

**[IT 13] RELATIONSHIP BETWEEN GREEN INFORMATION
TECHNOLOGY PRACTICES AND ATTITUDES OF STUDENT IN SCHOOL
OF TECHNOLOGY MANAGEMENT AND LOGISTICS, UNIVERSITI
UTARA MALAYSIA**

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ABSTRAK

Green Information Technology is a study and practices of environmentally sustainable Information Technology. The lack practice of green information technology is the one issues of green information technology. When Information Technology sector growing rapidly become a problem of increasing energy waste, paper waste and electronic waste. For this research will be focused on the relationship between green information technology practices and student's attitudes. This research to evaluate the practices of green information technology and to analyse the student's attitudes of the practices of green information technology. Then to determine the relationship between green information technology practices and student's attitudes. After that to encourage the green information technology practices. This study used questionnaire survey to collect data from Universiti Utara Malaysia students. Using statistics to analyse the correlation and regression analysis, there is a positive relationship between green information technology practices and student's attitudes. In general, it can be concluded that students should be aware and practices of green information technology, but must practices on good behaviour. With the aim of getting more accurate result, except collect data from students, also should be collect data from other people in society.

Keywords: *green information technology practices, student attitudes, Universiti Utara Malaysia (UUM)*

INTRODUCTION

Background

Green Information Technology (GIT) can be defined as a study and practices of environmentally sustainable computing or Information Technology (IT). According to Murugesan (2008), GIT include the designing, manufacturing, using, and disposing of computer, servers, and associated subsystems. For example, printers, monitors, storage devices, and networking and communication systems can be to use efficiently and effectively with the minimal or no effect to the environment.

Problem statement

In this twenty-first century, environmental issues are getting serious such as pollution, climate changes, and waste problem. Emissions are growing rapidly from the information and communications technology (ICT) sector. Around two per cent of

global emissions by ICT sector, this figure will expect to double by 2020 (Greening Your Office, 2016). However, another negative impact to the environment is the usage of IT and disposal of IT activities (Elliot & Binney, 2008). When ICT sector growing rapidly become a problem of increasing energy waste, paper waste and electronic waste or e-waste.

Research objective

The objective of this research are listed as below:

- i) To evaluate about the practices of GIT of among students in School of Technology Management, Operation and Logistics (STML), Universiti Utara Malaysia (UUM).
- ii) To analyse the student attitudes of the practices of GIT of among students in STML, UUM.
- iii) To determine the relationship between GIT practices and student's attitudes of among students in STML, UUM.
- iv) To encourage the Green IT practices of among students in STML, UUM.

Limitation

For this project the research will focus the relationship between GIT practices and student's attitudes of among student in STML, UUM. So that, do this research to find practices of students doing now. After that will do the analysing to find the student attitudes for the practices. The last will to encourage the GIT practices of students.

LITERATURE REVIEW

Objective of GIT

The objective of the GIT is to reduce energy consumption of our IT equipment, to ensure that equipment is shutdown when not in use, reduce the paper consumption and work with the Change Programmes to identify the influence of the changes them propose (Kensington and Chelsea, 2008). Murugesan lists the four paths along which he believes the environmental effects of computing should be addressed: green use, green disposal, green design, and green manufacturing (Murugesan, 2008).

Benefits of GIT

According to Osch and Avital (2010), discusses there are listed benefits of GIT. Reducing power consumption and reduce the cost is the highest percentages of among the other benefits because most of the company's first priority to the environmental issues is the energy efficiency and control the cost. The businesses will be focus on environmental sustainability to solve the problem of climate change will be due to the law and regulations, market mechanisms. For example, Dell and Wal-Mart to ask their suppliers to take measures to "green up" their products and their manufacturing process, so some buyers like buy their products. They force their suppliers to concerns environmentally sound practices. In the next five years, the inevitable result is that most of the companies will provide a series of new products and services, and new business opportunities will be emerging.

Factors of GIT

Firstly, e-waste is a term used to cover items of all types of electrical and electronic equipment and its parts that have been discarded by the owner as waste without the intention of reuse (Step, 2016). Every year millions of tons old electronic products were

abandoned, cause of e-waste around the world, due to produce many new electronic products and the service life of the products (Wu et al., 2007). This kind of situation has been found that will affected developing countries including Malaysia (John et al., 2010).

Secondly, energy consumption is referring to the electrical energy over time supplied to operate an electrical appliance (Wikipedia, 2016). For example, energy use to heating and cooling, lighting, electronic equipment etc. In Malaysia, energy consumption has been risen sharply in the past 20 years, due to the requirements of industrialization and urbanization (NEBM, 2009).

Lastly, climate change is one important issue of IT. The operational aspect of ITs generates regular carbon dioxide from the myriad electronic devices we use in homes and offices (Walied Askarzai, 2011).

Practices method of GIT

For the reducing energy consumption of IT equipment is saving power consumption on electrical, and to reduce energy waste coming from desktop computing equipment by the effective way. For example, we switch off the power of Personal Digital assistant (PDA), phone and laptop chargers when we not in use. Adopting GIT practices allows people to awareness energy saving and change their behaviour to preserve energy (Weiss & Guinard, 2010). According to Shin-ichi Kuribayashi (2012), one method to reduce the power consumed by the network is to estimate the power consumption from the volume of network devices.

Going paperless is the paper document are time-consuming and costly to create, process, file, distribute, retrieve, store, reproduce and dispose of. Then the benefit of digital documents outweighs the benefits of print in many cases. For Example, we e-mail our documents to another person don't print out the hard copies. At the University of North Carolina Wilmington (UNCW) by using the digital forms are turned into write able PDF documents and then distributed to advisors use a computer, Mac or iPad to fill out the forms (Underwood, 2013).

Besides that, buying energy efficient IT equipment. This is because IT equipment generate carbon dioxide emissions and this has environmental impact. So many energies consumed by a PC, for instance, the more carbon dioxide (CO₂) emissions that will be generated by this PC. In this context, the important to consider purchasing energy efficient equipment which in turn leads to lower carbon dioxide (CO₂) emissions (National Computer Board, 2011). For example, we can buy have mark Energy Star product. Energy Star is an international standard for energy efficient consumer products.

Lastly, disposal and recycling of IT equipment. For example, we can reuse and repair ICT equipment before replacing. According to Newark and Sherwood District Council (2011), list down the methods to disposal and recycling of IT equipment are register of IT equipment, reuse of surplus equipment within the council and disposal for recycling.

This description of practices method of GIT will help student know how to practices and which benefits will get for them when they practice it on daily lives. When have

the awareness, but not to practice, this is don't implement GIT. So that, awareness and practice is associated.

Awareness and practices of GIT among students Malaysia

According to Ramachandiran (2012), examined the awareness that implement GIT in Malaysia is still at the early stage. Therefore, need more efforts to spread and in all education institutions to promote the importance of green computing to ensure successful of implementation of GIT. For example, majority students Malaysia are not awareness of Energy Star products due absence of awareness of the end- users.

Besides that, Ahmad et al. (2013), also conveyed Malaysian public universities students lack of the knowledge in use the green computing. In exploring the Malaysian universities students' awareness of green computing, the researcher found that most of students in the low levels of awareness or it doesn't have any green computing problems but the researcher no found practices for students doing to saving the environmental to reduce the carbon dioxide emissions (CO₂).

RESEARCH METHODOLOGY

Theoretical framework

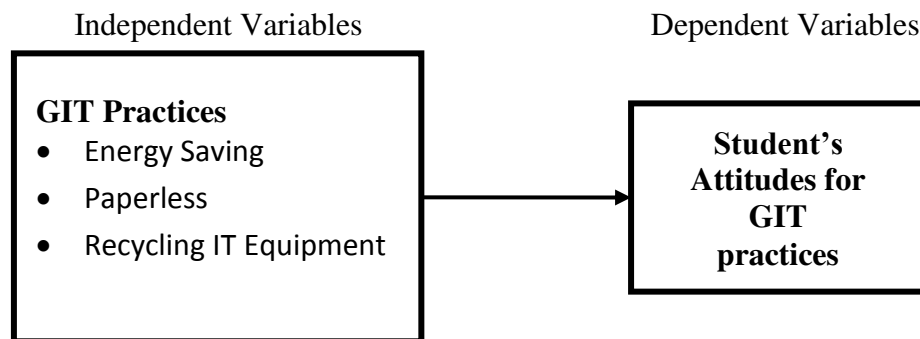


Figure 1
Student's attitudes for GIT practices framework

Hypotheses

The following hypotheses are proposed:

- H0: There is no significant relationship between GIT practices and student's attitudes among student in STML, UUM.
- H1: There is no significant relationship between GIT of energy saving practices and student's attitudes of among student in STML, UUM.
- H2: There is no significant relationship between GIT of paperless practices and student's attitudes of among student in STML, UUM.
- H3: There is no significant relationship between GIT of recycling IT equipment practices and student's attitudes of among student in STML, UUM.

Quantitative method

Quantitative method was conducted in this research in order to fulfil the objectives. In general, questionnaires are an inexpensive way to gather data from a potentially large

number of respondents (Zikmund, 2000). Hence, this study used questionnaire as the main source of collecting data from the students in STML, UUM.

Measurement of variables

In this study, questionnaires are used to be an instrument for analysis and which can be divided in to three parts:

Part A: Demographic

Part B: Question related to variables answered in five-point Likert scale.

Part C: Question related to attitudes answered in selected.

In the part A consist of five (5) questions, it is including respondent's gender, age, race, and program. All of these questionnaires can be related to the relationship between green IT practices and student's attitudes. In the part B consist of 12 questions which measure the independent variables. This part was divided into three (3) dimensions. The first dimension is questions related to "energy saving" and consists of four (4) questions while the second dimension is about "paperless" and has consists of four (4) questions. The third dimension is questions related to "recycling IT equipment" and consists of four (4) questions. In the part C consists of 12 questions which measure between the independent variables and dependent variables. This part was divided into three (3) dimensions. The first dimension is questions related to "energy consumption" and consists of four (4) questions. The second dimension is about "paperless" and has consists of four (4) questions. The third dimension is questions related to "recycling IT equipment" and consists of four (4) questions.

Population and sample design

The respondents for this survey is the students of STML, UUM. The total number of respondent are 300 because the total number of population are 1360 students in STML, UUM using the sample size for given population by Sekaran (2010).

Data analysis

After the data collected from the respondents, it has been analysed by using descriptive statistic (frequencies and means). It is a method of analysing or representing statistical data for calculating a statistic.

FINDING AND DISCUSSION

Sample characteristics

A set of 300 questionnaires were distributed to the students in STML, UUM. After that, only 290 respondents have returned the questionnaire. Therefore, 96.7% of the respondents answer completely the questionnaire.

Descriptive statistics of data collection

The demographics factors in this research are gender, age, race and program. Tables 1 to 4 below show the gender, age, race and program.

Table 1
Gender of respondents

Gender	Frequency	Percent
Male	90	31.0
Female	200	69.0
Total	290	100.0

Table 2
Age of respondents

Age	Frequency	Percent
>21 years old	62	21.4
21-22 years old	132	45.5
23-24 years old	94	32.4
24> years old	2	0.7
Total	290	100.0

Table 3
Race of respondents

Race	Frequency	Percent
Malay	122	42.1
Chinese	36	12.4
Indian	124	42.7
Others	8	2.8
Total	290	100.0

Table 4
Program of respondents

Program	Frequency	Percent
Technology Management	84	29.0
Operation Management	90	31.0
Logistics	116	40.0
Total	290	100.0

Mode and mean

Tables 5 to Table 7 provide the mode and mean scores of independent variables and dependent variables adopted in this research. In this research, the respondents were asked to rate the five dimensions on a five-likert scale ranging from never (1) to very frequently (5). Overall, the mean scores which consist of 12 items shows the positive low-medium to high-medium values which ranged from 2.34 to 3.29.

Energy saving

In Table 5, all the items have means between 2.56 and 3.79, indicating low to high level of GIT of energy saving practices of among student in STML, UUM.

Table 5
Mode and mean of items measuring the energy saving practices

No	Items	Mode	Mean
1	Do you switch off your computer to low power consumption?	4	3.48
2	Do you switch off computer when you away?	4	3.79
3	Do you charge computer overnight?	1	2.56
4	Do you charge mobile phone overnight?	4	3.34
Total			3.29

The mean of item 1, student have switch off their computer to low power consumption show that 3.48 is high level of energy saving practices. This is because most student have switch their computer to low power consumption. The mean of item 2, student have switch off their computer when away show that 3.79 is high level of energy saving practices. This is because most student have switch off their computer when away. The mean of item 3, student have charge computer overnight show that 2.56 is high level of energy saving practices. This is because most student don't charge computer overnight. The mean of item 4, student have charge mobile phone overnight show that 3.34 is low level of energy saving practices. This is because most student fear mobile phone not enough battery to use.

The mean of overall show that 3.29 is high-medium level of energy saving practices. This is because indicated that most student have involved the energy saving practices and some student have not involved are depending on their attitudes.

Paperless

In Table 6, all the items have means between 2.97 and 4.16, indicating low to high level of GIT of paperless practices of among student in STML, UUM.

Table 6
Mode and mean of items measuring the paperless practices

No	Items	Mode	Mean
1	Do you print out the slides for each subject?	4	3.70
2	Do you print out the assignment?	4	4.16
3	Do you use E-book in your study?	3	2.97
4	Do you use email to send assignment?	4	3.64
Total			3.62

The mean of item 1, student have print out the slides for each subject show that 3.70 is low level of paperless practices. This is because most student need a print out for their reading. The mean of item 2, student have print out their assignment show that 4.16 is

low level of paperless practices. This is because most lecturer need student to print out the assignment. The mean of item 3, student have use E-book in their study show that 2.97 is low level of paperless practices. This is because most student lazy to find the E-book on internet. The mean of item 4, student have use email to send assignment show that 3.64 is high level of paperless practices. This is because most student have use email to send their assignment.

The mean of overall show that 3.62 is high-medium level of paperless practices. This is because indicated that most student have involved the paperless practices and some student have not involved are depending on their attitudes.

Recycle IT equipment

In Table 7, all the items have means between 2.21 and 2.44, indicating low level of GIT of recycle IT equipment practices of among student in STML, UUM.

Table 7
Mode and mean of items measuring the energy saving practices

No	Items	Mode	Mean
1	Do you use refurbished computer?	3	2.41
2	Do you use refurbished mobile phone?	1	2.44
3	Do you take obsolete computer to recycling centre?	1	2.30
4	Do you take obsolete mobile phone to recycling centre?	1	2.21
Total			2.34

The mean of item 1, student have use refurbished computer show that 2.41 is low level of recycle IT equipment practices. This is because most student don't use refurbished computer because have problem of the functional system. The mean of item 2, student have use refurbished mobile phone show that 2.44 is low level of recycle IT equipment practices. This is because most student don't use refurbished mobile phone because have problem of the functional system. The mean of item 3, student taken obsolete computer to recycling centre show that 2.30 is low level of recycle IT equipment practices. This is because most student don't know how to find recycling centre. The mean of item 4, student taken obsolete mobile phone to recycling centre show that 2.21 is low level of recycle IT equipment practices. This is because most student don't know how to find recycling centre.

The mean of overall show that 2.34 is low-medium level of recycle IT equipment practices. This is because indicated that most student have not involved the recycle IT equipment practices are depending on student's attitudes.

CONCLUSION

In conclusion, GIT practices is important point to attain environmentally sustainable information technology. GIT practices aimed to reduce the negative environment impact of the information technology activities.

The objective of this study are to evaluate the practices of GIT and to analyse the student's attitudes of the practices of GIT. Then to determine the relationship between GIT practices and student's attitudes. After that to propose encourage the GIT practices. After analysis, the finding of this study showed that high level of GIT of energy saving practices, low level of GIT of paperless practice and low level of GIT of recycle IT equipment practices. For this three GIT practices showed the low or high level is dependent of student's attitudes. This finding show that is a positive relationship between GIT practices and student's attitudes.

Due to the time constrain, the research only able to collect data from University Utara Malaysia students. With the aim of getting more accurate result, except student should be collect data from other people in society in the future researches because of the green IT practices must be practices of all people. Besides, future researches also can focus on all GIT practices to gain more accurate result in their research works. Nevertheless, the key of study still remains, for the limitation of research do not affect from them, but it is providing a good starting point for further researcher.

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