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ICT-PROPELLED INNOVATIONS FOR ENVIRONMENTAL EDUCATION IN THE 21ST CENTURY: POSITIVE TRANSFORMATIONS AND SOME INHERENT HEALTH AND SAFETY CHALLENGES IN THE TEACHING AND LEARNING SETTING

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ABSTRACT: *The aim of this paper is to highlight the innovations and positive transformations in teaching and learning strategies in Environmental Education facilitated by Information and Communication Technology (ICT), as well as to x-ray the potential/inherent health and safety challenges arising therefrom. 21st century is an era in which the entire world experiences unprecedented advancements in technology. ICT has revitalised and transformed learning environments and platforms in the education sector for children, youths and adults alike by providing learners with a gamut of learning equipment and opportunities which include the use of Computer, Internet, WhatsApp, Facebook, Zoom/Webinar and so on. Specifically, the 21st century era has witnessed, in a positive manner, the effect of ICT in the field of Environmental Education (EE). Notwithstanding this effect, however, various outstanding research studies, have revealed that ICT has also posed certain health and safety challenges to both learners and facilitators/teachers in the environmental education setting. Comparison of the said challenges with the situation in the teaching and learning settings for EE prior to the emergence of ICT in the 21st century is done in this paper to provide further information that would assist the authors in making desirable recommendations towards effective management of the potential health and safety hazards in the 21st century teaching and learning settings for Environmental Education.*

Keywords: ICT-propelled, innovations, environmental education, health and safety challenges, 21st century.

INTRODUCTION

The tremendous contributions of information and communication technology systems (ICTS) over the years cannot be overstated. The impacts of these systems have permeated every fabric of the society, covering social, economic, cultural, political and educational sectors. In the education sector, for instance, ICTS have given different categories of learners an opportunity to access their learning careers and professions with ease. Learning has been made so flexible, easily-accessible and practical-oriented.

Information and Communication Technology (ICT) has revitalised and transformed the learning environment and platforms in the education sector. It has provided learners with

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a gamut of learning opportunities, ranging from computer, Internet and WhatsApp to Facebook, Zoom/Webinar and so on. With the large number of beneficiaries across the globe, there is no gainsaying the fact that the education sector is most advantaged when it comes to the use of ICT. Accordingly, Kozma (2005) has noted that education has been identified as one of the public sectors most influenced by technological advancements. Education in the 21st century has enabled learners to undertake learning activities or enterprises without limits. Indeed, the emergence and continuous spread of ICTS have ushered learners into the realm of limitless and rapid learning platforms.

Interestingly, both adults and school age children now enjoy unlimited access in exploring and maximising the various ICT potentials available at their disposal for increased learning opportunities. Adult learners, for instance, now have a wide range of choices to access their learning any day, anytime and anywhere, without moving from one place to another, and at the same time still carry out their various roles and duties in their respective homes, offices, churches, and so on. Adults are vulnerable to various challenges in their locality, and the solution to such problems, if not known or identified can be easily accessed with the aid of ICTS. More on the benefits of ICT to Adult Education later in this paper.

Whether the challenges are environmental or otherwise, the application of ICTS could help tremendously to identify the menaces. Regarding environmental issues, instead of going to places to study how people tackle their environmental problems, ICT gadgets could be used to identify solution to such problems in just one click. On this, NAAEE (2014) has further explained that through the use of "Google Earth" as ICT, students could be guided to gain visual experience of the aftermath of several oil spills on marine ecology, soil degradation and environmental destruction that adversely affect people's livelihood in several parts of the world, including Nigeria. Outside the classroom, on the other hand, the use of ICT tools, such as portable computers and mobile phones, has been found useful in the generation of outdoor learning experiences, including creation of environmental awareness and fostering of necessary attitude of concern for the environment and acquisition of relevant skills for identifying and solving environmental problems.

Despite the enormous merits of ICT in solving certain environmental and other education problems, it has also been discovered that ICT could pose certain health and safety problems in the teaching and learning setting. The thrust of this paper, therefore, is to examine the innovative strategies in Environmental Education brought about by ICT and highlight related potential/inherent health and safety hazards in the 21st century teaching and learning settings for Environmental Education (EE). In specific terms, the objectives are to:

1.) ascertain the nature of the 21st century teaching and learning settings and strategies for EE in relation to ICT;
2.) highlight the nature of as well differences in health and safety hazards in teaching and learning settings for EE prior to and during the 21st century.
3.) make appropriate suggestions towards effective control of the highlighted 21st century ICT-related health and safety hazards in teaching-learning settings and strategies for EE.

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Overview of the Attributes of Information and Communication Technology (ICT) and their influence on Education

Since its emergence, particularly in the 21st century, the term ICT has embraced a steady and constant romance from various practitioners and scholars across the globe. In a generic term, ICT stresses the use of unified communications and the integration of telecommunications (telephone lines and wireless signals), intelligent management systems and audio-visual systems in modern information technology (Showole et al, 2015). Accordingly, Rouse (2009) perceived ICT as all devices, networking components, applications and systems that combined, allow people and organisations (including personal agencies) to enter into and interact in the digital world. Thus, ICT encompasses all the technological devices and accessories emerging from or associated with information and communication sector or domain used for easy assimilation, transmission, facilitation and assessment of data for easy and quick response.

ICT has played an undeniable role in the field of education in general, and in the area of environmental education in particular. Generally, Information and Communication Technology systems (ICTS) make it possible for children, youths and adults to acquire knowledge and skills that facilitate continuous learning throughout their lifetime. ICTS, which include the radio and television as well as the new digital technologies, such as computers and internet, have been widely welcomed because of their capabilities to increase access to learning, and also to overcome such barriers as cost, time and space (NMEC, 2017)

ENVIRONMENTAL EDUCATION: ROLE AND IMPACT OF ICT

In defining the scope of environment, certain interrelated factors come to mind. Such factors include human, biological, biotic and abiotic, chemical, flora and fauna. Environment, in the course of time, has suffered serious deterioration mainly due to anthropogenic (human) activities and increased need for the improvement of standard of living of the populace. These negative impacts have created a hiatus in and a dire need for the preservation and maintenance of the environment. In order to address man's ignorance and the danger it has posed on the environment, various movements for environmental education have been sponsored. For instance, Hassan et al, (2009, p. 2315) reported that during the historic Tbilisi Convention sponsored by the UNESCO and United Nations Environmental Programme (UNEP) in 1977 in Tbilisi, environmental education was defined as:

> … a process aimed at developing a world population that is aware of and concerned about the total environment and its associated problems, and which has knowledge, attitude, motivations, commitments and skills to work individually and collectively towards solutions of current problems and the prevention of new ones.

Similarly, environmental education, according to Tbilisi Declaration (as contained in Eheazu, 2016; p. 23) refers to "a process through which individuals gain awareness of

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the environment and acquire knowledge, skills, values, experiences, and also determination, which will enable them to act - individually and collectively - to solve present and future problems." Environmental education involves the process of educating the citizens about matters and issues affecting the environment - the homes, villages, farmlands, water supplies, forest skills and human lives (Madumere-Obike & Nwabueze, 2016). In a nutshell therefore, any positive action geared towards environmental stewardship and preservation could be regarded as environmental education. This, however, could be done through various media like the use of Information and Communication Technology (ICT).

The enormous role of ICT in environmental education cannot be over-emphasised. Essentially, ICT has revitalised the environmental sector of education by giving facilitators and their clientele unlimited access to explore their learning activities and to overcome physical, financial or distance barriers.

Through ICT, individuals have acquired certain requisite environmental skills, attitude and competences to interact and collaborate on how to resolve certain environmental problems challenging and confronting them and also device means, via the use of ICT gadgets, on how such challenges can be forestalled.

Following explosion in the field of science and technology and continuous quest and dire need to satisfy human unlimited wants, needs, aspirations and desires, ICT has been used to explore the environment in order to identify how to tap and/or utilise the enormous resources available for man. In course of this, multiple threats to the environment have emerged from the use of various heavy and sophisticated technology systems. This calls for action to restore environmental quality and to ensure continued environmental sustainability and productivity. In search of environmental quality and preservation, various ICT gadgets have been employed. These include videos and slides/movie presentations which, apart from their role in providing visual opportunities, also help immensely by providing environmental experts with avenues to explore how people tackle their environmental problems without moving from place to place to acquire such skills (Eheazu, 2016).

In an attempt to improve the teaching/learning enterprise, ICT has played an important role in environmental education, and has given different categories of learners an edge to access learning at their doorsteps. Accordingly, NAAEE (2014) cited in Eheazu (2019), noted that a wide variety of ICT tools have been introduced for both indoor (within classrooms) and outdoor (outside classroom) uses in the formal educational institutions with a range of target audiences from elementary to higher education to cover the goals of environmental education which include to help individual and social groups achieve the following:

i. Awareness and sensitivity to the global environment and its allied problems.
ii. Attitude - a set of values and feelings of concern for the environment, as well as the motivation to actively participate in environmental improvement and protection
iii. Skills for identifying and solving environmental problems.

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Iv, Participation - an opportunity to be actively involved at all levels in working towards resolution of environmental problems and prevention of new ones.

ICT has helped to eliminate and minimise the financial involvement, time wastage and potential safety and health threats or hazards that would have been incurred or encountered in the process of moving from one place to another to create awareness and sensitize the public about the various environmental challenges faced by the people on a daily basis, and how such challenges could be mitigated. ICT achieves this through the use of some web tools such as *Blogs, Wikis* and *Google Earth,* to demonstrate a visual experience of a similar challenge elsewhere and at the same time illustrate how such challenges were handled or tackled in such an environment. People's attitudes have been moulded through ICT on how they can express feelings of concern about taking active participation with the primary aim of encouraging environmental stewardship. The various skills of ICT, if properly harnessed can enable environmentalists identify and solve such identified problems.

Nature of the 21st Century Teaching and Learning Settings and Strategies for Environmental Education (EE)

21st century is an era where the entire world experiences unprecedented advancements in technological development. The various sectors of the economy across the globe have also witnessed tremendous improvements in the way they carry out their various activities. Technology allows the most difficult tasks to be seamlessly easy and more efficient. In the field of education, for instance, technology has enabled knowledge to be dispersed instantly, allowing for quicker and more effective communication (Harris, et al; 2016). Technology has also improved the teaching and learning settings for both teachers and learners. It makes learning more accessible and practical-oriented compared to the traditional teaching-learning platforms. Uyal et al., (2017) buttressed the above idea by stressing that the use of technology in classrooms has resulted in a shift from the 19th and 20th centuries' traditional classroom settings (where the students were considered as passive consumers of educational knowledge) to a classroom in which learners are considered as active participants.

In the same vein, Bhakta and Dutta (2016) affirmed that education in the 21st century is the centre from which all changes and development arise. Accordingly, Bhakta and Dutta (2016) saw computers and internet technology, in particular, as having undoubtedly revolutionised the field of education. Teaching/learning platforms during the 21st century are practically different from those of the previous centuries, where teachers and learners did not have easy and flexible ways of knowledge transmission and acquisition. 21st century learning settings, on the other hand, enable students to take control of their own learning, and much of that process occurs outside the classroom. Not only are today's learners quite different from those of the previous centuries, especially in learning acquisition processes, but the world in which the former operated has also been radically transformed over the past several decades (SEG Measurement New Hope, PA, 2017).Their perception towards learning has equally drastically changed due to the introduction of flexible and practical-oriented teaching and learning materials (instructional materials) which facilitate productive learning situations. Under the 21st

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century learning settings, students (learners) are no longer solely dependent on the teacher to gather information; rather, they form resource persons in the learning settings because of the accumulation of knowledge and skills, and their constant romance and interaction with ICT gadgets before the learning takes place.

21st century teaching-learning enterprise has undoubtedly created avenues for the absorption of andragogical principles in today's arena of learning, in that, it eschews, though not in totality, the idea of tabular rasa, knowledge deposits/banking on the part of the students, and grants them opportunity to become active participants in teaching-learning situations. Not all learning is transmitted in school and learning is not exclusive to the classroom. The vision of the 21stcentury teaching and learning recognises that much of the learning that occurs is outside of the teacher's control (HEG Measurement New Hope, PA, 2017). Learners of this dispensation popularly referred to as digital natives, have freedom and opportunities for self-directed learning and independent study which are in consonance with the principles of andragogy. 21st century is characterised by enormity of teaching aids/ instructional materials, which serve as input in the transaction between the facilitator and the learner. This is a dispensation which involves a balance of the objectives of the teacher with the needs and input of the students (Boholano, 2017). In other words, the learners' needs must be in agreement with the objectives of the instructor. These days, students are treated as contributors to or producers of digital lesson content. Boothe and Clark (2014) lent credence to the above assertion when they observed that in 21stcentury learning settings, a teacher is no longer seen as "a sage on the stage" nor does he/she observe students working on low level, rote kinds of learning; rather, a student is seen as one working at the analysis, synthesis and evaluation levels of learning with the teacher acting as a facilitator in a classroom designed and equipped for this innovative model of instruction. Learners of the 21st century age now engage in interlocutory and interactive sessions with the providers of educational knowledge in order to reach an end. The outdated model of education through which teachers transmit factual knowledge to students via lectures and textbooks, is gradually fading out.
Digital natives prefer receiving information quickly and from a variety of multi-media resources.

In the 21st century, teachers and learners alike have turned the world to a global village or classroom where learning transaction can be done at ease without moving from one geographical location to another. In tandem with this, Solomon and Schrum (2010) maintain that as the world grows smaller, through communication, people are becoming more mobile in a variety of ways. Using blocks, for instance, students may create an on-going conversation about subjects they are studying. With Wikis, students may collaborate to create a story or an encyclopedia for the class similar to Wikipedia. However, Solomon and Schrum (2010) have also added that there are over 200 web tools available to teachers, and that the number grows on daily basis, even as web technology continues to evolve. This implies that the Teaching-learning transaction is greatly digitalised in this 21st century.

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Adult Teaching and Learning Settings for Environmental Education in the 21st Century

Adults, unlike children, learn best when the learning settings and environments are protected and flexible enough to accommodate their social, political, educational and cultural needs. The primary objective of adult learning is to address the immediate needs and challenges of adults across the globe. Adults are encumbered with various issues and challenges due to uncountable socio-economic demands on them and their responsibilities in the family, church, office, work place and so on. Considering such engagements, adults need not undertake sequential learning programme(s) in order to improve their status quo. Some of the outstanding principles of adult teaching/learning (andragogy) emphasize self-directed learning, experience and motivation, among others.

In adult teaching-learning process, adult learners are the decision-makers. They choose what to learn, how to learn and where to learn. With the pool of social knowledge and experiences brought to the class, learning becomes very easy and practical because their experiences will form the greater part of the input and contents or raw materials used in the interlocutory (exchange of ideas) process. In effect, adult learning facilitators must not treat adults like children in the teaching-leaning situation. The principles of andragogy must be duly and strictly followed to ensure a more productive and sustainable leaning. If such principles guiding adult leaning are violated, the purpose of leaning will be forfeited, and the adults will be discouraged out of the leaning enterprise. The relationship between effective teaching and learning, to a high extent, is dependent on the class settings.

The learning setting or environment is an important factor that determines effectiveness and outcome of leaning. If the setting is favourable to the learners, there will be a corresponding relatively permanent change in behaviour among learners. Adult learners in particular, learn well in a secured and flexible environment. As NMEC (2017) reported, in agreement with research, there is a direct relationship between the learning environment and the quality of the learning outcome. Accordingly, NMEC has noted that the location/setting and basic facilities such as furniture, electricity and ICT facilities, should be managed by qualified facilitators as this will undoubtedly improve the quality of adult learning.

In the 21st century, ICT has facilitated the teaching leaning-situation in a positive dimension. Many adults have undertaken series of educative experiences, whether formal, non-formal or informal through the use of Information and Communication Technology (ICT). Adults are self-directed learners, and they will learn well if the appropriate ICT tools are put into their hands (Keillor & Littlefield, 2012). The leaners themselves choose what to learn, where to learn and how to learn. Online learning in this 21st century has become one of the best platforms through which adults obtain their educative experiences and knowledge. Adults' use of ICTS for learning cannot be over-emphasized. Various researches and empirical studies have shown the extent of involvement of adults in 21st century learning enterprise.

Notably, Anderson (2017, pp. 2-4) reported from a research study that:

> Nine in ten (adults involved in the study) own computers or laptop, seven in ten 50+ own a smart phone, and over four in

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> ten own a tablet. Traditional activities dominate computer use for adults over 50, but a sizeable minority are using their device to manage their medical care or learn online. Surfing the web is the top activity for tablet users and older adults who have both computer and tablet are more likely to use their tablet for playing games and watching video than on a computer. Nearly nine in ten smartphone owners say they use their phone to send SMS/texts or emails, and over three quarters say they use it to get directions or traffic information. Other top activities include purchasing apps, surfing the internet, getting news and accessing social media. About 34 percent of adults use ICT to take classes, join webinars, or read/watch "how-to" tutorials; 42 % use it to get health information; 49 % use it to get news and other information, while 81 % use ICT to visit websites or surf the internet.

From Anderson's research report above, there should not be any doubt that adults are engaging positively with the use ICT in accessing their learning outcome. Teaching and learning situation among the adults is characterised by the use of web tools and digital technology. Many adults have accessed series of learning opportunities under the auspices of ICT with the guidance of adult education facilitators who have a good knowledge of the usage of ICT gadgets.

Differences in Teaching and Learning Settings and Related Health and Safety Challenges in Environmental Education prior to and during the 21st Century

Generally speaking, 19th, 20th and earlier centuries' teaching and learning settings differ in a number of ways from those of the 21st century. The differences in the two settings can be assessed from the following seven angles:

i) In the past centuries, learners had a symmetry kind of learning setting, i.e., students were always organised in some forms of tight rows in classrooms; but in the 21st century era, classrooms have a variety of learning spaces, in which students can move about freely.

ii) In the past centuries, learning was teacher-centred but in this present 21st century era, learning is more of learner-centred.

iii) The teacher controlled or regulated everything the students did in class in the past centuries, but in the 21st century era, students are self-directed learners due to their access to information through ICT systems;

iv) There was high rate of low expectations from students in the past centuries, but in the 21st century there is high rate of expectations due to students' constant interaction with knowledge sources with the aid of ICT gadgets.

v) In the past centuries, learning focused on the lower level of Bloom's Taxonomy of educational objectives; namely, knowledge, comprehension and application, while in the current (21st century) era of ICT, learning is centred on the upper level of Bloom's Taxonomy; *viz*, analysis, synthesis and evaluation.

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vi) Students of the past centuries were seen as passive learners, but in the present 21st century, students are seen as active learners.

vii) 19th, 20th and earlier centuries' learning settings were characterised by emphasis on the acquisition of the 3Rs (Reading, Writing and Arithmetic), but in the 21st century, learning settings focus on the acquisition of multiple literacies, including computer literacy.

(SEG Measurement New Hope, PA, 2017) supportvs the above articulated differences in teaching and learning settings by noting that 19th/20th centuries were characterised by industrial factory systems, where the learners moved through the factory, in lockstep, as vessels to be filled or objects to be completed; but the modern 21st century is a knowledge-based economy which is rooted in the manipulation and transmission of knowledge. In the factory-based school model, the teacher's role was seen as transmitting his/her enterprise to groups of students in the form of lecture, drill/practice and other group-centred instructional strategies. Accordingly, the use of technology in the classrooms has resulted in a shift from the traditional classroom setting (where the student was considered a passive consumer of educational knowledge) to a classroom in which learners are considered active participants (Uyal et al, 2017). Each of these settings has certain pitfalls and potential threats they remit to the learners and the learning environment in general, either directly or indirectly.

Prior to the 21st century, there were certain **health and safety hazards which** learners were exposed to. Similarly, in the 21st century, learners are also vulnerable to certain health and safety hazards inherent in the use of various ICT systems.

However, the hazards experienced in the two eras are different in a number of ways. In the case of the 19th, 20th and earlier centuries, the following potential hazards could be identified:

i. High rate of accidents/death: In the course of moving from place to place to source for information, a number of learners were involved in serious accidents that sometimes resulted in death.
ii. Armed robbery attacks/kidnapping: Many had experienced series of problems such as attacks from armed robbers and hoodlums while on trips in search of educative materials
iii. High rate of memorization: There was high rate of rote learning and memorization which sometimes resulted in some mental disorders.
Iv, Slow and highly structured learning setting: The environment of the past centuries was characterised by a very slow learning space.
v. High rate of transmission of diseases: There was increased transmission of diseases, especially those contagious and air-borne diseases which could be easily contacted as a result of the congested nature of the classroom.

In the 21st century, on the other hand, there is an increasing evidence that significant threats are involved in the use of ICT in the teaching-learning settings (Erdmann et al, 2004). Emphasizing on the potential hazards of ICT, Williams (2003) stressed that the production of semiconductors requires a large amount of energy, water and materials, as

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well as solvent and hazardous substances. Williams (2003) further pointed out that a personal computer is made up of more than a thousand components among which quite a significant number are toxics, such as heavy metals like Lead, Cadmium, Barium, Mercury, and Copper. The toxics emitted by computers constitute a serious threat on the health and safety of the users. Again, the use of ICT in teaching/learning arrangements also leads to excessive generation of *noise*. Noise is generated in all conductors and in electronic devices as well. Thermal noise due to random agitation of the charged particles, like electrons, leads to degradation of the fidelity in analogue computer system and produces errors in digital communications (Uzonov, 2006). Noise is one of the health threats, both to humans and the environment. Exposure to excessive or prolonged noise has been shown to pose a host of health problems ranging from stress, poor concentration, productivity losses in the workplace and learning environment, communication difficulties and fatigue from lack of sleep.

Furthermore, in the 21st century era of learning, ICT can also pose significant threats or potential hazards to illiterate learners who do not have requisite knowledge of the use of ICT gadgets. Due to the use of computers and automated systems, the frequently used quote "patience is a virtue" has become a severe understatement. Humans are no longer manifesting any patience in most aspects of life. Technology has made humans impatient. People no longer enjoy pausing or remembering. They log on, turn in, dial up and speed off like drag racers, leaving in their wake a swirling cloud of historic dust, memory, perspective and people (Sutton, 2013). It is a self-evident truth that being too impatient could lead to health challenges. This could happen with the introduction and continuous use of the ***internet***. In 2003, the Journal of the American Medical Association pointed out that impatience may lead to increased risk of hypertension among young adults. Again, Journal of Biosocial Science linked a rise in American impatience with an increase in obesity (Sutton, 2013). Emphasising the gross potential health and safety hazards which could result from the use of ICT in the 21st century teaching and learning settings, Emelin et al (2013) listed cyber stalking, cyber bullying, "technological addiction" and mental disorders as the various hazards associated with the use of ICT in the 21st century learning settings.

Beyond the above hazards, the primary purpose of ICT for education is also being abused by majority of users. Many are using it to achieve their selfish and bizarre desires. Olaore (2014) has reported that students, and sometimes teachers, can get hooked on the technology aspect, rather the subject content. Facebook, Twitter, YouTube, Instagram and other social media networking sites are becoming a distraction to living and learning in the real world. For instance, it is being observed that many learners and facilitators use ICT to engage in viewing pornographic activities. Apart from inducing a high level of promiscuity among learners and teachers as well, such misuse of ICT may further encourage rape, sexual harassment, prostitution, masturbation and other sexual misconducts which have grave consequences on the psyche of those involved both in the present and in the long-run. Unfortunately, the trend of the abuse of the primary purpose of ICT in education tends to be increasing astronomically as many learners and teachers are devising new means and more sophisticated ways of surfing the internet.

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CONCLUSION

Information and Communication Technology (ICT) has brought significant improvement to the process of education generally and environmental education particularly. The use of Information and Communication Technology Systems (ICTS) in classroom teaching and learning in the 21st century has resulted in a shift from the earlier centuries' traditional classroom settings (where the students were seen as passive consumers of educational knowledge) to a classroom in which learners are considered as active participants. Beyond education, ICTS have also brought significant improvements into the way various sectors of the economy across the globe carry out their various activities. In education, however, there is an increasing evidence that the use of ICT in teaching-learning settings in the 21st century poses enormous threats to the health and safety of teachers, learners and even the learning environment – with such magnitude that was hardly experienced in earlier centuries. Additionally, it has also been discovered, as recounted in this paper, that the primary purpose of using ICT in education in the 21st century is being abused by majority of the users. In view of the great advantages of using ICT in education and the presence of these unfortunate circumstances which tend to bedevil the full realisation of the advantages, one would conclude by harping on the urgent need for adoption of some measures to obviate or, at the least, mitigate the negative circumstances. In that vein, the under listed suggestions are considered pertinent.

SUGGESTIONS

In the light of the above conclusion, the following suggestions are considered useful in mitigating the negative effects of ICT on health and safety within teaching and learning settings, especially for Environmental Education:

-Managers of ICT should be approached to expose both the teachers and learners to the various implications and negative consequences of improper ICT usage.

-The use of ICT gadgets should be strictly regulated in the teaching-learning environment to prevent some learners from misusing the opportunity for frivolous activities like cyber bullying, pornography and so on.

-Sex education should be given to all learners and users of ICTS to minimize their interest in and adoption or practise of unwholesome cyber pornographic activities.

-ICT laws such as Wireless Telegraphy Act, the Nigerian Communication Act, the National Film and Video Censors Board Act and the National Broadcasting Commission Act should be strictly enforced.

-Overused and out-dated computers should be properly disposed of in order to eliminate high risk of health and safety hazards many of which have been articulated in this paper.

-Producers of ICT gadgets should be approached to device means of trapping the excessive noise and poisonous waves emitted by the gadgets in the process of using such technologies.

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