-waste management in UKM campus, interviews and surveys were conducted, presentations and dialogues took place during the period of the study. Some of the identified challenges are; inefficient data management, equipment classifications, low awareness on e-waste, collection and disposal problems and lack of specific regulations and policy on end-of-life electrical and electronic equipments (e-waste) management and practices within the University. This initiative can be an educational added value, by providing the possibility for the UKM employees and students to have the knowledge on the best e-waste management practice and the impact of e-waste to the environment. As each employee and student represents a household at the municipal level, this could help to strengthen e-waste management at all level.

Keywords: Challenges; case; e-waste; institutions; management; study; UKM

1. Introduction

According to International Journal of Scientometrics, infometrics and bibliometrics, there are approximately a total of 17036 universities in the world (IJSIB, 2010). There is no doubt that these universities has substantially high amount of electronic equipment necessary to fulfill part of their institutional needs. Recently, the majority of electronic equipments are no longer required for one reason or another has found its way to areas where they are not accounted for. In view of the university's commitment to sustainability, it is necessary to address current practices in the disposal of unwanted electronic equipment or e-waste. Several universities in their effort to gain sustainable campus have embarked on projects leading to their desired goals, for example Sydney university asset procurement, management, maintenance and disposal which is accompanied with procedures and guidelines that would ensure

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1877-0428 doi:10.1016/j.sbspro.2012.09.325

better management system (Sydney University, 2005). Griffith University has come up with approaches and principles that would help organisations to manage e-waste they generate while seeking sustainability (CAUDIT, 2006). University Richmond championed on asset management, sustainable initiatives like; reuse, system rotations, recycling and refurbishment of electrical and electronic equipments (EEEs) (Burchard, 2009). Queen's University moved a step further from recycling, reuse to landfill services.

The action of reduce, re-use and recycle within the waste management hierarchy assume particular importance (Oskamp, 1995; Hamburg et al., 1997), especially when it comes to e-waste management system. Kelly et al., (2005) indicated that successful recycling programmes depend not only on technology, but also on the involvement of people, and maintenance of environmentally responsible behavior.

Considering the volume of waste electrical electronics (WEEE) university campus communities should be able to establish and adopt a waste management strategy that is design to maximize participation is essential. Smith (2009) stated that successful recycling program should operate with an infrastructure for on-site collection that is free and accessible. On-campus accessibility will maximize collections and foster widespread organizational support.

Consequently, inappropriate disposal of e-waste not only leads to significant environmental problems but also to a systematic loss of secondary materials. Hence the appropriate handling of e-waste can both prevent serious environmental damage and also recover valuable materials, especially metals (Hagelüken & Meskers, 2008). This paper tends to review and discuss the present e-waste situation in UKM.

2. E-waste Scenario in UKM

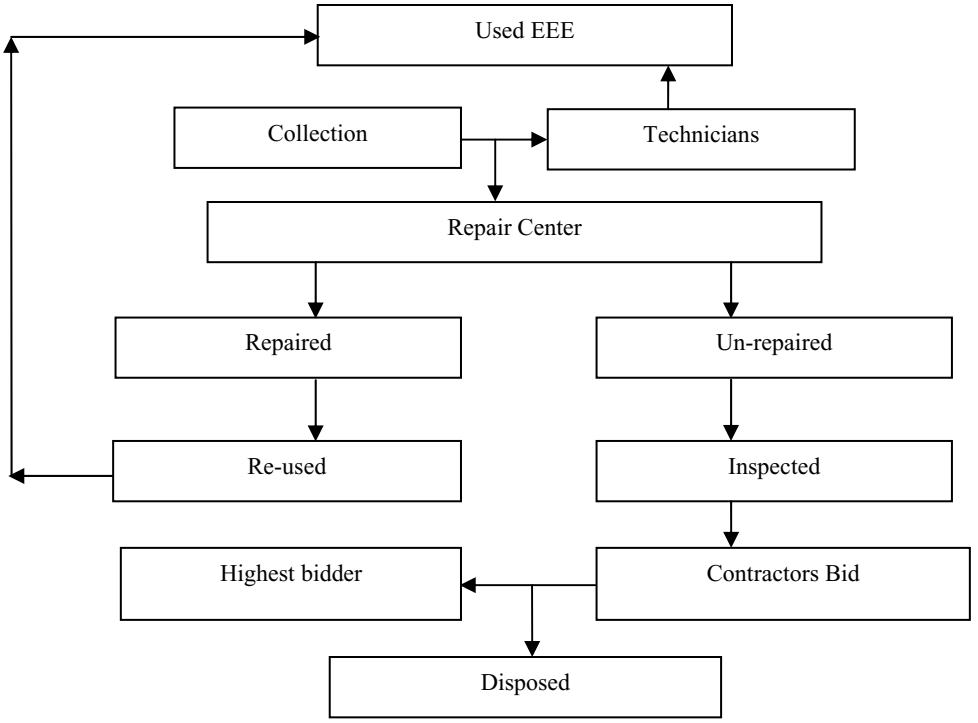
Like so many other universities, UKM is committed towards the well-being of the ecosystem as well as enhancing the sustainability of its natural and built environments through management, research, development and sustainable practices of communities within and outside the campus through some lay down principles:

i. Exhibit institutional practices which enhance sustainability and give priority to suppliers with sustainability practices;
ii. Enhances community well being and productivity;
iii. Enhances campus ecosystem health;
iv. Promotes environmental research and institutional development for sustainability;
v. Develops planning tools to support responsible decision-making processes, and
vi. Uses sustainable development indicators to continuously monitor report and improve sustainability. (UKM, 2006).

The above principles of the UKM sustainable development strategy are gradually achieved through the implementation of different programmes within and outside the University, for example sustainable solid waste management programme.

The e-waste management in UKM is still at its infancy (John et al., 2010). Presently there are over 8,000 computers within the university. Equipments valued above $900 with current exchange rate are classified as asset while below the value $900 is inventories and are not recorded in the data base (John et al., 2010). In UKM all electronic and electrical equipment (EEE) are being acquired through the asset department of the university. Although data's on these EEE are recorded, but they are still difficult to access due to lack of detailed database in storing such information (John et al., 2010). This problem also affects the data's related to the number of disposed EEE, which have reached the end of their useful life. In UKM, there are individual technicians attached to various Faculties and Institutes to service and maintain EEE's but the larger maintenance is carried out by UKM computer center.

John et al., (2010) indicated that most of the computers which are sent to the computer center are repaired. When the computers are repaired they are reused within UKM and in some cases donated to religious schools. Before computers are donated or sold to vendors, the computer center ensures that information's on the computer hard disk are deleted.



Simple Schematics on EEE in UKM
Figure 1. Source: (John et al., 2010)

In UKM, there is a simple process of e-waste management as shown in Figure 1. At the end-of computers useful life, they are collected from different locations of the campus by designated technicians and sent to UKM computer center. At the center, the computers are sometimes repaired and some are likely not repaired due to the level of damage. The un-repaired are inspected by the authorities and it's open for disposal through contractors or vendors, who pay certain amount of money to dispose them. The repaired computers are sent back to UKM as secondary system for re-use or donated as mentioned earlier. One of the problems identified in this study is the difficulty to ascertain the number of computers, repaired, re-used and disposed within a given time (month, years or decades).

3. Methodology

This study is conducted through a survey questionnaire which was distributed within the University. The survey was conducted from July to December 2009. A total of 500 questionnaires were sent to 300 employees of 10 selected Faculties and Institutes the other questionnaire were distributed to 200 students. Of the 500 questionnaires a total of 470 were returned, 270 from employees and 200 from students. The sample was split into students and employees in order to enable data from each group to be analysed separately, as it was expected that employee members would constitute a significantly different demographic group from students, and thus, there was reasons to expect some difference in attitudes and behaviours. To facilitate the returns of questionnaires by employees within stipulated time, two methods which involved dropping the questionnaire in the letter box of selected employees and a "one on one" personal conversation with the respondents were used Distribution of questionnaires to students was done randomly. The data of the survey were analysed using the SPSS 12.0 statistical package. A descriptive statistics such as percentage and correlation were also use to analyse the data from the survey. The primary and the main objective of the survey for this paper were to investigate on how UKM employees and students handle their end-of-life EEEs in their respective households, the level of satisfaction on the current collection method, the

reasons why some of the respondents are not satisfied with the collection methods in place and review on the awareness and interest of the respondents in joining e-waste scheme in UKM.

4. Data Analysis and Findings

4.1 Employees and Students Awareness on E-waste in UKM

This result is comparable with study done by John et al., (2010) which investigate on the awareness of e-waste among UKM employees and students. Table 1 is combination of the result of awareness and interest of UKM students and employees joining e-waste scheme. The study showed that only 33.5% of the 200 surveyed students knew or has heard about the subject of e-waste and 66.5% never knew or heard about e-waste. On the other hand, 46 % of the 270 surveyed staffs knew about e-waste and 54 % never knew about that. Table 1 show that both students and staff have low level of awareness about e-waste. Comparing the response of both parties it could be concluded that the staffs have a better knowledge than the student on e-waste. This shows that much is needed to be done among the stakeholders on creating awareness on e-waste and related issues within the campus and at the municipal levels.

Table 1. Awareness and Interest in Joining E-waste Scheme in UKM

Category of Response	Students Number		Percentage		Employees Number		Percentage	
Yes	67	132	33.5	66.0	123	176	45.6	65.2
No	133	68	66.5	34.0	147	94	54.4	34.8
Total	200	200	100	100	270	270	100	100

(John et al., 2010)

John et al., (2010) examined the interest of UKM employees and students to joining an e-waste scheme, since it is assumed that joining e-waste scheme would help in creating awareness on the benefits and dangers of e-waste in the environment. The response from the employees and students is an indication to implementing e-waste scheme in UKM as shown in Table 1.

This study also examined how individual households of UKM employees and students deal with their end-of-life EEE's. The result shows that 73 % UKM employees respondents repair their end-of-life EEE's, while 57.4 % of students do the same, 9 % of employees and 11.1% of students store their end-of-life EEE's while 4 % of employees and 5.9 % students donate, 12.5% of employees and 22.6 % of students throw away while 2 % of employees and 3% of students could not give any indication on how they handle their end-of-life EEE's. The result of this study shows that there is no specific e-waste collection system within the respondent's communities or they are not aware of the collection system within their individual communities. Thus, it's important for the department of environment to come up with a specific and regulated e-waste collection system within the country in other to achieve sustainable waste management.

Table 2. The measures of e-waste handling among UKM employees and Students

Category of Response	Employees Number	Percentage	Students Number	Percentage
Repair	146	73.9	155	57.4
Store	19	9.5	30	11.1
Donate	8	4.0	16	5.9
Throw away	25	12.5	61	22.6
Others	2	1.0	8	3.0

5. Expression of dissatisfaction on e-waste management among UKM employees and students.

This study examined why some individual employees and students are not satisfied with the current e-waste management (collection, recycling and disposal) in UKM campus. The result shows a very low response as about 90.5% could not give any comment on the area of their dissatisfaction on e-waste management in UKM, while 9.5%, stated out reasonably why they are not satisfied with the current practice in UKM as shown in Table 4. The result of the respondents is an indication that a lot more need to be done in terms of education in relation to e-waste management at all levels.

Table 3. Reason for dissatisfaction on e-waste management in UKM

Category of Response	Employees Percentage	Students Percentage
Poor awareness on e-waste among consumers	No comment	0.5
Inadequate enforcement	-	1.0
There is no clear indication of e-waste management		0.5
Do not have the understanding of the process		1.0
No idea about it		1.0
I never heard about it	-	0.5
I never knew about it		0.5
I have not seen it done before		0.5
I really don't know		0.5
Not satisfied		1.0
Nothing seems not to be happening		1.5
There is no enforcement	-	0.5
There is no proper management process		0.5
No comments		90.5

6. Conclusion and Recommendation

The study concludes that the awareness of e-waste management among UKM is still low. This gives an indication of the low level of awareness on e-waste at the municipal level as assumed each of these respondents represents a household within the municipality. There is also need for increasing awareness through teachings and seminars not only in the UKM but also at the municipal and local levels. The result also concludes that e-waste collection and recycling would be a good cause rather than harm to the environment, thereby fostering sustainable society. The expression of some individuals on the dissatisfaction on e-waste management in UKM is a clear indication that the individuals are thinking positively towards the environmental well being by raising few points that would help the stakeholders to take more action on e-waste management. The study recommends that Universiti Kebangsaan Malaysia should come up with strategies to collect and record data's in relation to EEEs in a more comprehensive manner.

Aknowledgments

We would like to thank Universiti Kebangsaan Malaysia for providing the research grant UKM-PTS-094-2009 and UKM-PTS-2011-137.

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