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The Level of Awareness on the Green ICT Concept and Self Directed Learning among Malaysian Facebook Users

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Abstract

The Green information and communication technology is introduced to support the implementation of the green environment. Recent initiatives of promoting green technology and green economy which include "green manufacturing hub", green infrastructure", low carbon emission, efficient use of resources and a healthy, well-educated populace. For this study, the independent variable is the self directed learning readiness while the dependent variable is the level of awareness on Green ICT. The sample size is seventy seven student adult learners. Random sampling is the sampling method used for this study. The study is to highlight the level of awareness among Malaysian Facebook users.

Keywords: Green ICT; sustainable; self-directed learners; facebook

1. Introduction

The realization of creating a society that is very aware and practice the initiatives to sustain the environment is crucial. Policy makers and public administrators also must make policies that incline to save the world for mankind to prosper and develop in this world. People are becoming more aware about the concepts and policies of sustainable development, global warming and the 'green' concept. Following this, initiatives for a collective effort to save the world on the part of human beings is urgent. The

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Brundtland Report which was published by the World Commission on Environment and Development in 1987 (United Nation Headquaters, 2012) has set a guiding principle of sustainable development. Since then sustainable development become a visionary development paradigm among governments, businesses and civil society in the sustainable process. However, the concept did not work well as the implementation become difficult as being reported in the Brundtland Report (United Nation Headquaters, 2012). This report had witnessed a drastic awareness across the world since decades ago. However, the citizen engagement in the taking care of the environment is still a long way off. Malaysia is not far behind as The "Green" practices in Malaysia are rather 'snail' phase and intermittent. The country may have started some fifty years ago with the smoke free environment through the "no smoking" and energy saving campaigns as well as recycling, land conservation and animal conservation but the unsustainable practices continues and sustainable development has not make real progress. These programs were initiated towards similar purposes of saving the world we live in. Nevertheless, endless initiatives through campaigns to include promoting green technology and green economy which include "green manufacturing hub", green infrastructure", low carbon emission, efficient use of resources and a healthy, well-educated populace being conducted to increase the awareness of the citizen that taking care the environment is a salient factor to be considered for future development. With all the green buildings and green technology, it is important that the attitude and thinking of the public are also "green". In fact, the statement of 'thinking green" among the people can be a salient factor for the success to reduce the problem of pollution earlier mentioned. Therefore, this paper the Green information and communication technology (ICT) is introduced as a method to support the implementation of the green environment and green technology. For this, a changed in the learning style is discussed. In the Green ICT technology environment, learners and instructors are engaged in ICT as a method of teaching and learning that is using internet as the medium to get connected with each other. Besides engaging the learner with the ICT, using ICT can combat climate change as learning will be made possible with video via online interaction. This is able to minimize the use of transport thus reduced emission of carbon dioxide as one of the reasons for global warming. The purpose of this research is to examine the level of awareness on the concept of Green ICT among the Malaysian self-directed learners who are also Facebook users. The study is to highlight how Facebook can be put to a good used specifically in raising the awareness to address issues of ecological imbalance and global climate change that affecting many parts of the world. Together to take actions to minimize the environmental impact that prevails.

2. Literature review

Energy consumption is one of the urgent issues in the sustainable development that need special attention by humankind in this lovely world of ours. The world that we live should be "environmentally friendly" as to ensure a healthy environment to live comfortably thus, quality of life can be improved (Theivaa, 2010). Green ICT is one way towards energy conservation and it is one domain that is crucially should be given an attention as ICT is greatly used by human in daily activities. "The Green ICT allows for users to identify energy saving opportunities and possibly adjust their behavior to conserve energy" as stated by Weiss and Guinard, 2010. Thus so, many of computers today are installed with a low energy devices such as energy efficient monitor logo. Good practices such as to turn off the computer when not in used are habits to be encouraged through campaigns and programs. By definition, Green ICT is about the study and practice of using computing resources in an efficient, effective and economic way (OECD, 2009). The term efficient construed doing things in a right way while effective would refer to doing the right things (Encylopedia of Management, 2006). Some of the examples of Green ICT would be the energy saving, disposal of electronic waste, virtualization of server resources, regulatory compliance, telecommuting, end-user satisfaction and return of the investment on the product used (OECD, 2009). An

article which highlighted the crisis as human population continues to grow which give influence to the environment such as air and water pollution has become a threat to the health of the human life (Nathan, 2010). Therefore, due to these pollutions, an effort to cope towards a healthy life is viable and the ICT system can be included as an integral part of this effort. This claim is in line with Nathan, 2010 that a "modern information tools are well poised to help people around the world shift to more sustainable life-style". In order to give support to a more sustainable behavior in the use of ICT, this study had given a focus to the self-directed learners from the distance learning program which use of ICT technology as their mode of learning. A self-directed learner would refer to an adult learner attending a distance learning program as an off-campus program. According to Knowles (1984), adult learners are referred to an individual that able to manage and responsible for his or her own life. In this context, the criteria set by Knowles (1984) do match with the self-directed learners as they are a working adult with responsibilities. The creation of this type of learning is popularized among the working individuals looking for opportunities to enhance their skill and knowledge academically.

The higher demand for higher education is also a contributing factor for the creation of the distance learning that proliferate the establishment of self-directed learning in Malaysia in particular. The Malaysian national agenda of 2020 to make the citizen to be a knowledge-based society propagate this mode of learning even more. Presently, most of the public universities cater this mode of learning alongside with many private colleges that take part in this program. Generally, the distance learning program is conducted with the aid of the internet technology.

Due to this nature of delivering the learning activities, distance learning construed to the online learning or better known as an eLearning. Since sustainability issue as a goal for this study therefore, emphasis on energy saving on the use of ICT among the self-directed learners attending the distance program is to find whether their behavior in the learning process do contributing to the sustainable energy conservation. The awareness level on the environment protection among the self-directed learners naturally, highlighting the behavior of sustainable energy conservation. It was stated that energy consumption through the use of electricity in Malaysia comprised 90% of energy used (Zainordin, et.all, 2012). Since ICT is heavily relied on the electricity, the Green ICT should be given a consideration in an effort to reduce its consumption. Thus, a world of better future is promising.

3. Research question, objectives and hypotheses

This study aimed at determining the level of awareness on the Green ICT concept. The level of awareness will indicate how much people understand the concept of Green ICT. This is very important so that decisions can be made to further initiate more campaigns on Green ICT. Green ICT has many benefits which include reduce the usage of hardware, less carbon emission, and reduce resource consumption. Facebook users interact not only locally but globally. They are chosen for this study is to measure their level of self directed learning, whether it is high, average or low. If they have a high level of self directed learning ability, therefore they will have lots of initiatives to find information online. Since their Facebook "FRIENDS" are linked, information on Green ICT can be found in the internet. It is assumed that the higher the level of self directed learning, the higher is the level of awareness. The research questions are:

- What is the level of awareness on the Green ICT among Malaysian Facebook Users?
- What is the level of self directed learning ability among Malaysian Facebook Users??
- What is the relationship between the level of awareness on the Green ICT concept and the level of self directed learning among the Malaysian Facebook Users??

The research objectives are:

- To determine the level of awareness on the Green ICT among Malaysian Facebook Users

- To determine the level of self directed learning ability among Malaysian Facebook Users
- To determine the relationship between the level of awareness on the Green ICT and the level of self directed learning among the Malaysian Learners
- The hypotheses are as follows:
- The hypotheses null is H0 – There is no relationship between the level of awareness on the Green ICT and the level of self directed learning among the Malaysian Facebook Users The alternative hypotheses is Ha- There is a relationship between the level of awareness of the Green ICT and the level of self directed learning among the Malaysian Facebook Users.

4. Methodology

This study is adopting a descriptive approach, where data derived through the quantitative methodology. Seventy seven students from the University of Technology MARA who are enrolled in distance learning programs are selected randomly. Another selection criterion, the respondents must have a Facebook account. A survey with 18 item questionnaire was designed to measure the level of awareness of the Green ICT Concept. The alpha cronbach for this survey instrument is 0.75 which shows that this instrument is reliable. The distribution of the questionnaire was self-administered to ensure a high return rate from the participants. For this study, the independent variable is the self-directed learning variable while the dependent variable is the level of awareness on the Green ICT. The sample size is seventy seven adult learners enrolled in the University Teknologi MARA Malaysia distance education programs. Purposive sampling of learners with an account of Facebook selected as the sampling method for this study.
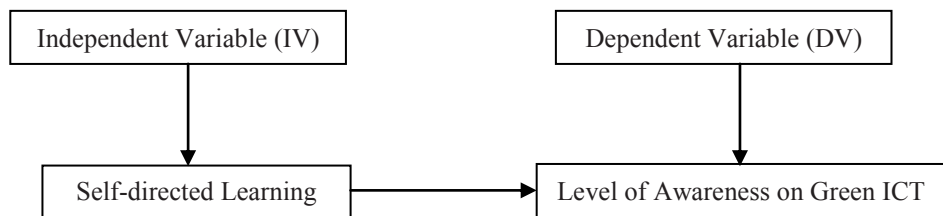
Fig. 1. Demonstrate the conceptual framework of the study

5. Findings and analysis

The scale to measure the level of awareness of Green ICT is highlighted in Table 1.

Table 1 . Demographic profile of the respondents

Variable	Mean Score
Age	28
Working Experience	8
Academic Achievement	2.46

The respondents have the mean age of 28 years old, and most of them have 8 years of work experience. The academic achievement is 2.46.

Table 2 . The Scale

Level of Awareness	The score
High level	67.5-90
Average	45-67.4
Poor	22.5 – 44.9
Below Average	0-22.5

The scale use to measure the level of awareness can be viewed in Table 2. The score of 67.5 – 90 represents a high level score; 45 – 67.4 represent the average score, while a poor score is from 22.5 – 44.9. A score of below 22 – 0 is considered as below average.

Table 3. The level of awareness of the Green ICT concept

Variables	N = 77
Level of Awareness	66
Minimum	46
Maximum	87
Standard of deviation	7.33

Table 3 shows the level of awareness on Green ICT concept among students surveyed. The level of awareness is 66 where the minimum level is 46 and the maximum level is 87. Therefore, it can be concluded that the level of awareness among students on Green ICT is at the average level.

Table 4. The scale of SDLR

Level of SDLR	The score
High level	18.8-25.0
Average	12.5-18.7
Poor	6.25-12.4
Below Average	<6.24

The scale of Self-Directed Learning (SLDR) is shown in Table 4. The high level of awareness is represented a mean score of 18.8 – 25.0, average level 12.5 – 18.7 and a poor level from 6.25 – 12.4. A mean score of 6.24 and below is considered as below average.

Table 5. The level of self directed learning (SDLRS)

Variables	N = 77
Level of SDLR	17
Minimum	4
Maximum	25
Standard of deviation	3.4

The level of SLDR from the survey can be found in Table 5 above. From the table, it shows that the level of the SDLR of the students surveyed is at a mean score of 17. The mean score of 17 is in the average range level. Thus, it can be concluded that the self directed learning ability of the students is also at the average level.

Table 6 . Correlations between two variables

		Level of Awareness	Self Directed Learning
Level of Awareness	Pearson Correlation	1	.797**
	Sig. (2-tailed)		.000
	N	77	77
Self	Pearson Correlation	.797**	1
Directed	Sig. (2-tailed)	.000	
Learning	N	77	77

**Correlation is significant at the 0.01 level (2-tailed)

Table 6 shows that there is a high correlation between the two variables that is the level of awareness of the Green ICT concept and the variable of Self Directed Learning and the significance at the .000 level. Therefore, the hypotheses Ha - that there is a relationship between self directed learning and the Level of Awareness on the Green ICT is accepted.

Table 7. Analysis of items 1 -18

Item	Mean Score	Standard Deviation
Aware of Green ICT Concept	3.41	1.05
Read Green Ict Concept	3.09	1.11
Know the meaning of the Green ICT Concept	3.18	1.06
Practice Green ICT Concept	3.11	.93
Prefer to use online forum for discussion	3.89	.66
Use ICT to minimize travelling	3.97	.76
E-module and books support learning	3.89	.78
Minimize printing hardcopy	3.36	1.09
My PC having energy saving feature	2.95	1.23
Use laptop to access study materials 24 hours	3.81	.88
Buy electronic device with energy saving feature	3.69	.79
Switch off computer after use	4.20	.75
Aware reduction in paper usage will save trees.	4.14	.70
Discard USED computer to the recycle centre	3.61	1.00
Use the computer for useful purposes	3.92	.88
Manage time to avoid unnecessary wastage of energy	3.87	.76
Take initiative to learn about Green ICT	3.79	.86
Aware of the damage for not taking care of the environment.	3.92	1.14

The mean of each item will be reported by analysing the items according to the level of awareness of the respondents towards the concept of Green ICT. The level of awareness is reported in Table 8. 14 items from 18 items reported a high level of awareness. The highest reported are two items which are:

- Item 12 " Switch off the computer afte use " which receive 4.21 and the item 13 "Aware that the reduction of paper will save trees" receive the mean score of 4.20 and 4.14 respectively. This is a very positive sign for the energy saving attitude and the knowledge on saving the trees is demonstrated here.

- Item 6 which is " the use of ICT to minimize travelling" receive the mean score of 3.97 and item 15 "use the computer for useful purposes only" and item 18 "aware the damage for not taking care of the environment" both receive the score 3.99.

The use of ICT to minimize travelling refers to using ICT to enhance the efficient of energy use and reduce the movement of people and goods. The most common are web based conferencing services, and this is happening in Malaysia now. The awareness to use the computer for useful purposes is important. Computers allow the acceleration of scientific achievement in the last few decades. At present as a result to technology development and the massive usage of computer significant changes have begun to occur in our natural environment. Computers are very close to human beings and to the environment. The lifetime of a computer which include the production of computers, the usage of computers, and disposal of computers - makes it closely and significantly related to the environment. The production of a computer involves trace metals and other toxic materials that pose health hazards to the people who handle the computer production. Computer are beneficial, its usage can lead to environmental benefits. For example, computers enable the study of complex environmental systems, will develop greater ecological education, or will initiate "paper-less" offices. However, at the end of the life span of the computers, they create disposal challenges posed by hazardous materials present and much difficulty in recycling them. Item 18 related to the awareness of the damage for not taking care of the environment. The score is high. When people are aware, they can make, initiate and influence changes. Environmental awareness can be a tool for envionmental policy making and management. The damage on the environment has increasingly become a serious issue. As of today, the global climate changes has result that the world is facing

earthquake, landslides, floods and tsunami at a weekly basis the entire third quarter of 2012. There are another 5 items that show significant high mean scores. They are:

- Item 7 "e- modules and books support my learning" with a mean score of 3.89,
- Item 16 "manage time to avoid unecessary wastage of energy" with a mean score of 3.87
- Item 10 " use laptop to access study material in 24 hours" scored 3.81
- Item 11 " Buy electronic device with energy saving feature" scored the mean of 3.68
- Item 14 " Discard used computer to the recycling centres" scored a mean of 3.61.

    Students now use electronic book and module for learning. The attitude of the public is changing for a paperless society. In the mainstream, it is found that students prefer e-book rather than carrying a bag full of heavy book.   The usage of e-books is related strongly to sustainable development initiatives. It is also related to time management and energy consumption. Another issue is the process of disposal of computers. Safety issues are the most important agenda here. Certain chips and electronic devices of the computers need to be handled with precaution as it can be damaging to health and environment. An example would be if these computers and computers equipments are burnts, it can increase carbon dioxide emission. This can cause hazards to the environment as well as posing a threat to the safety and health of the public. Item 17 will relate to the "initiative to learn about Green ICT". This item scores a mean of 3.79. This is a high score and a very positive score that the respondents are self directed in getting more information and knowledge on the Green ICT. The items that receive low mean score (2.95) are item number 9 "PC have energy saving features". From observation, most public organizations have PC with the logo "ENERGY SAVING".

Table 8. The level of awareness according to the mean score of items

Level of Awareness	The score
High level	3.34 – 5
Average	1.68 – 3.33
Poor	0-1.67

6. The limitation of the study

The sample size is small, therefore, a bigger sample will generate different results. In the study, no generalization will be made.

7. Conclusion

Awareness is an important tool to study the attitude and behavior of people. It is also an important tool for policy making and management. In this study the important findings include:

- The level of awareness on green ICT is average and the level of self directed learning is average.
- There is a relationship between the two main variables, Level of awareness on the Green ICT and the level of self directed learning ability.
- The respondents are the working adults who have much working experience plus enroling into the distance learning programs.
- Their level of self directed learning is average. These distance learning programs are implementing the "Green Concept" without much campaign on the issue.

For example activities that relate to the Green Concept are:

- The usage of e books,
- The energy saving attitude where students only travel 5 times per semester to meet their instructors ,
- Assignments that is posted in the emails to support the paperless concept.
- Energy saving PCs is located in all labs and library of the university.
- The weakness of this study is that it has a small sample. It is only a preliminary study to get a surface picture on the entire issue. Future research are planned to get a bigger sample, to further initiate recommendations for the government for policy making purposes.

These are recommendations:

- Increase more initiatives to increase level of awareness towards green ICT by making it a National agenda.
- To create more recycling centres for computer disposals.
- To create more recycling centres in universities and learning centres as well as schools.
- To create models of Green ICT communities that practices the green concept.
- To initiate the usage of Online Social Networking (OSN) platforms as a mechanism to promote Green ICT.

As a conclusion, any iniatitives and programs from many parties be it organizations, NGO's as well as an individual and the public at large, focussing on the sustainable of ICT environment for future development seems to be very crucial in order to make the world we are living-in become a place for comfort and leisure. Therefore, the measurement findings of this study to highlight on how the application of ICT among the self-directed distance learners about their level of awareness on Green ICT will increase the understanding on energy conversation. Any effort towards the awareness on promoting energy conversation will not be done on a short term basis. Program on campaigns as well as doing research to solve the problem of pollutions as mentioned earlier in the paragraph should be increased. Promoting green technology through campaigns and events to increase the level of understanding on the danger of not taking care of the environment will only jeopardize the health. The consequences will lead to the lowering the quality of life for the people generally. Future research should be undertaken to study the level of awareness among the Malaysian community and as the dependency on computer technology increases, the green ICT practices becomes more critical for the world to sustain its environment.

Acknowledgement

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