Green ICT Implementation at Professional Education Institutions: A Study from Indian Context

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Abstract— The future of the nation, the youths are in colleges, now. The India became the future IT hub for the world as per experts. This study covers the sustenance of ICT for preserving energy for this technology and along with preventing mother Earth from hazardous carbon emissions which is major cause of global warming. The paper outlines the policies of Indian government towards green ICT. The study identifies the need of eco sustainable or green ICT implementation at professional education institutes and also identifies the green parameters for information and communication technology. The objective of the study was to simply raise awareness of Green ICT implementation need at professional education institutes. In the present work, the authors tried to make a systematic study on the issues of ICT use in education and also to find three significant reasons namely the social, economic and environmental demands of green ICT.

Index Terms—Green ICT (GICT), Information and Communication Technology (ICT), Professional Education Institutions, Need of GICT.

I. INTRODUCTION

Globalization and technological changes have created a new global economy powered by technology, fueled by information and driven by knowledge. ICT is a collection of tools and devices used for particular tasks. ICT is that technology which uses the information to meet human need or purposes including processing and exchanging. ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form. For example, personal computers, digital television, email, robots etc [1]. Information and communication technology (ICT) has become, within a very short time, one of the basic building blocks of modern society. UNESCO aims to ensure that all countries, both developed and developing, have access to the best educational facilities necessary to prepare young people to play full roles in modern society and to contribute to a knowledge nation. [2]

In education, use of ICT has become imperative to improve the efficiency and effectiveness at all levels and in both formal and non-formal settings. ICT is playing vital role in education

[4]. The purpose of research is to analysis the awareness of GICT among academic professionals. It is also necessary to change the mindset of academic professionals and forced them to adopt Green ICT in their day-to-day life through emphasizing on Green ICT implementation benefits in terms of economical, social, environmental and technical.

This paper reviews the literature of Green ICT. It presents an analysis of the Green ICT implementation at India’s professional education institutes. The structure of paper is as follows. We first review the use of ICT in education. Then we present environmental impact of ICT use and Green ICT concepts. This is followed by an analysis of need of Green ICT practices at professional education institutions. A discussion on the government policy towards green ICT is followed by a conclusion.

II. RESEARCH DESIGN

A. Objective of Research

i. To study the existing ICT implementation at professional education in India.

ii. To identify the need of green ICT implementation.

iii. To study policies of government towards green ICT.

iv. To study environmental impact of ICT use.

B. Research Methodology

The research methodology consisted in a rigorous analysis of the latest research on green information and communication technology implementation at educational institutions.

Only secondary data is used. The various statistics, facts, and figures on green information and communication technology Articles published in national and international journal, E-journal, internet, books, newspaper, government policies etc.

C. Scope of Research

The scope of research is limited to professional education institutions of India. The population of study consists of faculty, student, researcher, and administrative staff of any professional education.
III. INDIA GOVERNMENT POLICY TOWARDS ICT IN EDUCATION

India possesses a highly developed higher education system which offers facility of education and training in almost of all aspects of human creative and intellectual endeavors. In its size and diversity, India has the third largest higher education system in the world, next only to China and United States (Annual Report, MHRD, 2006-07). Nowadays, most Higher Education Institutions rely on Information and Communication Technology (ICT) for all aspects of their activities such as administrations, teaching, learning and research services. The adoption of ICT in higher education has been extensive since mid 1990’s. The national policy for integrating ICT into education by MHRD is laid down in the Five Year Development Plan. The enrolment in Higher education institutions (by type of management) has been rising steadily from 13072 in 2000-2001 to 17973 in 2005-06 (source UGC, India). Innovative use of ICT in teaching and learning stimulated dynamic learning environment. ICT have improved the quality of teaching and learning by providing access to a great variety of educational resources. However ICT was designed, manufactured, and applied in professional education without regard to its environmental impact. Global warming and climate change coalescing with limited availability and rising cost of energy has become a major concern for global economy. Therefore there is need to do research on ICT impacts on environment and to take initiatives to save earth and human life from hazardous material.

IV. ENVIRONMENTAL IMPACT OF ICT

ICT have improved the quality of teaching and learning by providing access to a great variety of educational resources.

ICT equipment’s power consumptions and greenhouse emissions are becoming major concerns among ICT professionals [6].

According to Gartner, if the ICT sector continues growing at the current rate, emissions are expected to increase by another 60% by the year 2020. Due to huge amount of carbon emissions the ozone layer getting thinner and which is dangerous for human body. The local effects of ICT on human health and environment are Electronic waste, Health risk (disease), Air pollution, Water pollution, and Land Pollution. The global impacts of ICT on human health and environment are Global warming, Climate change, Level of ocean raising, Temperature increase and Ice Cap to Shrink.[7] The revolution coming is Innovative economy. We have to find Innovative ways to minimize above mentioned impact.

John W. Houghton have studied the role of ICT in climate change mitigation, mitigating other environmental pressures and climate change adaptation providing an overview and pointing to examples of current activities and opportunities in each of these areas [8].

V. WHAT IS GREEN ICT

Green Information and Communication Technology is broadly understood as an initiative to encourage individuals, groups, and organization engaged in the use of ICT to consider environmental problems and find solutions to them [9].

At the international level, in 2005, the G8 requested the International Energy Agency (IEA) to play a strong role in implementing the G8 ‘Gleneagles Plan of Action’ on climate change, clean energy and sustainable development [10]. Environmental sustainability is not an option- it is necessity, we have a compelling and ever more urgent duty of stewardship to take care of the natural environment and resources on which our economic activity and social fabric depends. So the new synthesis we need is that economic growth, social justice and environmental care advance best when they all advance together [11].

Green ICT has an aspect of innovation in managing ICT related to the environment. Green ICT is broadly understood as an initiative to encourage individuals, groups and organization engaged in the use of ICT to consider environmental problems and find solutions to them. Green ICT is understood as an initiative to encourage stakeholders engaged in ICT activities to address environmental problems and find solutions to them. Advances in Information and Communication Technology (ICT) over the past few years shown an exponential growth in technology and global presence. Hence, there is need for solutions to optimize energy consumption in the ICT sector. Such solutions are collectively referred to as Green ICT.

A. Definitions

Green or eco-sustainability is “the ability of one or more entities, either individually or collectively, to exist and thrive (either unchanged or in evolved forms) for lengthy time frames, in such manner that the existence and flourishing of other collectivities of entities is permitted at related levels and in related systems”[14].
Keiichi Nakata extends the existing definitions as a coordination and convergence of strategy, practice and measurement of Green ICT which addresses environmentally sustainability. Green ICT aims to minimize carbon footprint, minimize hazardous ICT waste, reduce energy cost, achieve corporate social responsibility (CSR), and finally comply with regulations [9].

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VI. NEED OF GREEN ICT IN PROFESSIONAL EDUCATION INSTITUTIONS

There is increasing pressure on universities and colleges to adopt more sustainable approaches to ICT use. This pressure need to come from government, from external stakeholders and the public who are increasingly aware of the environmental cost. Recently biggest challenge facing the environment is global warming caused by carbon emission. It is very much necessary to save the environment and ultimately the earth. Use of ICT in education is a cause of carbon dioxide emission, high energy consumption and hazardous waste production. These pressure led education institutions to adopt Green ICT so as to minimize energy consumption, carbon footprint, ICT waste, to maximize recycling & reuse and to reduce energy cost. Moreover savings can be achieved by minimizing the wastage of computational facility. With the increase in the number of institutions offering professional education, green ICT implementation at professional institutions has become key ingredient to achieve cost effective solutions.

All educational institutes need to satisfy AICTE norms as well as need to apply for NBA (National Board of Accreditations) in India when establishing new course or running existing course. The institutions where computer and IT related courses are conducted, consider an Institute with yearly intake of 60 students of MCA Course. According to AICTE norms Institute requires a Computer Lab of 30 Computers with latest configuration. These computers become outdated after three years because at that time “Latest Configuration” will be different [16].

Green ICT has an aspect of innovation in managing ICT related to the environment. We(researcher) will further elaborate some of these motivations to understand why professional education institutions need to pay attention to green ICT by examining three kinds of demands: environmental, social and economic.

A. Green ICT and Environmental Demands

Generally, Green ICT issues are expressed in environmental terms due to the impact of ICT on the environment. ICT is cause of carbon dioxide emissions, high energy consumption, and hazardous e-waste produced toxic in nature and pose severe risks to humans and the environment. Regarding India’s higher education systems, students and staff have increased the number of ICT used in their day to day life[ ##]. Accordingly, these pressures based on these assessments led professional institutions to adopt Green ICT so as to minimize energy consumption, carbon footprint, ICT waste, and to maximize recycling, refurbishing and reuse. Everyone should become Green ICT trendsetter for cultural change and savings mankind from environmental pollution.

B. Green ICT and Social Demands

ICT has social impacts which are both affirmative and pessimistic. Even if Green ICT is generally approached from scientific, technical and environmental points of view, a consideration of social challenge should be addressed. In terms of professional institutions; Green ICT operates to achieve social aspects which are related to Corporate Social Responsibility.

C. Green ICT and Economic Demands

ICT has directly affected financial cost including utilities and maintenance cost, which increase every year. The energy consumption of India ICT infrastructure is forecast to grow by 30% to over 31 trillion-watt hours by 2014, a study of Global research firm Gartner.

VII. GOVERNMENT POLICY TOWARDS GREEN ICT

Internationally, The United Nations Framework Convention on Climate Change (UNFCC), which came into force in 1994, established the first intergovernmental framework aiming to tackle climate change. The Kyoto Protocol,
enforced in 2005, imposed on Member States to reduce greenhouse gas (GHG) emissions. The commitment period for the Kyoto Protocol ends in 2012.

A. India Government Policy
With many current scientific studies pointing to global warming and climate changes caused by greenhouse gases, there is an ever increasing societal push for renewable environmentally friendly green technologies to reduce greenhouse gas emissions. Government policy plays a vital role in the development of green policy. At the last year’s Copenhagen Summit, India has committed to reduce its emission by 20-25% as compared to the 2005 emissions levels. Government of India ministry of Environment and Forests (2011) have developed national mission for Green India under the National Action Plan on Climate Change (NAPCC). They have presented tentative action plan for Implementations of the Green India mission during 2011-12.[5]

B. Maharashtra State Government Policy
Maharashtra IT/ITES Policy-2009 will be valid up to 14th August, 2014. Maharashtra is the largest market for IT hardware and internet in India. IT continues to transform daily life for the better. It has become necessary to address the environmental consequencnes of the rapid increase in IT users. The Policy proposes path breaking initiatives to promote ‘green’ IT and electronic hardware, as well as e-waste recycling. [15]

VIII. CONCLUSION
This paper examined Green ICT concepts and discussed the reasons why professional education institutions need to pay attention to Green ICT. This research focuses Green ICT implementation at educational institutes with environmental sustainability in mind that is, to contain the minimum amount of hazardous materials, to be energy efficient during the use period of their life cycle, and to be disposed or recycled with the minimum effect on the environment and human health.

REFERENCES

[16] AICTE manual for MCA course.