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Adopting Green ICT at Egyptian HEI: A Step towards Sustainable Future

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Abstract:

One way to sustaining future and environment protection is the use of Green ICT. This paper investigates the practices of Egyptian HEI regarding Green ICT. Moreover, it highlights the benefits as well as the barriers to Green ICT adoption, also the good and ill impact of ICT is illustrated via the green theory. Practices of Egyptian HEI regarding Green ICT collected through the survey of HEI websites, also, the paper takes an interdisciplinary approach drawing together literatures from a variety of fields, including green theory, information systems, green economics, energy, waste management, and transport research. The paper reveals that GICT is major component at Egyptian HEI for sustaining future. Also, it concluded that the most important issue that may influence the success of the adoption of GICT is motivation and support exerted by HEI management.

Keywords: GICT, HEI, GICT barriers, GICT benefits

1. Introduction

This paper focuses on issues related to green ICT (GICT) practices by Egyptian higher education institutions (HEI), as well as the benefits and the barriers faced by HEI in their adoption of GICT. Staff and students should be trained and motivated to adopt green practices regarding their use of ICT, this approach aid in saving costs and sustaining the environment.

Currently, one of the most important issues, is achieving cost effectiveness and environment sustainability, while keep running operations using ICT. GICT highlights the impact ICT has on the environment and environment change.

HEI, as a high consumer of the latest technology in teaching and learning, considers one of the enormous producers of e-waste (AICTE, 2013). This same opinion is shares as well by Porritt (2010), who declared that one of the major challenges facing the environment is the global warming caused by carbon emission, Porritt illustrated that ICT use in education is considered one of the causes of carbon emission as well as e-waste.

Due to the fact that ICT is invading all aspects of our lives and due to the increasing number of HEI; the adoption of GICT becoming a major issue towards achieving cost effectiveness and environment sustainability. Going green will save the environment and ultimately saving the earth, as well as being vital in solving various environmental problems (Riaz et al., 2010).

Adopting GICT benefit HEI in many ways as it reduces the overall energy cost, reduces the dangerous environmental effect of ICT, increases satisfaction of stakeholders, and improves HEI image in local societies (Chai & Nakata, 2011). All these benefits are considered essential for future sustainability. The logic behind these benefits is as follows:

- Improving HEI Image: adopting GICT is a way to achieve social responsibility, which enhances the overall image of HEI in such societies.
- Conforming to Authorities' Regulations: following green practices, HEI comply with regulations aiming at preserving natural resources and future sustainability. Being environment friendly is good for the economy and contributes to saving the resources of the country as a whole.
- Environmental Sustainability during ICT Consumption: conforming to GICT practices preserve natural resources and ultimately contributing to environmental sustainability.
- Reducing Overall Energy Cost: following GICT practices, HEI not only reduces energy utilization but also energy cost, and ultimately contributes towards preserving natural resources.
- Reducing Carbon Emission and e-Waste: following GICT practices of reusing and recycling, HEI contributing to the reduction of carbon footprint and dangerous e-waste.

Due to these widely recognized benefits, there is a widely accepted appeal to save earth and reserve natural resources, although worldwide, there is a very limited governmental standards aims to enforce this appeal. HEI management starts to pay attention to this important issue due to the huge energy bills they have to pay, although staff and students may not know anything about it, or how much their usage for ICT contribute to it, staff and students have to find motivation to adopt GICT practices, which would face several barriers as follows (Wabwoba et al., 2012):

- Lack of governmental GICT practices' standards and regulation.
- Inadequate research and development of GICT initiatives.

- Lack of educational and training awareness of GICT practices by HEI.
- Lack of participation and motivation among staff and students.
- Lack of adequate funding and support from HEI management.
- Widespread of unconcerned environmentally cultural.
- Lack of good green procurement practices for ICT components at HEI.
- Widespread of the concept that ICT's environmental impacts are not significant.

2. GICT Awareness & Environmental Impacts

Although there is an increasing awareness among technological specialists regarding its important environmental impact, it will require more time in order to be widely accepted among ICT users (Fair-weather, 1998). In the same context, there is an increase in the global awareness of the importance of GICT. For instance, German HEI adopting GICT by forming GICT communities each of more than 300 members, which stimulate and help HEI to go green (Hankel, 2013). On the other hand, UK adopting GICT in a form of policies that direct HEI to go green in order to reduce carbon dioxide releases and to reduce Greenhouse gases progressively (Chai & Nakata, 2011; Pandey, 2010).

This issue is getting more and more attention as the number of manufactured technological devices is keep increasing, and its life cycle is keep decreasing, thus adding to the hazardous environmental impact (Kawa & Golinska, 2010). Adopting GICT practices significantly reducing this dangerous environmentally impact and reducing the overall energy bills, which constitute a mandate that push HEI management to go green (Murugesan, 2008).

There is a recognized opinion that the use of ICT has significant energy consumption, regardless the used form of energy generation. Every form of energy generation, even the best, has its disadvantages, even if we can get to a situation where our energy needs are met by renewable energy, the green view always will be that there are good reasons to try for improved energy efficiency. We have opportunities to reduce energy consumption by making use of power management practices (O'Neill, 2010).

Researchers have agreed that GICT is about what directly reduces the carbon footprint (O'Neill, 2010; Ghose et al., 2010). But, in a broader point of view, to be green is all about pursuing welfare for all, in an approach that is suitable with the requirements of the lasting effects on naturalness and on members of the environment (Barry, 2008; Markvart, 2009; Fletcher, 2009).

Although the majority of energy use for ICT is in production, not operation (Williams, 2004), ICT use impacts for energy can be considered to be at least as important as those of manufacturing (James & Hopkinson, 2009).

Some organizations substitute older ICT devices, with new more energy efficient ones, in order to be more earth-friendly. This practice might not always be the most environmental efficient solution (Kurz, 2008). Since there is significant debate about whether or not lifetime use accounts for more environmental impacts of ICT than production does (James & Hopkinson, 2009), replacing older devices, with new more efficient models, will only in exceptional situations yield environmental benefits.

Disposal and recycling encompass only a relatively minor percentage of the lifecycle energy impact of ICT (James & Hopkinson, 2009). Although e-waste can have major effect on pollution, this may be significantly lessened by the use of proper recycling (Silicon Valley Toxics Coalition, 2010).

O'Neill (2010) points out that the ICT industry is responsible for approximately 2% of worldwide carbon emissions, ICT is in a unique position to influence the other 98%. This leaves a heavy responsibility regarding how ICT can be best used to influence and promote environmental responsibility.

3. HEI and GICT

Adopting GICT is a mandate by the environment itself, as ICT has harmful effects on the nature including people and ultimately the earth. Adopting GICT practices benefits HEI, as it results in enhancing HEI image, reputation and credibility. All these benefits achieved when HEI meets social responsibilities.

ICT have the potential to substitute travel and commuting, with positive environmental effects, but that prospective is generally unrecognized. GICT practices would lead to a huge reduction in carbon emission through its replacement to transport and commuting; this is an enormous positive effect since transport and commuting accounts for almost one-fourth of carbon emission (Roby, 2010). More positive effect for using GICT practices is in substituting air travel, as aircrafts carbon emission is more damaging to the climate than ground vehicles emission (Chapman, 2007).

GICT comprises strategies and practices that deals with environmental sustainability and undertake corporate social responsibility by minimizing carbon footprint, ICT waste as well as optimizing energy consumption and sustaining natural resources. Green sustainability is the capacity of the materials to exist and flourish for long time (Molla et al., 2008).

Due to the reason that HEI considered as one of the high consumers for ICT, there is increasing pressure on them to go green in their ICT practices in order to reduce energy cost and sustain environment via reducing energy consumption, carbon emission, e-waste, and boosting recycling and reuse (James & Hopkinson, 2009).

4. GICT Practices' Analysis

The culture of Egyptian HEI is currently changing, and there is an increase in the awareness towards adopting GICT. This new widespread direction is due to the fact that HEI gain significant benefits through ensuring the sustainability of ICT (Murugesan, 2008).

Several Egyptian HEI websites were analyzed in order to collect data regarding their GICT practices. In general, GICT practices followed by Egyptian HEI are as follows:

- GICT awareness: by forming GICT committees, Egyptian HEI increases awareness of GICT among all stakeholders and encourage them to adopt GICT practices. These committees should participate in GICT activities raised by national and international bodies and transfer the experience to various stakeholders.
- Adopting GICT strategies: Egyptian HEI formulates GICT strategy in order to instruct sustainability and to comply with GICT practices. This made it easy for stakeholders to adapt GICT practices.

- Adopting Cloud Computing: this practice reduces the efforts needed as well as the overall cost of e-infrastructure especially computer labs and the maintenance of its hardware and software.
- Printing Reduction and Merging: becoming paperless Egyptian HEI is an important goal. Egyptian HEI stress that hard copy printing done only when necessary, otherwise, staff and students are encouraged to use online communication and digital submission in exchanging information. In addition to this, several offices or labs are connected to use only one printer. These practices benefit Egyptian HEI at large through the saving in the consumption of paper, ink, toner, energy, and hazardous material from printing devices.
- ICT Recycling: this practice aims at reducing carbon footprint through the proper disposal of ICT hard components. Egyptian HEI achieves recyclability and safe disposal of e-wastethrough a recycler.
- Building e-Infrastructure: through building appropriate physical e-infrastructure, Egyptian HEI reduces carbon emissions resulted from staff and students travelling activities in order to attend lectures or conferences. Egyptian HEI use of recent telecommunications - in forms of desktop video-conferencing and e-learning systems - results in the reduction of carbon emissions greatly.
- Purchasing Energy Star Rating Hardware: this represents a good purchasing practice aiming at reducing energy consumption and energy cost in general.
- ICT Power Management: Egyptian HEI increases staff awareness for their efficient electric power use which resulted in decrease of power consumption in general. Among these practices switching off unneeded equipment especially when not in use and overnights, removing active screensavers, use of LCD (liquid-crystal display) instead of CRT (Cathode Ray Tube) monitors, use of new generation of computer processors which are energy efficient etc.

5. Conclusion

Although the relationship between ICT and greenness is complicated and multidimensional, this paper considered a step towards the adoption of GICT for a sustainable future. Moreover, it illustrates GICT practices by Egyptian HEI based on overall analysis of websites, as well as illustrating GICT significant concepts, GICT benefits, GICT barriers and the reasons why HEI has to give it careful attention and consideration.

This paper has concluded that the most important issue that may influence the success of the adoption of GICT is motivation and support exerted by HEI management towards GICT practices adoption by both staff and students.

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