

## **Integration of GICT and sustainable development**

**Dr. Arifuzzaman Khan**

*Department of commerce  
Christ Church College Kanpur*

---

**ABSTRACT:** *Information technology is initially focused on only knowledge and skill of using traditional computers, but the focus has moved from stand alone computers to network devices. Furthermore, the concepts of sustainable development and globalization of technology has created a pressure on the academicians especially at higher education level to take initiative for sustainable as well as global use of technology. In the current study, a research has conducted on women academicians at higher education institutions to study their attitude towards sustainable use of ICT with reference to sustainable development and globalization of technology.*

**Keywords:** *Information Technology, Green Information Communication Technology(GICT), Sustainable Development, Globalization of Technology, Women at higher education, Women towards ICT, Women towards Sustainable development, Women towards Globalization of technology etc.*

---

Date of Submission: 17-02-2018

Date of acceptance: 06-03-2018

---

### **I. INTRODUCTION**

Today's world is a world of information explosions. This information explosion is moving so fast that even a well literate person is feeling as if he or she is illiterate, being not able to cope up with such an information explosion. Information Communication Technology helps us to manage with this. The GICT id commonly referred as Green ICT.

At the higher education level, we find large scale innovations- Computer- aided Learning (CAL), Computer based Training (CBT), online learning, audio-visual representation of information, online discussion forum, computer based networking system and interactive learning has provided the present day teachers with a choice of modern tools to deliver the materials in classroom and end the instructional boundaries. According to S.Radhakrishnan, "A teacher is one who never teaches but gives an opportunity to learn". How very true in today's Information and Communication Technology world. Modern technologies and ICT provided computer and internet to facilitate the advancement in the field of education. Many universities are embracing the use of Information Communication Technology for more competent and competitive processes both in teaching learning as well as delivery of services and in administrative processes. NASSCOM and Akamai Technologies have released a report in 2015 called "The future of internet in India". The report says, that the population of internet users in India till October 2015 was 31.7 crores and anticipation are drawn that it will increase up to 42.6 crores till June 2016 and will become 73 crores in 2020. The report also says that among the new internet users 75% people will be from rural areas and will use the internet in regional language, where the share of women users consist 34%.Therefore, we can say that there will be a huge use of ICT and great dependability on ICT equipments in India in near future.The role of ICT involves both positive and negative impacts on environment. Sustainable development demands transformational changes regarding both technology and behavioral. In the last few years global warming and climate change was catapulted to the front of society and became a common subject of discussion in global society. In this context, the impact of ICT on ecological sustainability usually coined as Green ICT and it has emerged as one of the key management issues in corporate sector, BPOs, call centers, educational institutions etc.

Green ICT is comprised of initiatives and strategies that reduce the environmental footprint of technology. This arises from reductions in energy use and consumables, including hardware, electricity and papers. Because of these reductions, Green ICT initiatives also produce cost savings in energy use in addition to environmental benefits. Electricity footprints and the amount of equipment needing future recycling are simultaneously reduced. Green ICT aims to minimize carbon footprint, minimize hazardous ICT waste, reduce energy cost, achieve corporate social responsibility (CSR), government regulations and finally comply with awareness of people through education. Yasuyuki Sugiyama described Green research and development activities for reducing environment impact of society by reducing the impact of ICT installations in telecommunication centers, datacenters and customer offices and homes as well as educational institutions and by reducing the impact of society as a whole by providing various kinds of green ICT services.

Sustainable development aims at improving the living standards and the quality of people's lives, both now and for the future generations. But in the development model that we adopt today, we are extracting natural resources at a pace faster than their capacity to regenerate at the same time we are also pumping pollutants back into the natural ecosystem at rates far higher than they can absorb or can be cleaned up. The result is an unsustainable development model that could collapse any time. That is why all countries strive to ensure that citizens both in urban and rural areas have clean and adequate supplies of resources. Many of our environmental problems are the manifestation of our developmental activities.

Globalization is also a developmental activity. Globalization refers to the free movement of goods, capital, services, people, technology and information. It is the action or procedure of international integration of countries arising from the convergence of world views, products, ideas, and other aspects of culture. Advances in the means of transport, such as the steam locomotive, steamship, jet engine, and container ships and in telecommunications infrastructure including the rise of the telegraph and its modern offspring, the Internet and mobile phones have been major factors in globalization. Globalization is helping most of the countries to eliminate the discrimination and all forms of violence against women and the girl child. Globalization affects different groups of women in different places in different ways. On the one hand it may create new opportunities for women to be forerunners in economic and social progress.

### **Review of Related literature**

Research is a scientific discovery which is done systematically, honestly and intelligently, but can never be done in isolation of the work that has already been done on the problems, which are directly or indirectly related to the study proposed by the researchers. There exists a correlation between the old theories and the new ones. Knowledge is dynamic and it always grows along with corrections. A careful review of research journals, books, dissertations, thesis and other sources of information on the problem to be investigated is one of the important steps in planning of the research study. The fact is discussed to view a problem is a proper perspective so that the researcher may streamline the efforts to solve the problem.

According to **Carter V. Good** (1954), "A survey of related literature is necessary for proper planning, execution and to have right concept of the problems and solutions. It provides guiding hypothesis, suggestive methods of investigations and comparative data for interpretive purpose." Though many researchers have been conducted in the field of information communication technology, but very few studies have been done, as far as the knowledge of the researcher. The present research is concerned in the field of attitude towards ICT based teacher education. The purpose of this section is to provide a brief review of the researches done in the field of attitude towards ICT.

### **What is Green –ICT**

Green generally means energy efficient and environment friendly and Green –ICT is concern with the use of ICT in a sustainable manner. Here, Sustainable manner means planning and investing in a technology infrastructure that serves the need of today as well as the needs of tomorrow while conserving resources and saving money. Green –ICT is mainly focused on energy efficient equipment utilization. There are some points mentioned below which can help to understand the concept of Green-ICT.

They are-

1. Designing energy efficient chips, disks, devices, equipments etc.
2. Replacing personal computers with energy efficient thin computers.
3. Use of virtualization software to run multiple operating system on one server.
4. Reducing the energy consumption of computer labs at educational institutes.
5. Using renewable energy sources to power computers labs, classrooms, offices etc. at the educational institutions.
6. Replacing obsolete computing equipments.
7. Reducing electronic waste.
8. Promoting tele-commuting and remote computer administration to reduce transportation emissions.

### **Concept of Sustainable Development**

The rich and diverse religious and cultural traditions of India, including its tribal religions, include rich conglomeration of beliefs about nature and rules for the sustainable utilization of material resources. It also gives an idea of how nature's different aspects should be kept clean and pleasant for a happy living on this earth. Environmental conservation and protection were of major concerns in ancient India. As time proceeded, Industrial revolution has created a huge pressure on the environment. This was the main reason for including Environmental Education as a major subject in all education systems. Development is essential for the progress of any country. Hence, we started to think of both development and environmental protection, where it came out

with a new concept of Sustainable development. Here the development is concerned with the economic and societal aspects, whereas the environmental protection is the environmental aspect in sustainable development. The aims of sustainable development are to promote understanding of the interdependence of natural, socio-economic and political systems at local, national and global levels, to encourage critical reflection and decision making. It is reflected in personal lifestyles, to encourage the active participation of citizenry in building sustainable development, develop interactive and participatory skills, developing appropriate environmental understanding based on an understanding of the independence of nature and skills of problem-solving. Beyond a simple one sentence definition, many governments and individuals have pondered what sustainable development means. Sustainability is a well-articulated goal for management based on the explicit abandonment of the assumption that Natural resources are limitless (World Commission on Environment and Development, 1987; Lubchino et al 1991). Sustainable Development, which is a complex concept, has its origin in the Natural and Social Sciences that has been developed through international dialogue in response to the challenges facing the world today. There are many views and definitions of Sustainable Development. Some of them are; Sustainable Development is “development which meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland Commission/ Our Common Future, 1987). A sustainable society is “one that... can be sustained indefinitely while giving optimum satisfaction to its members” (Blueprint for Survival, 1972). “Sustainable development is using, conserving and enhancing the community’s resources so that ecological processes, on which life depends, are maintained and the total quality of life, now and in the future can be increased. For development to be sustainable it must take account of social and ecological factors, as well as economic ones; of the living and non living resource base; and of the long term as well as the short term advantages of alternative actions”(World Conservation Strategy, 1980).

### **Concepts of Globalization of Technology**

The effects of technological change on the global economic structure are creating immense transformations in the way nations organize production, trade goods, invest capital, and develop new products and processes. Sophisticated information technologies permit instantaneous communication among the far-flung operations of global enterprises. New materials are revolutionizing sectors as diverse as construction and communications. Advanced manufacturing technologies have altered long-standing patterns of productivity and employment. Improved air and sea transportation has greatly accelerated the worldwide flow of people and goods. All this has both created and mandated greater interdependence among firms and nations. To maximize returns, arrangements such as transnational mergers and shared production agreements are sought to bring together partners with complementary interests and strengths. This permits both developed and developing countries to harness technology more efficiently, with the expectation of creating higher standards of living for all involved. Globalization of technology is concern with that. Rapid technological innovation and the proliferation of transnational organizations are driving the formation of a global economy that sometimes conflicts with nationalistic concerns about maintaining comparative advantage and competitiveness. It is indeed a time of transition for firms and governments alike. In broad view globalization of technology focuses on such areas as the changing nature of international competition, influences of new technologies on international trade, and economic and social concerns arising from differences in national cultures and standards of living associated with adoption and use of new technologies.

### **Higher Education and ICT**

Quality of education is directly proportionate to the quality of teacher that includes competency and efficiency. Teaching is really a challenging job. The classroom environment is very dynamic. Methodology and technique adapted by the teachers in the classroom needs frequent change as the students’ attitude and aptitude vary. Effective teaching thus depends upon tactfully design methodology as well as technology. ICT enhance this and upgrade the classroom with other means available ranging from, audio-visual display, films, CD-ROMs and the internet.

Technology has fabulous impact on education. In the past few decades, school curriculum has changed to match the new aims of education and it will continue to change. Teaching rather than teaching its content, will require significant change in its mode of teaching and an improved knowledge and understanding in teachers. Osborne and Hennessy (2003) emphasize that along with the change in views on the nature of education and the role of education, the increase in the use of ICT offers challenge to teaching.

### **Barriers to Integration of ICT into Higher education**

The act of integrating ICT into teaching and learning is a complex process and one may encounter a number of difficulties. These difficulties are known as “barriers”. A barrier is defined as “any condition that makes it difficult to make progress or to achieve an objective”. The objective being analyzed in this paper is successful ICT integration in education.

**1. Lack of Teacher Confidence**

Several researches indicate that one barrier that prevents teachers from using ICT in their teaching is lack of confidence. Some studies have investigated the reasons for teachers' lack of confidence with the use of ICT is that teachers "fear of failure" (Beggs, 2000). On the other hand Blanskat et al. (2006) found that limitations in teachers' ICT knowledge makes them feel anxious about using ICT in the classroom and thus not confident to use it in their teaching. Becta conclude his study with the statement: "many teachers who do not consider they to be well skilled in using ICT feel anxious about using it in front of a class of children who perhaps know more than they do". Many teachers identified their low confidence as a barrier and afraid of entering the class room with limited knowledge in the area of ICT. As a result lack of confidence and experience with technology influence teachers' motivation to use ICT in the classroom.

**2. Lack of Teacher Competence**

Another barrier which is directly related to teacher confidence is teachers' competence in integrating ICT into pedagogical practice. It is found that many teachers lack the knowledge and skills to use computers and were not enthusiastic about changes and bringing computers into their teaching.

Current researches have shown that the level of this barrier differs from country to country. In the developing countries like India, researchers reported that teachers' lack of technological competence is a main barrier to their acceptance and adaptation of ICT (Plegrum,2001). In many European countries teacher who do not use computers in classroom claims that "lack of skills" are a constraining factor preventing them from using ICT for teaching. On the other hand in Netherlands, teachers' ICT knowledge and skills is not regarded as a main barrier to ICT use any more.

**3. Resistance to Change and Negative Attitude**

Research into the barriers to the integration of ICT into education found that teachers attitudes and an inherent resistance to change was a significant barrier. Watson an Australian researcher, (1999) argued that integrating the new technologies into educational settings require change and different teachers' will react and handle this change differently. According to him, considering different teachers' attitudes to change is important because teachers' belief influence what they do in the classrooms. Although teachers felt that there are more than enough technologies that will benefit their teaching, but they do not believe that they were being supported, guided and rewarded in the integration of technology into their teaching. The change from present level to desired level of performance is facilitated by driving (encouraging) force, such as, the power of new developments, rapid availability, creativity, internet access or ease of communication, while it is delayed by resisting (discouraging) forces such as lack of technical support, expertise help or time for planning.

**4. Lack of Time**

Several recent studies indicates that many teachers have competence and confidence in using computers in the classroom, but they still make little use of technologies because they do not have enough time . According to Sicilia (2005), the most common challenge reported by all the teachers was the lack of time to plan technological lessons, explore different internet sites or look at various aspect of educational software. According to Ai-Alwani (2005), lack of time is an important factor affecting the application of ICT in education in Saudi Arabia because of busy schedules. Saudi teachers work from about 7:00 a.m. to 2:00 p.m. and the average number of class sessions taught by a science teacher are 18 per week. Similarly in Canada, Sicilia (2005) concluded that a teacher takes much more time to design lessons that includes the use of ICT than to prepare traditional lessons.

**5. Lack of Effecting Training**

The barrier most frequently referred to in the literature is lack of effective training. There were not enough training opportunities for the teachers' in the use of ICT in the classroom environment. The issue of training is certainly complex because it is important to consider several components to ensure the effectiveness of the training. These components are time of training, pedagogical training, skill training and an ICT use. Recent researches concluded that lack of training in digital literacy, lack of pedagogic and didactic training in how to use ICT in the classroom and lack of training concerning the use of technologies in specific area are obstacles to using ICT in classroom practice. Therefore, pre-service or in- service training both should focus on pedagogical issues with the use of ICT.

**6. Lack of Accessibility**

Several research studies indicate that lack of access to resources, including home access is another complex barrier that causes discouragements among teachers to use new technology in education. Various studies indicated several reasons for the lack of access to technologies occurred. Teachers complained about how difficult it was to always have access to computers or other ICT materials because most of these were shared with other teachers. But the inaccessibility of ICT resources is not always merely due to the non-availability of the hardware and software or other ICT materials within the school. It may be the result of poor organization of resources, poor quality of hardware, inappropriate software or lack of personal access for teachers.

### **7. Lack of Technical Support**

Without both good technical support in the classroom and whole school resources, teachers cannot be expected to overcome the barriers preventing them from using ICT. In the view of primary and secondary teachers, lack of technical support is one of the top barrier and technical problems were found to be a major obstacle for them. These technical problems includes waiting for websites to open, poor internet connections, printers not working , malfunctioning of components and teachers having to work with old computer. If there is a lack of technical support available in a school, then it is likely that technical maintenance will not be carried out regularly, resulting in higher risk of technical breakdown. Many teachers indicated that technical faults might discourage them from using ICT in their teaching because of the tear of equipments breaking down during a lesson. ICT support or maintenance contracts in school help teachers to use ICT in teaching without losing time to fix soft ware and hardware problems.

### **Barriers for Green ICT implementation in Higher Educational level**

1. Lack of adequate funding and support from top management.
2. Lack of adequate funding and support from top management.
3. Environmentally unconcerned institutional cultural.
4. Lack of Awareness of Green ICT.
5. Lack of education or training from Institutes.
6. ICT's environmental impacts are not considered as significant.
7. Lack of motivation among faculty/staff/student of institutes.
8. Lack of Government strict Regulation.
9. Lack of good procurement practice at education institutes.
10. Inadequate Research & Development Activities.

## **II. CONCLUSION**

Therefore, it is clearly seen that there is a great scarcity of awareness in the total population. Some researchers have shown that, people had no knowledge or very few knowledge about GICT, GICT practices and strategies. Thus with its special emphasis on science and technology, industry and commerce, the education has to make its contribution towards the consciousness of the GICT practices and strategies. In the same context, it also envisages to contribute to the balanced and greened use of science and technology not only to solve the problems of environmental degradation but also to design appropriate measures during the course of development activities. Education including formal education, public awareness and training, should be recognized as a process by which human beings and societies can reach their fullest potential.

## **REFERENCES**

- [1]. Alexander Nowak, Leymann F., Mietzner R., "towards green business process re-engineering", Service oriented computing book volume 6568, 2011, pp 187-192.
- [2]. Al-Alwani, A. (2005). Barriers to integrating Information Technology in Saudi Arabia Science Education
- [3]. Anandan, K. (2010). Instructional Technology in Teacher Education, New Delhi: A.P.H. Publishing Corporation
- [4]. Anandan ,K. & William Dharma Rja, B. (2010). Educational Technology, New Delhi: A.P.H. Publishing Corporation
- [5]. Bandhopadhyya, A.K. (2008). International Encyclopedia of Audio Visual Media (Vol- 1) Delhi: Anmol Publication Pvt Ltd
- [6]. Becta, (2004) British Educational Communications and Technology Agency. A review of the Research literature on barriers to the uptake of ICT by teachers
- [7]. Best, J.W. and Khan, J.V. (2006). Research in Education (9<sup>th</sup> ed)New Delhi: Prentice Hall of India Pvt. Ltd.
- [8]. Garrett, H.E.(1995) Statistics in Psychology and Education, New Delhi: Kalyani Publishers
- [9]. Global e-Sustainability Initiative, "Smart 2020: Enabling the low carbon economy in the information age," 2008. [online] Available at [www.smart2020.org](http://www.smart2020.org) [Accessed 16 December 2013].
- [10]. Gupta, S.C. and Kapoor, V.K. ,Fundamentals of Mathematical Statistics, 11th Edition, (Reprint), Sultan Chand and Sons, 2007.
- [11]. Gupta, S.P. and Gupta, A.(2009) Sankhkiya Vidhiya Allahabad: Sharda Pustak Bhawan
- [12]. Jain, M.E. and Agarwal, J.C. (2008) Encyclopedia of Education (Vol-2) Delhi: Anshan publishing house
- [13]. Sicilia, C. (2005). The Challenges and Benefits to Teachers' Practice in Constructivist Learning Environments Supported by Technology.