

GLOBAL PERSPECTIVES FOR SUSTAINABLE DEVELOPMENT IN HIGHER EDUCATION

Title of paper: Role of ICT in Sustainable development

Dr.Najma Chaudhary, Assistant Professor, Department of Education ,
Maulana Azad National Urdu University, CTE, Nuh,Haryana

Abstract

Over the last decades, **Information and Communication Technology (ICT)** in learning institutions has increased learning. Technology-enhanced learning in both pre-schools and higher learning institutions serves as a supportive education tool to propagate learners' knowledge and skills. In most prior research on the impact of technology in education, researchers have pointed out that technology-enhanced learning has facilitated knowledge and skill acquisition. One of the critical areas where technology has highly improved understanding is critical thinking, as students are empowered to approach and exploit opportunities with courage and potential.

Sustainable development is **a development that meets the needs of the present without compromising the ability of future generations to meet their own needs**. The Sustainable Development Goals (SDGs) aim to **transform our world**. They are a call to action to end poverty and inequality, protect the planet, and ensure that all people enjoy health, justice, and prosperity.

Technology tools are one way to expose children to this type of learning. Indeed, as researchers have begun to understand more about the situations in which students learn best, they have found that “the structure and resources of traditional classrooms” are often inadequate and that “technology – when used effectively – can enable ways of teaching that are much better matched to how children learn”.

Information and Communication Technologies (ICT) have great potential to develop access, quality, and equity in education at all levels – early childhood, primary, secondary and tertiary. For example:

- **Radio/audio** can be used in place of a teacher to deliver highly structured lessons with pauses for learners to respond, or as a supplement with a teacher present;
- **Television** provides visual effects of which can illustrate complex or abstract concepts; it can be supplemented by workbooks or other materials;
- **Computers/ internet** can be used as teaching tools (simulations, online learning journals, books), and management tools (assessment, record keeping); can also be used to form community telecenters and virtual schools.
- Multi-media integrate radio, television, and or computers.

ICTs (Information and Communication Technology sustainability) are key strategic tools for improving livelihoods and should be integrated into mainstream development thinking, while existing frameworks for understanding ICTs for development, such as the ICT for Rural Livelihoods knowledge map, must be developed and shared more widely.

Keywords: Sustainable Environment, Role of ICT in Sustainable development, pillars of sustainability and impact of ICT in sustainability.

Title of paper: Role of ICT in Sustainable development

Name: Dr Najma Chaudhary

Designation: Assistant Professor

Institution Name: Department of Education Maulana Azad National Urdu University,
CTE, Nuh, Haryana

Contact number: 9289665632

Email Id: lnazmakhan@gmail.com

Introduction:

Sustainable development is **a development that meets the needs of the present without compromising the ability of future generations to meet their own needs.** The Sustainable Development Goals (SDGs) aim to **transform our world.** They are a call to action to end poverty and inequality, protect the planet, and ensure that all people enjoy health, justice, and prosperity.



Figure 1. Meaning of Sustainability

Figure1.Meaning of Sustainability

Technology tools are one way to expose children to this type of learning. Information and Communication Technologies (ICT) have great potential to develop access, quality, and equity in education at all levels – early childhood, primary, secondary and tertiary. Technology has long played a crucial part in economic and social development. The level of technology has always limited what is technically possible or economically viable, while the evolution of technology has continually raised those thresholds of possibility and viability.

Introduction to ICT Sustainability:

- ICT Sustainability refers to environmental, social, and economical sustainability for computing or Information Technology.
- The practice of designing, manufacturing, using, and disposing of computers, servers, and associated subsystems – such as monitors, printers, storage devices, and networking and communications systems – efficiently and effectively with minimal or no impact on the environment.
- Many corporate IT departments have Green Computing initiatives to reduce the environmental impacts of their IT operations. The goals of green computing are:
 - Reduce the use of hazardous materials
 - Maximize energy efficiency during the product’s lifetime and
 - Promote the recyclability or biodegradability of defunct products and factory waste.

Three pillars of Sustainability:

1. Economic sustainability development
2. Social sustainability development
3. Environmental sustainability

1. Economic Sustainability development –

- reducing and seeking to eradicate income poverty,
- achieving higher levels of prosperity and
- enabling continued gains in economic welfare.

**Figure 2. Pillars of sustainability****2. Social Sustainability development –**

- reducing and seeking to eradicate other dimensions of poverty.
- improving the quality of education, health, housing, and other aspects of the welfare of individuals and communities, and
- enhancing the quality of social interaction, engagement, and empowerment;

3. Environmental Sustainability development protection –

- reducing pollution and other negative impacts on the environment,
- mitigating the effects of industrialization and human activity; and seeking to achieve sustainable use of resources in the interest of future.

Development, in this context, is not a matter merely for developing countries, as the term is sometimes used. It is about development at all levels, from the family, through local communities, regions, and nations, to the planet as a whole. Sustainability needs to be a priority in all countries—post-industrial and industrial as well as developing countries—and in the international system that links them.

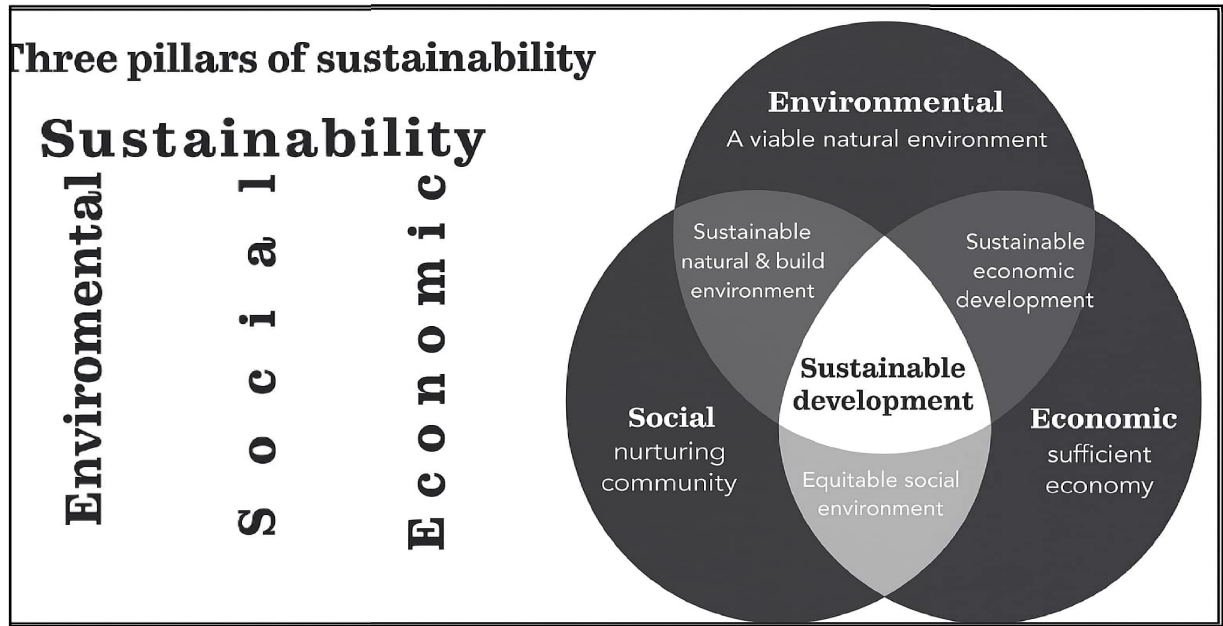


Figure3.Pillars of sustainability

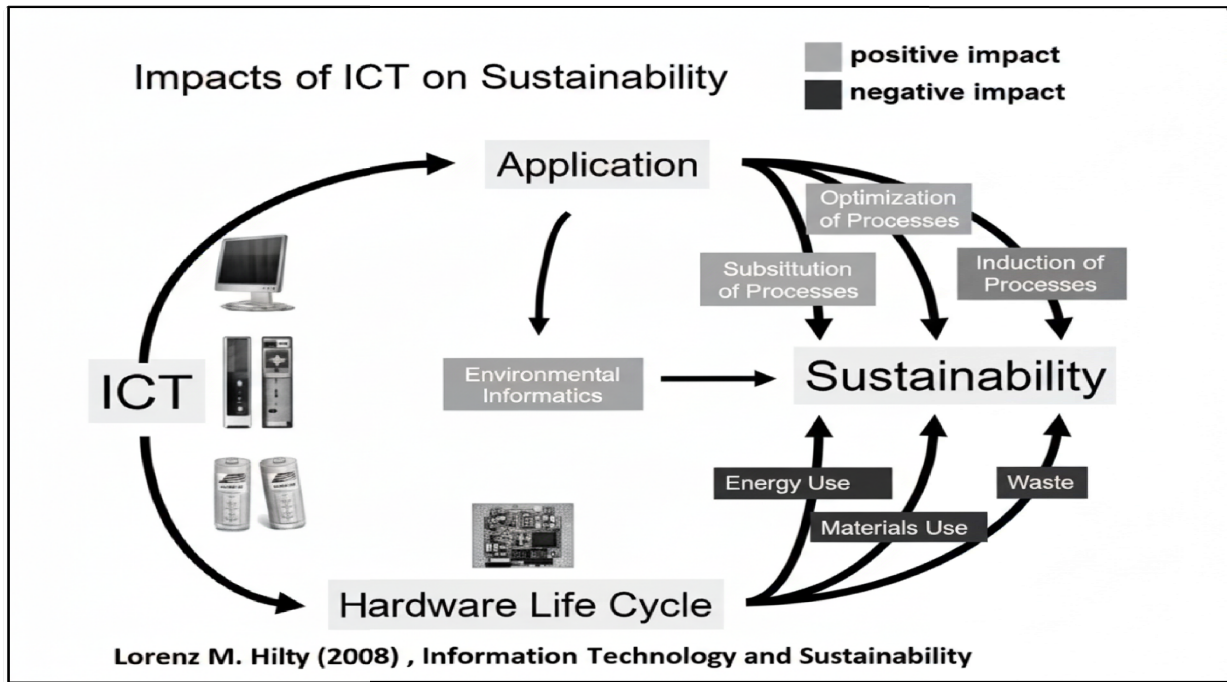
The Role of ICT in Sustainable Development

For United Nations Environment Programme (UNEP) ICT has enabled:

1. Online measuring and monitoring for environmental assessment
2. Rapid response to environmental emergencies
3. Video- and e-conferencing of expert groups
4. Reduction in tones of CO₂ emissions through tele- and video-conferencing
5. More rapid and resources efficient dissemination of information

Sustainable Development and ICT

- The ICT industry is responsible for around 2–3% of global Green house Gas (GHG) emissions.
- ICT solutions have a large potential to enhance performance across the economy and society to reduce the remaining 97–98% of emissions and enhance performance across all sectors of the economy.
- Green ICT refers to more generic types, products, and eco-friendly applications of ICT.



The Brundtland Commission (1987) recommended seven critical actions needed to ensure good quality of life for people around the world (WCED, 1987, Ch. 2, para. 28):

- Revive growth ;
- Change the quality of growth;
- Meet essential needs and aspirations for jobs, food, energy, water, and sanitation;
- Ensure a sustainable level of population;
- Conserve and enhance the resource base;
- Reorient technology and manage risk; and
- Include and combine environmental and economic considerations in decision-making.

The goal of sustainable development policy is human well-being for people everywhere, measured in terms of factors such as security, the satisfaction of material needs, health, social relations, freedom of choice and action, and following a principle of equity and fairness. To meet this goal, it is necessary to generate and distribute wealth in ways that reduce poverty and provide a decent standard of living to people everywhere.

It is widely accepted that there is a strong linkage between technology and social organization and that development has taken place through stages in which technological innovation has led to economic and social transformation; this is sometimes described as a succession of transitions from hunter/gatherer, to agricultural, to industrial, to information/knowledge societies.

The impact of ICTs on how economies and societies work is profound and visible at all levels, from global trade and culture to relationships within the family. For example:

1. Information technology has enabled and increasingly enables major changes in the production of goods and services, including the globalization of product development, manufacturing, and labor markets; the displacement of labor by technology; and the expansion of service sectors.
2. It increasingly enables the digitalization and virtualization of some traditional goods (such as books and music) and the individualization of some traditional services (such as banking, travel, and insurance).
3. It has enabled the creation of a new range of business opportunities within the ICT sector itself, from software design to street corner resale of telephone airtime.
4. It disrupts traditional governance arrangements among state, business, and consumer, including those relating to taxation and intellectual property. It also provides opportunities for new forms of administration, marketing, and service delivery through which governments and businesses can interact with citizens, and through which citizens engage with them when they wish to do so.
5. It greatly increases the extent to which individuals can access information, entertainment, and other resources, including those which have been restricted by law—but also enables new forms of tracking of individual behavior by the state, businesses, and non-governmental actors.
6. It enables individuals to publish material of all kinds—from personal information to political comment, “citizen journalism” to rumor-mongering and defamation, music making to pornography—without the economic, political, and social constraints that have hitherto prevailed.
7. It has enabled and increasingly enables the capacity to communicate immediately at a distance—facilitating the exchange of information and maintenance of social contact within families, social networks, and diasporic communities, greatly increasing the pace with which news (and rumor) spread and influence behavior.
8. It facilitates networking between individuals and organizations, within and beyond national boundaries, enabling more extensive and diverse forms of organizational partnerships—from new forms of marketing to new forms of solidarity amongst the marginalized, from social networking forums such as Facebook to criminal organizations.

ICTs can play an important role in monitoring, measuring, and managing the natural, human, and built systems of the physical environment through remote sensing systems, embedded sensor networks, radio-frequency identification (RFID), and ubiquitous networking technologies that together make up what has been called the “Internet of Things.” Improved measurement can enhance early warning mechanisms as well as enable more efficient utilization of facilities.

Education is a continuous process that is lifelong in which the learner will continue seeking knowledge through various sources. This means that ICT skills are increasingly indispensable

to them. ICT has been seen as a critical factor that expands access to education because, with it, education can occur at any time and anywhere. Most educational material is available online at any time. Technologies such as teleconferencing allow students and instructors to interact simultaneously, efficiently, and conveniently. There is a myriad of resources on a particular subject matter available on the internet; these resources are of various materials: videos, audio podcasts, 3D visual representation, etc. The main task in achieving sustainable education for all by 2030 has been converting the education environment into a more learner-centered one.

According to Brush (2008), ICT for education sustainability has helped students and learners across the world access educational material more effectively and efficiently. ICT has been a tool that has enabled them to discover new areas of interest, solve problems, and discover new perspectives.

Role of Teachers in Sustainable Development

The role of teachers in education for sustainable development is complex and nuanced. **Teachers are considered to be the change agents to put into action sustainable development goals.** However, teachers are rarely exposed to the ideas and concepts of sustainable literacy through their preservice programs. Using Information and Communication Technologies (ICT) to benefit the environment has favored sustainable education, which has helped bring forth responsible and more aware students. To better achieve sustainable education, management institutions must have ethics internalized to ensure sustainable development.

Yusuf (2007) sees information and communication technology as an electronic technology used for accessing, processing, gathering, manipulating, presenting, and communicating information. Similarly, Sukanta (2012) described ICT as the varied collection of technological gear and resources used for communication. They are also made used to generate, distribute, collect and administer information.

Education is regarded as the most important area that needs adequate attention, especially for the empowerment of women in society, and the introduction of ICT as an educational tool in the promotion of both men's and women's educational advancement has immense potential. The application of ICT as a tool for effective enhancement of learning, teaching and education management covers the entire spectrum of education from early childhood development to primary, secondary, tertiary, and basic education etc.

(Sukanta, 2012) Usha, S (2009) identified three major areas in which ICT is considered significant in improving the educational system in general. These are; ICT Education, ICT-supported Education, and ICT Enabled Education. It is a general belief that ICT help in the creation of human resources, hence regarded as the primary backbone of the teaching-learning process such as online courses through the web. Integrating ICT in teaching and learning both in science and other related field have helped in the improvement of the learner. ICT is seen as an essential aspect of teaching that affords new and

transformative models of development that extend the nature and reach of teacher learning wherever it takes place (Leach, 2005).

The introduction of ICT has helped to promote fundamental changes in teaching and learning methods thereby helping to overcome the barriers of time and place as technology introduces new choices and opportunities for students and teachers through endless research and learning on the internet (Osakwe, 2012). Also, Kwace (2007) argued that ICT has the potential of accelerating, enriching and deepening skills; to motivate and engage students in learning; to help relate school experience to work practices which enable them to create economic viability for tomorrow's workers, contribute to radical changes in school, to strengthen teaching and provide opportunities for connection between school and the world.

The evolution of ICT has helped in the transformation of the global economy and created new business linkages and opportunities that cross business sectors, cultures, and distances. Also, e- business has provided opportunities for tourism by offering a fully developed web portal as a comprehensive Destination Management System (DMS) that includes booking and transaction facilities which promote the opportunity to increase sales and revenue (Paul, 2010).

Conclusion:

The introduction of ICT into the education system has helped to eliminate constraints and thereby enable the application of scientific knowledge to meet societal aspirations and goals. The study, therefore, concluded that information and communication technology (ICT) is a veritable tool for promoting sustainable education development and this is in line with a similar study by Anya (2012).

It is believed that if properly harnessed and put into proper usage, a reasonable level of development would be achieved through ICT. Based on the conclusion drawn from the findings, the following recommendations were made:

- People should be sensitized on the importance of information and communication technology in business, access to and sharing information.
- Government should also create an enabling environment for ICT to thrive.
- There should also be a public-private partnership in information and communication technology for efficiency and effective utilization of both the hardware and software.

Teachers must try to integrate the ICT tools in their pedagogy as a facilitator, allowing students to construct their learning, rather than rote memorizing the learning material. In this rapidly advancing world to meet the challenges faced by mankind related to issues and problems of the Environment and availabilities of resources integration of ICT in education is the best way ever. So, through ICT-based education for sustainable development, we can save our environment and help the future generation.

REFERENCES

1. Barbier, E. (1987). *The concept of sustainable economic development*. Environmental Conservation, 14(2): 101–110.
2. Sánchez, J. J. C., & Alemán, E. C. (2011). Teachers' opinion survey on the use of ICT tools to support attendance-based teaching. *Computers & Education*, 56(3), 911-915.
3. Paul, R. (2010). Issues Concerning the Role of Information and Communication Technology (ICTs) in Developing Sustainable Tourism. *Tourism Workshop South-West Journal of Teacher Education*, vol.3, 598-614.
4. Sukanta, S. (2012). The Role of Information and Communication Technology (ICT) in Higher Education for the 21st Century. *The Science Probe*, 1(1), 30-41.
5. Lu, Z., Hou, L., & Huang, X. (2010). Research on a student-centered teaching model in an ICT-based English audio-video speaking class. *International Journal of Education and Development Using ICT*, 6(3), 101-123.
6. McCombs, B. L. (2010). Assessing the Role of Educational Technology in the Teaching and Learning Process: A Learner-Centered Perspective.

Online References:

- http://www.energystar.gov/ia/partners/prod_development/
- <https://gdc.unicef.org/resource/role-information-and-communication-technology-realizing-sustainable-education-2030>
- http://homepage.cs.latrobe.edu.au/sloke/greenIT/eito_form_2002.pdf
- <https://core.ac.uk/download/pdf/234646399.pdf>
- https://www.iisd.org/system/files/publications/icts_internet_sd_new_paradigm.pdf