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Awareness of Green IT towards Improving Environmental Sustainability in Varsities: Case Study of Federal University of Technology Minna, Nigeria

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Abstract. Going green means to live life as an individual, as well as a community in a way that is friendly to the natural environment and is sustainable for the earth. In other words, it means contributing towards maintaining the natural ecological balance in the environment, and preserving the planet and its natural systems and resources. Presently, not much is known about the climate change implications of carbon emissions from the ICT resources. Green Information Technology (IT) strives to achieve economic viability and improved system performance and use, while abiding by the social and ethical responsibilities of the society. It is important to take into cognizance how IT equipments are efficiently utilized without compromising the environmental sustainability, the economics of energy efficiency, which includes the cost of disposal and recycling within usable built environment. This research is aimed at evaluating the level of green IT awareness in academic community in order to ascertain the effort required to achieve a sustainable environment with green IT. The studies therefore examined how conversant are the members of academic community with IT and how the IT equipments they use contribute to climate change. The study adopted descriptive research model. The population of the study is 1350 respondents which comprises of 510 students, 670 academic staff and 170 non-academic staff of Federal University of Technology Minna. A structured questionnaire was randomly administered to the respondents. The data was analyzed using simple descriptive statistics. Findings from the study revealed that majority of the sampled population are conversant with IT equipment but are not aware of the concept of green IT. Moreover, most of the respondents are not aware of how green IT can improve environmental sustainability. The study revealed the need for creating awareness of green IT contribution to environmental sustainability in academic community.

Keywords: Energy, Environment, Green, Green IT, Information technology (IT), Sustainability.

1. Introduction

The investment in Information Technology has obviously grown over the years as a result of the globalizations and activities have been influenced by Technology. Information Technology has influenced virtually all disciplines and has become inextricably intertwined with business. This is a societal Push on all Organisations because it is a natural change that is occurring in Organisations. Any Organisations that failed to align her activities with IT will find it difficult to operate in this contemporary time.

The shift into the electronic world has greatly influenced the way activities are been carried out, which is a great plus to Information Technology. Educational activities have completely improved from the face to face, laboratory practical, chalk board etc to more advanced system. Now learning have gone electronic, from registration, admission, lectures, assessment, grading and even the administration of learning have been influenced by Information Technology.

As IT becomes more central to the survival of the company, the planet is been polluted as a consequence of the emission from IT devices like the Monitors, Central Processing Unit, Papers use for Printing, Radiations from Radios and Satellites and so on.

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The question is, can this be regarded as development or destruction of the planet? Although, David and Dale argued that what we need is a more sustainable livelihood where we can enjoy nature's bounties without depriving the inheritance of the future generation [7]. If some of the pollutants emitted by the Information Technologies tools can be reduced then It will become green, which will help the Organizations to get green and stay green.

2. Objectives of the Study

(i) To evaluate the level of awareness of green IT in academic institutions;
(ii) To assess the level of concern given to green IT by members of academic institutions when purchasing ICT equipment

3. Related Work

Brown *et al.* develops information matrix to identify alternative management strategies for framing and responding to environmental issues in accounting information systems [4]. According to the research work, such environment friendly Accounting Information Systems (AIS) offers two benefits to the organization. First, it provides management with required opportunity and awareness of prospects and risks of environmental friendly information systems. Second, it supplies necessary information to implement environmental strategy.

As IT continues to be part of environmental problems, so also will green IT becomes imperative in attempts to proffer solutions through IT [10]. Murugesan suggests various approaches, such as, tactical increment, strategic, and deep green as means to implement enterprise green IT strategy in addition to comprehensive green IT awareness.

Murugesan presents a model that defines green IT from four different perspectives, while Chen *et al.* pursues ecological sustainability by suggesting a conceptual model and proposition with regards to information systems [6]. In attempts to explore green IT and organization activities, researchers also focus on green IT coverage by Information Technology Management Service (ITMS) frameworks. Carter-Steel and Tan reveals limited support for green IT by Information Technology Information Library (ITIL) a leading ITMS [5].

Awareness is reported to be effective tool in achieving pertinent goals areas of information security [3,9,10] and other numerous areas of human endeavors. Therefore, researches to uncover and access level of awareness about green IT is current and ongoing. Ansari *et al.* carries out research to assess awareness, current and past practices of green IT in Bangladesh [1]. The research focuses on mobile phones and batteries.

Follow-up research [11] conduct descriptive studies to measures green IT awareness of IT professionals in Indonesia and compares the research findings with result of green IT awareness and attitude of same professionals in other countries. Malandrino *et al.* examines awareness of green IT concept among face book users [10] using descriptive research and data were drawn from descriptive methodology. These research methodologies and objectives are related to our study but our data will come from academic institution in Nigeria.

However, in academic environment, Hong Kong promotes green IT awareness among students using cloud technology, online interactive games, physical environment and competitions [2]. Existing literatures on green IT awareness in Nigeria is yet to be conducted or rather published in high impact journals. Oyelude and Alabi appraise awareness of green initiative among librarian and within the context of Nigerian university libraries [12]. The study is neither directed to green IT nor cover entire university community. Awodele *et al.* develops possible green IT model [2] as output of research conducted for carbon footprint in a Nigeria educational institution for adoption. The model includes green IT awareness as a vital component. Therefore, this research work will provide a quantitative data of green IT awareness of an academic community in Nigeria.

4. Methodology

The research employs a case study of Academic institution in Minna to find out the awareness of Green IT amongst the staff and students of Federal University of Technology Minna. The population of studies comprises of Academic Staff, Non-Academic staff and the students. The total population of the University is about 12,000 (inclusive of staff and students).

The research instrument used in this research is structured questionnaire. One thousand three hundred and fifty (1350) questionnaires were randomly administered. The questionnaire contains three sections; Section one cater for demographic information of the respondent, section two access the level of awareness of respondents to green IT and three point out consideration for environmental sustainability. The questionnaire was a close ended questionnaire to elicit guided responses and for easy analysis.

5. Data Analysis

A total of ***1350*** questionnaires were administered to academic staff, non academic staff and the students of Federal University of Technology Minna Nigeria. A total of 1080 males (80%) and 270 females (20%) were the respondents that participated in the study. Table 1 shows the age range of the respondents.

6. Discussion

6.1 *Demography*

More than 72% of our respondents are aged 31 years and above this agrees with the statistics that 49.2% of the respondents are academic staff that use IT equipment. Also 20.7% are between 21 to 30 years of age, most likely

Table 1. Age range.

Age range	Frequency	Percentage (%)
15–20	90	6.7
21–30	280	20.7
31–40	910	67.4
51 and Above	70	5.2
Total	1350	100.0

Table 2. Cadre.

Cadre	Frequency	Percentage (%)
Student	510	37.8
Academic Staff	670	49.6
Non- Academic Staff	170	12.6
Total	1350	100.0

Table 3. Awareness of the concept of green IT.

S/N	Questions	YES	NO
1.	Are you conversant with ICT Facilities, like computers, printers, mobile phones etc?	1280 (94.8%)	70 (5.2%)
2.	Have you heard of the term Green IT before now?	490 (36.3%)	860 (63.7%)

Table 4. Knowledge of green IT.

S/N	Question	Absolutely	Basic Understanding	Not at all
1.	If you have heard about Green IT, do you understand what Green IT is about?	150 (11.1%)	470 (34.8%)	730 (54.1%)

Table 5. Can green IT curtail global warming.

S/N	Question	SA	A	D	SD	I don't know
1.	Do you agree that Green IT can curtail global warming?	130 (9.6%)	540 (40%)	70 (5.2%)	20 (1.5%)	590 (43.7%)

Table 6. Guiding factors when purchasing ICT equipments.

	Guiding Factors	Accepted Factor	Not Factored
Factors that guide you choice when buying ICT equipments like Desktop, Laptops, Phones, Tablets, Television, Satellites etc.	Cost	420 (31.1%)	930 (68.9%)
	Ease of Use	260 (19.3%)	1090 (80.7%)
	Performance	880 (65.2%)	470 (34.8%)
	Aesthetics	70 (5.2%)	1280 (94.8%)
	Eco-friendliness (Energy Star Label)	110 (8.1%)	1240 (91.9%)

representing students with a population of 37.8%. Hence, the academic staff and students constitute large percentage of the university population in this study and they fall within the age bracket of elite with passion for ICT products.

6.2 *Awareness of the concept of green IT*

It is not a surprise that over 74% respondents are conversant with ICT facilities because the survey covers academic institution where most of the populace are educated and employ the facilities for works, studies and communication. The remaining percentages of those who are unaware of ICT facilities accounts for uneducated casual staff with the institution. Although, most respondents are conversant with ICT facilities, less than 37% of respondents have heard green IT.

6.3 *Knowledge of green IT*

Among those who have heard about green IT, 54%, 34% and 11% have no knowledge, basic knowledge and absolute knowledge of green IT respectively. The result indicates that even if 37% claim to have heard about green IT, those who do not have green IT knowledge outnumbered those with basic and absolute knowledge combined.

6.4 *Curtailing global warming with green IT*

More than 43% respondents do not know about the positive contributions of green IT to reduction of global warming. This agrees with the fact that 54% are unknowledgeable of green IT. Therefore, the result concur with general believe that people should not be expected to agree with concept or idea which they know nothing about, especially in academic surroundings. Similarly lack of green IT knowledge can be responsible for those who disagree or strongly disagree representing 5.2% and 1.5% respectively. Awareness of green IT, basic and absolute knowledge of green IT can be attributed to 40% and 9.6% of respondents who agreed and strongly agreed respectively, that green IT is a good drive to curtail global warming.

6.5 *Guiding factors when purchasing ICT equipments*

The result shows that performance factor having 65.2% is the most factored guide above other factors when respondents buy ICT equipments. Consideration given to green IT by respondent is 8.1%, meaning that 91.9% of the respondents do not factor green IT when purchasing ICT facilities. Although, 11.1% of respondents claim to have absolute knowledge of green IT and 9.6% strongly agreed that green IT can restrain global warming, only 8.1% actually use green IT when shopping for ICT equipments.

7. Conclusion

This research work measures green IT awareness in university community to elucidate perception of the community towards global warming. Although significant numbers of those sampled are conversant with ICT facilities only few are aware of green IT and its contribution to curbing global warming. Thus, there is slight difference in responders answer to knowledge of green IT, conviction about use of green IT to promote friendly environment and readiness to include green IT as crucial when purchasing ICT facilities.

There is need to promote green IT awareness in academic environment especially among academic staff and student, because these classes of university members are mostly elite with considerable population and high yearning for

ICT products. They will no doubt, be instrumental in creating needed awareness and abiding with green IT policy on campus, where one is available. The research outcome also indicates the need for extensive and comprehensive ICT consumers' enlightenment program that centers on factoring eco-friendliness of ICT products. Members of the community should be encouraged to accord almost same priority to eco-friendliness as demonstrated for product performance in the study, to engender green environment on campus and reduce global warming at large.

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