# Driving Education of Environmental Legislations Through ICT for Wide-Ranging Accessibility and Implementation

S.O. Iheukwumere[1], D.C. Onuoha[2], K.F. Nkwocha[3] and C.P. Nwabudike[4]

Corresponding Author: so.iheukwumere@unizik.edu.ng

[1]Department of Geography and Meteorology, Nnamdi Azikiwe University, Awka, Anambra State.

[2]Department of Environmental Management, Nnamdi Azikiwe University, Awka, Anambra State.

[3]Department of Geography, University of Maiduguri, Borno State.

[4]Department of Social Science Education, University of Nigeria Nsukka, Enugu State.

***Abstract***

*Environmental problems come in different forms and facades traceable to many human activities. Hence, environmental laws are formulated to regulate human activities, in order to check, prevent triggering or aggravation of environmental problems. The job of protecting the environment is one which has constantly kept environmental managers on their toes trying to fashion out various measures to employ. Environmental protection problems are a challenge for which there is no application of a single strategy, but combination of strategies in all social, economic and technological areas which would contribute to solving the problem of environmental protection and management. Environmental protection is currently a principal area of local and international regulations and cooperation. Local regulations and laws help to drive environmental protection at local levels. A myriad of laws exists in Nigeria, albeit mostly in paper form and difficult to access. The advancement of information and communication technologies (ICTs) and its rapid spread have accelerated the use of online means of communication. While technology and digital tools have proven effective for educational purposes, it becomes necessary to employ ICT in creating awareness on environmental laws which are a tool in environmental protection. Awareness of environmental legislations and laws are instrumental to curbing environmental abuse and enhancing of protection measures. To achieve early and wide spread awareness, it is the view of the authors that ICT be employed through internet portals and social media in driving wide reaching awareness.*

**Keywords:** Environment, Sustainable development, Environmental laws, ICT.

## Introduction

Education is the process of acquiring knowledge, skills, values, and attitudes that enable individuals to develop their full potential (Idris et al, 2012; Al-Shuaibi, 2014). Adesemowo and Sotonade (2022) assert that education is a dynamic instrument of change. Education is expected to affect or condition the social behaviour of the person being educated. It is one of the most essential aspect s of human life, as it plays a critical role in personal, social, and economic development. Education can take place in a formal or informal setting, and can occur at any stage of an individual's life. While formal education is a structured and systematic process of learning that takes place in institutions such as schools, colleges, and universities. Informal education, on the other hand, refers to the learning that occurs outside of formal institutions. It can take place in various settings, such as the family, community, workplace, or online. Online means of education has become an effective means to reaching a wider audience and passing different kinds of information. Education has been identified as a critical force for adopting a range of strategies for implementing environmental policies and programmes.

Environmental education is a process that aims to increase people's knowledge of the environment, how it interacts with them, and how their actions affect it. It also aims to create the responsible behaviours required for the protection, improvement, and conservation of the environment and its elements. The pursuit of sustainable development and environmental conservation require that the public be sufficiently sensitized. Awareness and understanding of environmental legislations provide a basis and rationale for commitment and meaningful action towards environmentally sound practices and sustainable development.

This paper focuses on the use of ICT (Information and Communication Technology) to drive mass literacy of environmental legislations, with the aim of spiking commitment to implementation of enacted laws geared towards environment friendly practices and sustainable development. Additionally, this paper is meant to educate on the existence of environmental legislations and its importance in achieving a healthy environment.

**Concept of Environment**

The environment is the place for human existence and it has come under the risk of degradation as a result of human activities and growing civilization (Ladan, 2007). Environment is that space in which we live, interact, and carry out every activity that defines us as humans. As humans, we depend on the environment to provide a platform for our existence, daily interaction and survival. From the definition of Ladan (2007), we can deduce that environmental quality can be degraded. The degradation of environmental quality is both a function of nature and of man. However, there is a balance which exist, enabling natural processes to cater for natural sources of pollution and degradation. Natural systems such as biogeochemical cycles serve as a means through which such agents of pollution can be eliminated.

The elimination of natural sources of pollution and degradation by natural processes leaves us with human-induced agents of pollution and degradation, which due to their nature, composition, lethality, degree and duration of discharge, byproducts of human activities have continued to impact on the environment in differing degrees and forms. By providence of ecosystem services, humans realizing that the environment is the cradle of existence and survival have tried to understand how the environment work and how best to cater for it in order to stem the consequences of human-induced degradation and pollution. In striving for a healthy environment, environmental policies, regulations, frameworks, and laws have been enacted. On several occasions, international conventions geared towards environmental protection have been held with treaties signed at the end. All these efforts are in a bid to ensure a healthy environment and what is known as Sustainable Development.

Environmental laws are enacted to protect the environment in order to make it safe and productive for human life and activities. Environment belongs to all the biotic and abiotic components and therefore is, vital for all. Consequently, everyone is affected by environmental

issues like global warming, depletion of ozone layer, dwindling forest and forest resources, depleting energy resources, loss of biodiversity etc.

In order to sustain a healthy environment, basic knowledge of environmental processes and interactions has become a sine-qua-non. Environmental knowledge helps us in setting benchmark for safe and healthy natural ecosystem. Prasad (2023), noted that environmental knowledge is a multidisciplinary knowledge whose fundamental aspects have a direct significance to every segment of the planet. Its main characteristics include:

- Conservation and natural resources.
- Maintenance and management of biological diversity.
- Controlling and managing environmental pollution to permissible limit
- Stabilisation of human population and environment.
- Development of alternate sources of renewable energy systems
- Providing new dimension to nation's security through conservation, protection, management, maintenance of environment and environmental resources.

It also deals with vital issues like safe and clean drinking water, hygienic living conditions and pollution free fresh air, fertility of land, healthy food and development of sustainable environmental laws, administration, environmental protection, management.

**Concept of Sustainable Development**

Since the Brundtland Commission published its landmark report in 1987 termed our "common future" (Brundtland, 1987), the concept of sustainable development has come a long way and has become a resounding concept in many disciplines. Either for or against the fundamental principles of the concept, both schools of thought acknowledge that our actions must take into account effects on the environment, economy and society, and that what we do today should not compromise the well-being of future generations. However, before the advent of

sustainable development concept, the issue of environmental management has been operational albeit with a different set of rules. The period which followed the emergence of the concept saw a shift in measures to tackle environmental issues. These measures included enactment and amendment of new and existing laws, policies and regulations.

**Environmental Legislations and Legal Frameworks**

Environmental legislations and legal frameworks are collection of laws, policies and regulations pertaining to air quality, water quality, flora and fauna including endangered wildlife and other environmental factors. The umbrella of environmental legislation covers many laws and regulations, yet they all work together toward a common goal, which is regulating the interaction between man and the natural world to reduce threats to the environment and maintain public health.

Environmental law, on the other hand is a special body of official rules, decisions and actions concerning environmental quality, natural resources and ecological sustainability (Cunningham et al., 2003). Environmental law is a special body of official rules, decisions and actions concerning environmental quality, natural resources and ecological sustainability (Cunningham, Cunningham, and Saigo, 2001). Environmental laws are rules, regulations, and agreements that governs how humans interact with their environment. The purpose of environmental laws is to protect the environment and create rules for how people can use natural resources. Environmental laws not only aim to protect the environment from harm, but they also determine when and who can use natural resources and on what terms. Laws may regulate pollution, the use of natural resources, forest protection, mineral harvesting, animal harvesting and poaching.

Ladan (2007) stated that environmental laws often give individuals and groups the right to bring legal actions or seek court orders to enforce the protections or demand revisions of private

and public activity which may have detrimental effects on the environment. Environmental law is thus practiced in the public interest, by groups and individuals seeking environmental protections for general public benefit.

An environmental policy on the other hand is a government's chosen course of action or plan to address issues such as pollution, wildlife protection, resource conservation and preservation, land use, energy production and use, waste generation, and waste disposal. According to RAND (2021), environmental regulations attempt to protect public health and the environment from pollution by industry and development. Environmental regulation is a legal framework usually issued by governmental body stating standards and procedural guidelines. It provides advice on issues relating to risk reduction and prevention.

**Environmental Regulations and its Importance.**

In the last 30 years, significant progress has been made in managing the environment. Most States and Federal government have begun to incorporate sustainable development into their planning and policy. Pro-active organizations across the globe have brought sustainability to their products and processes. Local initiatives and traditional beliefs have had success in informing citizens of the importance of participating in activities that protect and preserve nature. Local traditional practice as witnessed in Awka, Anambra State in Nigeria has been a factor in the preservation of monkeys. While pythons are preserved by the traditional belief system of the Idemili People of Anambra State. Environmental laws, just like these traditional laws are indispensable tools in achieving sustainable development. Environmental laws confer rights which ensures that every Nigerian has a right to a clean and healthy environment. These policies, laws and regulations serve the purpose of:

- controlling pollution by stipulating lower emission levels.

- conserving natural resources through regulation of processes and activities that could impact on flora and fauna, as well as other forms of resources.
- It also has relevance to product design in the form of environmentally friendly materials, emission controls and energy-efficient devices.
- Protection of public health by listing procedural guidelines for executing specific activities in order to eliminate impact on human health.

**Environmental Laws, Policies and Regulations in Nigeria.**

In Nigeria, environmental protection provisions are generally embedded in different pieces of legislation. Environmental legislation took a focal point following the Koko toxic waste dump in 1988. This prompted the formation of then Federal Environmental Protection Agency (FEPA) (now Federal Ministry of Environment, since 1999) for the administration and enforcement of regulations. Ogbodo (2009), noted that prior to June 1988, Nigeria responded to most environmental problems on an adhoc basis.

The basis of environmental policy in Nigeria is contained in the 1999 Constitution of the Federal Republic of Nigeria. Pursuant to section 20 of the Constitution, the State is empowered to protect and improve the environment and safeguard the water, air and land, forest and wildlife of Nigeria. In addition to this, section 2 of the Environmental Impact Assessment Act of 1992 (EIA Act) provides that the public or private sector of the economy shall not undertake or embark on or authorise projects or activities without prior consideration of the effect on the environment. In this regard, the Federal Government of Nigeria has promulgated various laws and Regulations to safeguard the Nigerian environment. These include:

- Federal Environmental Protection Agency Act of 1988 (FEPA Act) repealed by the National Environmental Standards Regulation Agency (NESREA) Act 2007. The following Regulations were made pursuant to the FEPA Act:

- National Environmental Protection (Effluent Limitation) Regulations:
- National Environmental Protection (Pollution Abatement in Industries and Facilities Generating Wastes) Regulations; and
- National Environmental Protection (Management of Solid and Hazardous Wastes) Regulations.

Others

- ❖ Environmental Impact Assessment Act (Cap E12 LFN 2004). This law sets out the general principles, procedures and methods of environmental impact assessment in various sectors.
- ❖ Harmful Waste (Special Criminal Provisions) Act (Cap H1 LFN 2004). This law prohibits the carrying, depositing and dumping of harmful waste on land and in territorial waters.
- ❖ Endangered Species (Control of International Trade and Traffic) Act (Cap E9 LFN 2004). This provides for the conservation and management of wildlife and the protection of endangered species, as required under certain international treaties.
- ❖ National Oil Spill, Detection and Response Agency Act 2006 (NOSDRA). The objective of this law is to put in place machinery for the co-ordination and implementation of the National Oil Spill Contingency Plan for Nigeria to ensure safe, timely, effective and appropriate response to major or disastrous oil pollution.
- ❖ National Park Services Act (Cap N65 LFN 2004). This makes provision for the conservation and protection of natural resources and plants in national parks.
- ❖ Nigerian Minerals and Mining Act 2007. This repealed the Minerals and Mining Act No. 34 of 1999 and re-enacted the Nigerian Minerals and Mining Act 2007 for the purposes of regulating the exploration of solid minerals, among other purposes.

- Water Resources Act (Cap W2 LFN 2004). This aims at promoting the optimum development, use and protection of water resources.
- Hydrocarbon Oil Refineries Act: The Act is concerned with the licensing and control of refining activities.
- Associated Gas re-injection Act: This law deals with gas flaring activities by oil and gas companies. Prohibits, without lawful permission, any oil and gas company from flaring gas in Nigeria and stipulates the penalty for breach of permit conditions.
- Nuclear Safety and Radiation Protection Act: The Act regulates the use of radioactive substances and equipment emitting and generating ionising radiation. In particular, it enables the making of regulations for protecting the environment from the harmful effects of ionising radiation.
- Oil in Navigable Waters Act: This is concerned with the discharge of oil from ships. It prohibits the discharge of oil from ships into territorial waters or shorelines.
- The Nigerian President Muhammad Buhari Thursday, November 18, 2021, signed into law the Climate Change Bill Passed by the National Assembly. In signing the bill into law, Nigeria has joined group of countries that have enacted emissions-target legislation aiming to eliminate carbon emissions. The main objective of the climate law is to provide an overarching legal framework for achieving Nigeria's long-term climate goals including a net-zero carbon emission target, national climate resilience, an adequate volume of climate finance, and mainstreaming climate change actions into national development priorities.

Environmental Standards and Regulations of NESREA

- National Environmental (Air Quality Control) Regulations, 2014
- National Environmental (Base Metals, Iron and Steel Manufacturing-Recycling Industries Sector) Regulations, 2011

- National Environmental (Chemical, Pharmaceutical, Soap and Detergent Manufacturing Industries) Regulations, 2009
- National Environmental (Coastal and Marine Area Protection) Regulations, 2011
- National Environmental (Construction Sector) Regulation 2011
- National environmental (Control of Alien and Invasive Species) Regulations, 2013
- National Environmental (Control of Bush, Forest Fire and Open Burning) Regulations, 2011
- National Environmental (Control of Vehicular Emissions from Petrol and Diesel Engines) Regulations, 2010
- National Environmental (Dams and Reservoirs) Regulations, 2014
- National Environmental (Desertification Control and Drought Mitigation) Regulations, 2011
- National Environmental (Domestic and Industrial Plastic, Rubber and Foam Sector) Regulations 2011
- National Environmental (Electrical Electronics Systems) Regulations, 2011
- National Environmental (Food, Beverages and Tobacco Sector) Regulations 2009
- National Environmental (Hazardous Chemicals and Pesticides) Regulations, 2014
- National Environmental (Mining and Processing of Coal, Ores) Regulations 2009
- National Environmental (Motor Vehicle & Miscellaneous Assembly Sector) Regulations 2013
- National Environmental (Noise Standards and Control) Regulations 2009
- National Environmental (Non-Metallic Minerals Manufacturing Industries Sector) Regulations, 2011
- National Environmental (Ozone Layer Protection) Regulations, 2009
- National Environmental (Permitting and Licensing System) Regulations, 2009

- National Environmental (Protection of Endangered Species in International Trade) Regulations 2011
- National Environmental (Pulp and Paper, Wood and Wood Products Sector) Regulations, 2013
- National Environmental (Quarrying and Blasting Operations) Regulations, 2013
- National Environmental (Sanitation and Wastes Control) Regulations 2009
- National Environmental (Soil Erosion and Flood Control) Regulations, 2011
- National Environmental (Standards for Telecommunication/Broadcast Facilities) Regulations, 2011
- National Environmental (Surface and Groundwater Quality Control) Regulations, 2011
- National Environmental (Textile, Wearing Apparel, Leather and Footwear Industry) Regulations 2009
- National Environmental (Watershed, Mountainous, Hilly and Catchment Areas) Regulations 2009
- National Environmental (Wetlands, River Banks and Lake Shores Protection) Regulations, 2009

Environmental laws and regulations as stated here amongst others work to protect biodiversity, soil, air, and water. Negligence of these laws results in various punishments like fines, community service, and in some extreme cases, jail term. Without these environmental laws, the government would not be able to punish those who treat the environment poorly.

**Major Weakness of the Laws**

Despite the myriad of available laws which is aimed at protecting the Nigerian environment, the laws are not easily accessible to all whenever and wherever needed. This has left many

defaulting in several ways unconsciously even as it is said that “ignorance is not an excuse before the law”. This difficulty of inaccessibility of environmental laws is occasioned by the fact that:

- They are mostly available in paper forms,
- There is inadequate publicity of the laws.

The fast rate of development and globalization requires that environmental laws need to be communicated widely as a means to aid sustainable development. In order to achieve wide ranging accessibility, new and accessible methods are required. Hence, the use of information and communication technology has become paramount and an indispensable tool.

**Literature Review**

Andrew (2016) through survey research in Uganda, reported that media helps the people and civil society group to raise the issues and keep people aware. He noted that lack of adequate policy measure and lack of awareness are believed to complicate the problem of mitigating the impact of environmental change. The study concluded that the media has a big role to play in making people aware of environment issues and taking actions to protect the environment.

Ors (2012), examined Turkey’s environmental problems and the role of media in addressing the problems through environmental education. Ors opined that environmental education cannot be limited to formal educational institutions since an individual also acquires awareness through his social life and his social relationships. In this context, the media is an important tool in environmental education.

Severo et al (2019) using survey research studied the influence of social networks on environmental awareness. Their result highlight that individuals who are exposed to information related to social responsibility and environmental sustainability are positively influenced in the formation of social and environmental awareness.

Scholtz et al (2016) examined the impact of a social media campaign on the environmental awareness of staff members in a Higher Education Institution (HEI). A centralised website together with selected social media formed the technological foundation of the campaign. Throughout the campaign information about environmental management was distributed by means of these technologies to selected staff members in the case study. Issues related to environmental management as well as suggested strategies to deal with them was also communicated to the staff members. In order to determine the growth of knowledge related to environmental issues and to get feedback on the campaign benefits and problems, surveys and interviews were conducted at regular periods throughout the campaign. The findings revealed that the campaign promoted environmental awareness.

Rahim and Adeen (2016) conducted research in University of Sulaimani to investigate the role of social media on environmental awareness of undergraduate students. The result showed that students use social media continuously to get news and information as number one priority, then to increase their knowledge as number two, raise awareness about science and education as number three, and finally increase environmental awareness as number four.

Neelima and Uttama (2014), also expressed the opinion that the scope of education has expanded from its formal definition to include various media which have potential to inform, create awareness and educate. They stated that a combination of formal environmental education in schools and media education through various channels can be an effective strategy in sensitizing people towards environmental issues. Their experimental study to explore the impact of environmental education in schools using 150 students of classes 8th, 9th and 10th whom were shown educational programs over a period of three months. The analysis of the reports of pretest and posttest of the experiment showed positive increase in awareness of environmental issues.

Misra (2021), in a review highlighted that several environmental issues related to the change of land use pattern, air pollution, climate change and water availability as well as water quality are found as an important topic and the awareness for environment protection is taking place as an important aspect among society through print and online media. However, the circulation of environmental issues may be delayed through print media while the social media like Facebook, WhatsApp, Twitter (now known as X) do not delay conveying the message within the state, country or worldwide because of web based platform.

**Information and Communication Technology**

Globalization and technological change processes that have accelerated in tandem over the past years have created a new global economy powered by technology, fueled by information and driven by knowledge (University of Mumbai, 2011). Information and communication technology (ICT) have become, within a very short time, one of the basic building blocks of modern society. Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy (Gokhe, 2011).

ICT covers any product that store, retrieve, manipulate, transmit or receive information electronically in a digital form. For example, personal computers, digital television, email, robots. Information and communication technologies (ICTs) which include radio and television, and the Internet - have been touted as potentially and powerful enabling tools for educational change, awareness and reform. When used appropriately, different ICTs are said to help expand access to education and public awareness. Two ICT tools which will enhance access to environmental laws are: Internet portals/web pages and Mobile applications alongside the previous campaigns in print and electronic media.

**Internet Portals and Web Pages**

In the context of the Internet, a portal refers to any commonly used website serving as an entry point to the Internet, usually with many links to a wide variety of information, data, resources and services. Gant and Gant, 2002 stated that for a state government, the web portal serves as the integrated gateway, or main user interface, into the website. It provides both external constituents and internal government personnel with a single point of contact for online access to state information and resources. Through this gateway millions of web users can access the vast landscape of information, services, and applications available on the state web sites. Businesses and government agencies continue to take advantage of the Internet to provide services and improve service delivery (Al-Kibsi, Boer, Mourshed, and Rea, 2001; Gant and Gant, 2002).

**Mobile Application**

A mobile application is a computer program designed to run on a mobile device such as mobile phones, tablets, and personal device assistants. Mobile devices function by connection to the internet or other wireless communication network using any standard wireless communication protocol. The focus of mobile applications is to enable the use of these applications in accessing important information and access basic level of services. The term “mobile” associated with the name denotes the portability and ability of the devices to be carried around with easy. Mobile applications vary and serve a vast category of functions. Common examples of mobile application include application for mobile banking which are maintained by various banks for easy transfer, deposit of cash and for information broadcast to customers. Mobile application has unburdened the burden to commuting a long distance to acquire information or execute transactions. It has bridged the wider gap created by distance in communication of information and knowledge. Social media applications such as WhatsApp, Facebook, Telegram and Twitter which are also mobile applications have served a great deal in information dissemination.

**Creating Awareness of Environmental Laws Through Internet Portals, Web Pages and Mobile Applications.**

There is an overwhelming amount of news coverage related to the state of the economy, international politics, and various domestic programs. The environment and environmental policies on the other hand, are being ignored. When environmental policy is discussed many citizens and representatives and even organizations seem to be in the dark. This is because environmental legislations are not as often a topic of discussion as politics, sports, and entertainment.

Awareness of environmental issues and importantly legislations and laws are instrumental to curbing environmental abuse and enhancing of protection measures. To achieve early and wide spread awareness, the United States in 1990 enacted the National Environmental Education Act which required the USEPA to provide national leadership to increase environmental literacy, to encourage and assist students in studying Environmental Engineering and other environmental related courses (USEPA, 2022). According to the United States Environmental Protection Agency (2022), Environmental education is a process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment. As a result, individuals develop a deeper understanding of environmental issues and have the skills to make informed and responsible decisions.

The USEPA gave components of environmental education as:

- Awareness and sensitivity to the environment and environmental challenges
- Knowledge and understanding of the environment and environmental challenges
- Attitudes of concern for the environment and motivation to improve or maintain environmental quality
- Skills to identify and help resolve environmental challenges

- Participation in activities that lead to the resolution of environmental challenges

Environmental awareness is crucial to understanding the fragility of our environment and the importance of its protection. Promoting environmental awareness is an easy way to enhance the knowledge and understanding of the environment in individuals. Knowledge is a potent agent for attitudinal change, compelling individuals to become environmental stewards and participate in creating a healthier environment.

As stated earlier, the purpose of environmental laws is for the protection of the environment, as such, knowledge or easy accessibility of environmental laws. Awareness of the laws could bring about attitudinal changes and spur participation in environmental protection. Unless there is awareness of the laws, there is no action – or at least no proper action. And this action must start from the individual level and spread through the people and organizations (Basu, May 11, 2019).

According to Basu (2019), staying up-to-date on environmental news and subscribing to magazines on natural history and environment are among the ways he recommended for environmental awareness. This therefore further show the importance of ICT in environmental awareness as media outlets now have social media handles and subscription channels for information dissemination. Such media outlets have incorporated the utilization of ICT through mobile application creation and installation, sending of newsletters by email and hosting of web portal for easy accessibility of information.

It is no longer the time when if you wanted news you had to read a newspaper, watch television or listen to the radio. Today, you can get all information on websites, social media pages, and mobile devices. This diversification has made it possible for communication to be efficient, effective and reach all four corners of the world (Hernandez, 2018). Digital media such as the blogs, news websites, Twitter, Facebook is gradually replacing print media

such as newspapers, magazines. We comfortably get information about what is happening around the world from the comfort of our homes via the mobile phones, tablets, and laptops (Okafor, Apr 4, 2019).

Shonhe and Jain (2017) stated that the changing landscape of Information Communication Technology (ICT) has changed people's lifestyles. ICTs are now an indivisible part of individuals in different disciplines and spheres of life. Mobile technology provides a suitable platform for information dissemination as itis more personalized. Information providers can harness mobile features to provide selective information dissemination or enhanced user-oriented services (Saxena and Yadav, 2013).

**Conclusion**

Environmental legislation is a broad topic, mainly because the natural environment encompasses so many different aspects. So, environmental laws need to consider everything, from the air we breathe to the natural resources we rely on to the plants and animals that share this world with us. Environment and society are both interrelated and interdependent. Environmental legislations are one possible way of striking the balance between both. Though several legislations are available in the Nigerian spere, its existence in hard copies have limited its accessibility to a wider audience. ICT has provided a platform for dissemination information to a wider audience in less time. Environmental protection which is essential to ensure the continued health and well-being of both ecosystems and human societies requires a multi-faceted approach, involving contribution from individuals and organizations working together to address environmental issues. One of the approaches towards promoting a sustainable healthy environment should be the employment of ICT to drive environmental education. Understanding environmental rules and regulations is essential to reducing environmental misuse and improving protective measures. The authors believe that ICT should be used

through internet portals, mobile application and social media to promote widespread awareness

in order to attain early and widespread awareness.

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