

ISSUES AND CHALLENGES IN THE APPLICATION OF INFORMATION COMMUNICATION TECHNOLOGY (ICT) TO PHYSICAL EDUCATION AND SPORTS PROGRAMMES IN NIGERIA

Peter O. Oboh (Ph.D.); Ufuoma Atufe and Anthony Oriabure

Abstract

The purpose of the paper is to take a look at the issues and challenges in the application of Information and Communication Technology (ICT) to physical education and sports programmes. ICT is simply set of activities which facilitate the powers, transmission and display of information, using modern electronics devices, principally the computer, the internet and other devices such as the telephone, television etc. digital divide is the gap between with regards to their opportunities or ability to have access to ICT and their use of the internet for a variety of activities. Physical education and sports are integral part of the educational system, and therefore, make use of ICT facilities just like any subject discipline in education in line with global trend. To adequately throw more light on this paper, the following areas were highlighted, introduction, the digital divide, issues in physical education and sports programmes, challenges and contributors of ICT to physical and sports programmes, summary, conclusion and recommendations.

Introduction

Modern technology these days has show great development and reform in this present 21st century, and which is apparently moving fast toward globalization. As a result of Information and Communication Technology (ICT), information and communication gap have never before drawn closer to the door steps of mankind.

Information Communication Technology (ICT) is simply set of activities which facilitate the process, transmission and display of information using modern electronics devices, principally the computer, the internet and other devices such as the telephone, television etc (Lee, 2004). Proper availability of the right kind of information is however important for realization of the right policy programmes for economic development. Economic development without appropriate educational system to facilitate its operational tendencies may meet with little meaning, and as a result may run to a hitch.

According to Cooke (2004), education is the bedrock of any civilization and without adequate information and communication skills, it will require a slow process to flourish. The Nigeria education system needs modern development in line with globalization to actualize its dreams and it is therefore imperative to harness all avenues to ensure the depository and flow of information to her every day existence.

However, among the subject domain in educational field are physical and sports. Physical education is an integral aspect of the total process of education which uses human movement activities for an all-round development of the individual. According to Ojeme (1998) physical education should be defined as an organized field of knowledge concerned with the study of man and his movement and the variety of application to life in society. Sports is an institutionalized game

govern by rules and regulations and that can be participated in from the amateur and professional level of attainment.

The application of Information and Communication Technology (ICT) in Nigeria education system with particular reference to issues and challenges in physical education and sports programmes is what this paper seeks to address

In addressing the issues and challenges in physical education and sports programmes, the following subheadings were highlighted; the concept of information and Communication Technology (ICT), the Nigeria and the digital divide, issues, challenges and contributions of ICT to physical education and sports programmes, summary, conclusion and recommendations.

The Concept of Information and Technology (ICT)

According to the Asian Development Bank ADB (2003), ICT is an electronic means by which activities, such as processing, transmission and display of information are facilitated. Uwaje (2005) defined ICT as information transmission technology built on the potentials of electronic communication equipment, for connecting and accessing various ends in the information pathway.

Greenidge (2007) sees ICT as those technologies that can be used to interlink information technology devices such as personal computers with communication technologies such as telephone and their communication networks. According to Obenobe and Atajeromavwo (2009). It can be referred from these definitions, that the concept of ICT connotes sophisticated technologies designed for monitoring, gathering and display of geospatial information. These technologies include the satellite, personal computer, Computer Support Internet, Geographic Information Systems (GIS), Global Planning Systems (GPS) Remote Sensing etc.

The Technical Agriculture and Rural Co-operation CTA (2003), defined ICT as technologies that facilitate communication, processing and transmission of information by electronic means that embraced a multitude of other simple communication devices such as telephone (mobile or fixed line), television, radio, audio cassette or compact disc (cd) recorders/players. Video tape or VCD/DVD record/players, faxes and telex.

According to united nation development programme, UNDP (2001), the definition of ICT should encompass a comprehensive outlook of the components and versatile of the concept and must include not only the digital technologies of computers that embrace local area network, metropolitan and wide area network internet technologies, but also the older technologies of print, radio and television that have been used extensively in dissemination of information. They must include 'old' ICT of radio, television and telephone and the 'new' ICT of computers, satellite and wireless technology and the internet (Lee, 2004).

Nigeria and the Digital Divide

The digital divide is the gap between individuals, households or geographical areas which are of different socio-economic leagues with regard to their opportunities or ability to have access to ICT and their use of the internet for a variety of activities. In other words, there is disparity amongst countries, just as there is amongst individuals in their ability to have access to information and the advantages of the inherent potentials of the internet in particular and ICT in general. Although the divide is most obvious between developing and developed countries, it is worth noting that the divide also exists even amongst developed countries (Finks & Kennedy, 2003).

According to the International Labour Organization (ILO) World Employment Report (2001) as cited by Aduge and Ogheneguke (2009), nearly 90% of all internet users are in developed countries

with USA and Canada accounting for about 57%. In Nigeria, the rate of development of the ICT sub-sector has been very phenomenal over the past decade or so. This is due to the fact that some developing countries have been able to overcome some of the technical hitches of technological development faced by developed countries (Finks & Kennedy, 2003).

In comparison with some other African countries, Mike (2003) noted that the rate of ICT development of ICT diffusion in Nigeria until recently is not in any way comparable to that of Egypt, South Africa and Botswana Ndukwe (2004) according to Aduge and Ogheneguke (2009) regrets that in terms of teledensity which is the number of telephone line per 100 of the population and personal computer penetration, Nigeria still ranks below countries like Egypt, South Africa , and Botswana with figure less than 60%. Sweden for example tops the list of world leaders in e-learning.

Issues of ICT in Physical and Education and Sports Programmes

Physical education and sports are both science related discipline and are embedded in the science domain. Both are very interrelated and require the use of ICT to function very well in this era of globalization. The issues of ICT in physical education and sports programmes are as follows:

- 1. Low Level of Accessibility to the Internet:** The low level of accessibility to the internet is a major problem to physical education and sports programmes. This is affecting the smooth flow of information about sports news from all over the world, and also the short-fall in retrieving information from the net. Network problem has equally been a contributory factor to this problem (Mobelaji, 2006).
- 2. Epileptic Power Supply:** The ICT as it is, needs electricity to function effectively and functionally, but unfortunately it is a scarce commodity in Nigeria. Huge sums of money amounting into millions of dollars had been wasted in a bid to upgrade the existing Mega Watts, but to no avail. (Mobaraji, 2006).
- 3. Low Level of Income:** This is one of the most important factor inhibiting economic development of ICT in developing countries. Income level in most developing countries is still far less than average, and this is made more challenging by unemployment and high inflation rate (Mike, 2003).
- 3. Low Level of Education:** In most developing countries there is absolutely low level of education among its populace, and there is the tendency for this to seriously affect the awareness and use of ICT. Even if a reasonable proportion of the population can afford a personal computer, the basic and necessary skills and prerequisites of the potential of ICT is lacking because of high illiteracy level. This can affect physical education and sports programme, since it is not possible for ICT programme to be effected without adequate knowledge (Ndukwe, 2004).
- 4. Low Level of Computer Literacy:** The total number of educated persons when compared to those who are computer literate is low. There are computer centers almost every where in our cities, advertising for students to become computer literate. A large number of physical educationist and sports men and women do not offer themselves the opportunity to be computer literate (Okon, 2007).

- 5. Environmental and Climate Problems:** Environmental and climatic problems are compounding the problem of the effectiveness and efficiency of ICT in physical education and sports programmes. Certain geographical locations are difficult to locate networks from, especially in the rural areas, and climatic conditions of a given area will predispose it to clarity of network in ICT programmes. Stormy weather may bring about serious destructions to telecommunication mast and antennas, which may require time and money to replace.

The Challenges and Contributions of ICT to Physical Education and Sports Programmes.

Due to modern globalization, the following are the challenges and contributions of ICT to physical education and sports programme:

- 1. The Need to be Computer literate**
There is the need for every physical education and sports athletes and coaches to be computer literate in order to be abreast with modern ICT programmes. Being familiar with the computers and internet will open the way to globalization.
- 2. Global Positioning Systems (GPS)**
According to Hellmick and Rubin (2003), recent medical research and technology has led to the development of new sets of training techniques, wrist-worn heart rate monitors. Global positioning system (GPS) use coded satellite signals that provide accurate coordinates to determine exact location. GPS technology has been integrated into the sports and fitness industries and incorporated into sports watches that are commonly used by runners and cyclists (Magill, 2000). The integration of GPS technology into the watches makes it possible to determine distance traveled and speed, and the system includes a GPS receiver and a watch monitor which are connected by a radio signal. The receiver (typically strapped to the upper arm) get the signal from a satellite and sends it to the watch for immediate feedback (magill, 2000).
- 3. Ergonomics**
Ergonomics also known as human factors engineering is a discipline that helps to develop tools and place setting that put the least amount of strain on the body. Biomechanical principles are used to help identify movements and positions that put individuals at greater risk for specific injuries and micro-trauma. One application of ergonomics is the design of effective workstations for computer users (Corbin & Welk, 2004).
- 4. Automated External Defibrillator**
One form of new technology for saving lives is the automated external defibrillator (AED). After identifying cardiac arrest and performing cardio-respiratory resuscitation CPR, if ventricular fibrillation (chaotic electrical activity to heart muscle) occurs, it may be necessary to “shock” the heart back to a normal rhythm. The AED has a heart rhythm analysis system, which advises the operator when a “shock” is appropriate. The operator must then take action to deliver the shock (America College of Sports, Medicine, 2000).

5. Stretching Rope

An advance in equipment technology for flexibility training is the development of “stretching” ropes. These ropes have multiple loops which enable individuals to change the length of the rope and perform variety of exercises (Alter. 1996).

6. Resistance Training Equipment

Over the years, there have been major changes and developments in resistance training machines and, recent developments, have allowed machines to overcome some of the well-known limitations. For example, many new machines allow movements to take place in multiple dimensions to allow for converging and diverging movements and independent arm function. Some examples include the cyber VRZ line, the Paramount ART Line and the Actuate Line by Pacific Fitness. These machines provide additional variety for stretch training and a more natural motion (National Strength and Conditioning Association, 2004).

7. Healthy Eating Index

The United States Development of Agriculture (USDA) Centre for Nutrition Policy and Promotion (CNPP) has recently made its healthy eating index (HEI) available for free by consumers. This online dietary assessment uses the most comprehensive database of foods available and features one easy-to-use interface to analyze foods (U.S Department of Health and Human Services, 2000).

8. The Segway HT

Recently, a personal movement device known as the segway, Human Transport (HT) has become available on the market. These devices utilize a gyroscopic system to assist in balancing and a small system to assist in balancing and a small electric motor to propel people around. The manufacturers of the segway HT emphasize that increased use of the segway HT is society will have tremendous benefits on our society and this will shift away from car traffic could indirectly encourage more walking (Tate; Wing & Winett 2000).

9. Modern Facilities and Equipment

New modern facilities, equipment and sophisticated supplies are being produced, replacing the old ones, Smith (2006) opined that, new paving materials, new types of equipment, improved landscapes, new construction materials, new shapes of swimming pool, partial shelters and synthetic grass are just a few of the many new developments. Facilities are moving from use of regular glass to either plastic and fiberglass panel or to overhead skydome. Light weight fiberglass, sandwich panels, or fabricated sheets of translucent fiberglass laminated over an aluminum framework are popular (Asher, 2000). Equipment and implements like Javelin, spike shoes, soccer boots amongst others are now being made lighter to meet up with latest technology, and modern sensitive electronics score boards are made and placed at strategic places during competition.

10. Research and Publications

According to Oboh and Ovuema (2009), research and publications are not left out of the modern trends, for computers have replaced manual typewriter and access to important information is now easily accessibly from the internet via websites. Recent research findings

and publications around the globe can be instantly retrieved via internet services. Desktops and laptops computers of various sizes and capacities are now available for research method and statistical analysis, and they have proved useful in physical education and sports programmes (Ropeik & Gray, 2001; U.S. Department of Health Human Service, 2000).

11. Random Doping Test

To curb the menace of the intake of performance enhancing drugs, the International Amateur Athletics Federation (IAAF) and other sports associations are embarking on random doping test on athletes. These tests are done during training and even at athletes' home unannounced. This is to reduce to the barest minimum the use of performance enhancing drug in sports by athlete. This advanced technology has helped to reduce the incidence of drug abuse and cheating in sports (Ropiek & Gray, 2001).

12. Measurement of Laboratory Test

The ICT over the years has been employed during measurement laboratory test in physical education and sports in the following protocols;

- i. Treadmill Protocol:** Vo₂max can be predicted from submaximal exercise duration. It can be estimated by equations that use the heart rate to exercise at different submaximal intensities accompanied by the ACSM equation for steady-state Vo₂ (Roberg & Keteyian, 2003).
- ii. Cycle-Erometer Protocols:** Bicycle ergometer test are commonly used to measure and predict oxygen intake. One of the most common submaximal cycle ergometer protocols used for predict Vo₂max was developed by the YMCA (Golding, Meyers & Shining, 1989).
- iii. Lactate and Ventilatory Threshold:** Lactate threshold (LT) is the term used to denote the intensity of exercise when there is an abrupt increase in lactate accumulation in blood or muscle. The best measure of success in running events longer than 1500m for running, and also in long-distance road cycling is the pace or Vo₂ at the lactate threshold (LT). The intensity of LT reflects an individual's maximal steady-state intensity. Research has continually revealed very high correlation (<0.9) between the pace at the LT and some expression of race performance (time, average, pace etc) (Londeree, 1986, Sjodin & Svedenhag, 1985; Tanaka & Matsuura, 1984).
- iv. Measurement of Field Tests:** Information and Communication Technology (ICT) had equally being very useful in the measurement of field tests in physical education and sports programmes in the following tests:
 - i. Coopers 1.5 mi Run:** The 1/5Mi test, originally developed Kenneth Cooper, is a popular test used to predict cardiovascular fitness. This test is conducted on a four hundred meter track. After subjects have warmed up, they walk, jog or run as fast as they can 6 times around the track. Oxygen uptake is predicted by a formular.
 - iii. Rockport Walk Test:** The Rockport walk test is an excellent test to predict cardiovascular fitness, especially for sedentary individuals. Individuals are instructed to "walk" as fast they can for 1-mi and then record their heart rate at the end of the walk. Vo₂max is predicted by

using a multiple regression equation developed by Kline and Colleagues (Robergs & Keteyian, 2003).

- iii. **Step Tests:** The 3-min step test predicts oxygen, uptake, from the recovery heart rate following 3 min of stepping. The test is conducted on a bench 161¹/₂ in height. A metronome should set to 88 counts, or 22 steps/min for women, and 96 counts or 24 steps/min for men. At the signal to starts subjects step to a four-step cadence (up-up-down-down). At the end of 3 min, the subject remains standing and a 15- a pulse rate is recorded between 5 to 20s into recovery (Robergs & Keteyian, 2003).

14. Muscle Metabolite Accumulation (Anaerobic Capacity)

The rate ATP regeneration cannot be measured directly, but often estimated by sampling muscle tissue and assaying for key intermediates of glycogenolysis and glycolysis. It is assumed that during intense muscle contractions, there is minimal muscle blood flow resulting from high –intramuscular pressures. Consequently, muscle contraction occurs in a closed system where the accumulation of glycolytic intermediates, reflects glucose-6-phosphate flux through glycolysis, from which ATP regeneration can be estimated (Kelly, 2001).

15. Accumulated Oxygen Deficit (Anaerobic Capacity)

An indirect and noninvasive method for determining anaerobic capacity is to estimate the total energy requirements of exercise by calculating the theoretical Vo₂ required for the exercise intensity and subtracting from this value the measured Vo₂. Exercise is usually performed on a cycle ergometer or tread-mill, and the different between these two integrated values has been termed the accumulated oxygen deficit and has been argued to reflect anaerobic capacity (Kelly, 2001, Robergs & Keteyian, 2003).

Summary

Information and Communication Technology is an electronic means by which activities, such as processing, transmission and display of information are facilitated. The digital divide in Nigeria is still very high, in other words, there is disparity amongst countries just like amongst individuals in their ability to have access to information.

The issue of ICT in physical education was viewed as the problems that limits the effectiveness and efficiency of ICT to physical education and sports programmes and they are, low level of accessibility to the internet, epileptic power supply, low level of income and education and low level of computer literacy as well as environmental and climatic problems. The challenges and contributions of ICT to physical education and sports programmes ranged from global positioning system (GPS), ergonomics, automated external defibrillator, stretching rope and resistance training equipment to anaerobic capacity tests.

Recommendations

The following were the recommendation drawn for this study:

1. Every physical educators and sports athletes, coaches, and practitioners should endeavour to be computer literate.
2. Efforts should be made for students and lecturers of physical education to store their research works and publications in the computers and flask drive for preservation purpose.

3. Information and Communication Technology related courses should be introduced at departmental level in physical education as a core subject.
4. Physical education students should have uninterrupted access to the internet services at departmental level.
5. The epileptic power supply should be addressed by the government of the day so as to provide power source for internal services.
6. Alternative power supply should be provided by universities for twenty four hours access to the internet by students and lecturers.
7. Computers and its accessories should be provided in large number of physical education department and sports centers.

Conclusion

The application of Information and Communication Technology (ICT) in Nigeria education system is not as encouraging as expected because of numerous associated problems in the system. The issue and challenges will help educationist especially in the field of human kinetics and sports to enumerate the problems inhibiting the full potentials of ICT to the two disciplines, and how far it has been done and put in place to update the digital divide in not only physical education and sports, but in all other discipline in Nigeria educational sphere. By so doing the issues must have been surmounted and challenges met.

References

- Aduge, A & Ogheneguke, E. (2009) Information and communication technology (ICT) as catalyst for sustainable economic growth in Nigeria: Challenges and prospects. A conference paper presented at the 1st annual conference of science education journal, Delta State College of physical education, Mosogar. 1-4
- Alter, M. J. (1996) *Science of stretch*. Champaign, IL: Human Kinetics.
- America College of Sports Medicine (2000). Programme models in resistance training for healthy adults: *Medicine and science in sports and exercise*. 34(2): 364-380.
- Asher, S.U. (2000). The use of exercise in multiple physical activities recommendations. *President council on physical fitness and sports research digest*. 3(19): 1-8.
- Cooke, V.I. (2007). *Modern technology and education attainment in London*. London: Longman Books.
- Corbin, C.B., Welk, G.J. Corbin, W.R. & Welk, K.A. (2004). *Concept of physical fitness. Active lifestyles for wellness*. (12ed.) Boston: McGraw Hill Publishers.
- Finks, P.. & Kennedy S.A. (2003). *Wither the digital divide: The Way out: Operational Publication* in Oslo. 4(2): 45-51.
- Greenndidge, C.B. (2003): *ICTs and rural sectors in ACP States: Mirage or marriage?* Features address delivered at CTA's ICTs observatory.

Issues and Challenges in the Application of Information Communication Technology (ICT) to Physical Education and Sports Programmes in Nigeria

- Hellmich, N & Rubin, R. (2003). Health guidelines: It's rough keeping up. *USA Today* 1A-1B June 16.
- International Labour Organisation, (2001) *World report: Life at work in the information economy*.
- Kelly, G.E. (2001). Estimation of the gas exchange threshold humans: A time series approach. *Eur. J. Appl. Physical* 85*6): 586-592.
- Lee, J.K. (2004). *ADB's experience in supporting community centers* A presentation for international seminar on ICT policy reform and rural communication infrastructure. August, 26.
- Magill, B. (2000). *Active living everyday*. Champaign, IL: Human Kinetics, McGraw Hill Publisher.
- Mike, J. (2003). Information and Communication Technology in Africa. *A Status Report, UNICT Task Force*.
- Mobalaji, E.A. (2006) Some issue in ICT for Nigerian development. www.nigerianmuse.com/project/interconnectivity_Aluko.appt. Retrieved on June 15.
- National Strength and Conditioning Association (2004). Acquiring the indices for physical conditioning. *Eur J. Apple. Physiology*, 89(1): 28-34.
- Obenobe, I. & Atajeromavwo, E.J. (2009). Information and communication technology (ICT) development for economic reform in Nigeria. A Conference paper presented at the 1st annual conference of science education journal, Delta State College of Physical education, Mosogar, 1-12
- Oboh, P.O. & Ovueme, R. (2009) Development in sports science from one level to the other. An accepted unpublished paper submitted to science education journal, Delta State College of Physical Education, Mosogar, 6-10.
- Ojeme, E.O. (1998). *Memograph of career in physical education*. Benin: NERA Publishers. 5-7.
- Okon, P. (2007) *Information communication technology: How far has Nigeria embraced it*. ICT conference on education held in Lagos. August 17th.
- Robergs, R.A. & Keteyian, S.I. (2003). *Exercise physiology for fitness, performance and health* (2nd ed.) Boston: McGraw-Hill.
- Ropeik, D. & Gray, G. (2002). *Risk: A practical guide for deciding what's really safe and what's dangerous around us*. Boston: Houghton Mifflin.
- Smith, S.M. (2006). *Information and communication technology around the world what are its prospects*. London: Longman Books.
- Tate, D., Wing, R.R. & Winett, R.A. (2001). Using internal technology to deliver a behavioural weight loss programme. *Journal of the American Medical Association* 285:1172.

Technical Agriculture and Rural Co-operation, (2003). ICTs: Transforming agricultural extension? An e-discussion 20th August, 29th Sept.

United National Development Programme (2001). Information communication technology for development. *Essentials ICTD. UNDP evaluation office* 31.

US. Department of Agriculture and U.S. Department of health and human service, (2000). Physical activity and health: *A report of the Surgeon general*. Atlanta, 17.

Uwaje, G. (Vanguard 6th, 2005). *Preparing for the emerging challenges and opportunities of information society*. November, 21.