

The Role of Information and Communication Technology (ICT) and Higher Education in Sustainable Development

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ABSTRACT The present study examined the role of information and communication technology (ICT) and higher education in sustainable development in Nigeria; it aimed at understanding the need for ICT and higher education in sustainable development, and understanding how ICT and higher education enhance sustainability. Three research questions were asked and answered. Structured questionnaire which was divided into three sections to answer the three research questions were validated and used with the reliability co-efficient of $r=0.87$. The study adopted a descriptive survey research design to investigate the role of ICT and higher education in sustainable development. One hundred and thirty-one lecturers ($N=131$) were randomly selected from different universities. The results showed that all the indicators mentioned were said to be significant in sustainable development.

INTRODUCTION

In many countries, education is more than a means for enabling progress and preventing poverty; it is also critical for the development of knowledge societies and knowledge-based economies. As suggested by many researchers, the role of Higher Education Institutes (HEIs) within the context of knowledge-based economies and globalization is to give individuals the ability to transform information into socially beneficial knowledge, skills, and values; modernize societies and improve the standard of living; as well as prepare and produce a skilled workforce (Shaikh and Khoja 2011). Amjad (2006) defined a knowledge-based economy as “one that bases its growth not only on increasing capital or land or labor inputs, but also on knowledge.”

The advent and spread of ICT in varying degrees over the last two decades have led to the advent of information societies which are sometimes called knowledge societies. Today, these societies play a momentous role in the development of knowledge economies. These ICT-driven knowledge societies necessitate a workforce skilled in the use of ICT, as well as

government support, transparent and autonomous institutions, progressive attitudes, and a sound ICT infrastructure (Shaikh and Khoja 2011). In another study (Yusuf and Afolabi 2010) argue that ICT does not only help sustainable development in less developed countries to narrow the global digital divide and produce their own knowledge societies, rather it helps to improve the quality of learning and educational outcomes. They further suggested that the state of any education system is determined through the quality of its higher education, given it contributes to the development of education at all levels.

The ICT industry according to Nworgu (2007) appeared to be significant in-road into the Nigeria society. Prior to 1999, ICT resources and facilities were grossly limited in the country. Only very few wealthy Nigerians had access to these facilities and services. Internet facilities and services were rare to come by and the facsimile (that is, Fax) remained for a long time, the only means available to Nigerians for transmitting and receiving data or documents to other parts of the world. Public awareness of ICT and its application was low.

However, the current picture is entirely different. Huge investments have been made by both the public and private sectors in the ICT business in the country. Within the last three (3) years, the country has witnessed tremendous expansion in ICT resources and facilities. About 20 million Nigerians now have access to Global

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System for Mobile Communication (GSM). With the liberalization policy of the Federal Government, more GSM operators and Internet Service Providers (ISPs) have been licensed and are now operating in the country. Millions of Nigerians now have access to these facilities and services even in the rural communities. (Ozioko and Nwabueze 2011).

A significant milestone in the development of the ICT industry in the country is the formulation of a National Information Technology Policy (NITP), which was approved in March, 2001 by the Federal Executive Council. With the enactment of this policy came the establishment of an implementing agency-the National Information Technology Development Agency (NITDA) in April 2001. This agency is charged with the responsibility of implementing Nigeria's Information Technology (IT) policy "as well as promotes the healthy growth and development of the IT industry in Nigeria (Isoun 2003: 13).

The major thrust of the IT policy in Nigeria can be gleaned from its vision and mission statement. According to the then Honorable Minister of Science and Technology, Professor Turner Isoun, the vision of the policy was to make Nigerian IT-capable country in Africa and a key player in the information society by the year 2015; this was with the aim of using IT as the engine for sustainable development and global competitiveness. On the other hand, its mission statement was to: Use IT for:

- ♦ Education
- ♦ Creation of Wealth
- ♦ Poverty Alleviation
- ♦ Job Creation
- ♦ Global Competitiveness

The policy relied on human capacity building as the major strategy for realizing its vision and mission (Isoun 2003).

The development of any nation is usually indicated by the degree and extent of the socio-cultural, socio-economic, and political improvement that are brought to bear through the enterprises of science, technology and mathematics. According to Olorundare (2007), sustainable development leads to fulfillment of societal ideals considered relevant to the needs and aspirations of the society. Factors, which influence such developments, are based on human ability to explore, invent, and utilize. Satisfaction of spiritual, physical and material needs and the mastery of the environment are parameters for

development when applied to the human society. It has been stated by several authors and scholars that the development of any nation depends very much on the advancement and application of science and technology. The role of science in the development of modern societies is not so much in dispute now that the influence of modern technological innovations is far reaching in every sphere of man's life. If Nigeria is to build an organized, self-reliant, and technologically compliant society, much emphasis has to be continually made on science and technology.

A great deal of research and development has been conducted in order to bring Information and Communication Technology (ICT) to its current state of art. ICT was originally intended to serve as a means of improving efficiency in the educational process (Jones and Knezek 1993). Further, it has been shown that the use of ICT in education can help improve memory retention, increase motivation and generally deepen understanding. ICT can also be used to promote collaborative learning, including role playing, group problem solving activities and articulated projects (Forcheri and Molfinio 2000). Generally, ICT is promoting new approaches of working and learning, and new ways of interacting. Consequently, the introduction of ICT into schools has provoked a host of new questions about the evolving nature of pedagogy.

Whether or not changes in pedagogy are contingent on trends and innovations, and are moot points. The question that should be asked, however, is: What will be the long term impact of ICT on the teaching and learning process? It is well documented that ICT changes the nature of motivation to learn (Forcheri and Molfinio 2000).

Initially, educators saw the use of ICTs in the classroom mainly as a way to teach computer literacy. Nonetheless, most of them now see a broader role: that of delivering many kinds of learning at lower cost and with higher quality than traditional methods of teaching allowed. In addition, schools and universities increasingly use ICTs, as do other large organizations, to reduce the costs and improve the efficiency of administration. (Adu and Tella 2013)

Worthy of note is the fact that the largest investments so far in ICTs have been in the United States. The United States' budget for the use of technology in schools is enormous since 1989. The US Department of Education has invested almost US\$1 billion in the use of technol-

ogy in public education, not surprisingly; most of the work developing educational ICTs and their most widespread applications are in the United States. As a result, many of the evaluations of ICTs have been carried out in the United States. Some lessons from American experience will be universal. (Nyangechi et al. 2013)

Others are, however, peculiar to this country's education system, which at the higher level involves more private money and enterprise than those higher educations in most other countries. In examining the development of ICTs in schools, universities and training, an important distinction should be made. In the case of schools, teachers primarily use ICTs in the school as an instructional device. "Distance" learning is rarely part of school teaching. In the case of higher education and training, students are more likely to use ICTs partly to learn at a distance from the instructor. Different teaching techniques are, thus, probably required in the two areas of education. (Adu and Tella 2013)

Also important to remember is the fact that most investment in education is publicly financed. Indeed, some have been driven more by politics than education policy. Computers and broadband connections have a high level of visibility; that makes them an attractive way for politicians to claim to be upgrading education with public money.

Even when politicians are not involved, the most measurable spending on ICTs in education is generally the result of public policy rather than private choice. However, private investment in ICTs also occurs. Some are by companies, using ICTs for training programs. In addition, many students acquire home computers partly for educational purposes; many, especially in richer countries, use their computers for study and homework. One important question is whether public investments in ICTs in education, made at the behest of administrators or politicians have been less successful than private investments, made by students on their own account. Certainly, public-sector investors in ICTs in education need to be aware of the way corporate employers are approaching the use of ICTs in training, in case there are lessons to be learned. (Tella and Adu 2010)

It is a general conception that man is the object of development and development cannot take place except man takes the initiative as well as plans, organizes, and implements develop-

ment (Onuka 2007). Thus, it can be said that development is by man and for man. Yet, no man can cause development to take place until he is adequately educated to do so. Onuka (2007) believes that manpower development is the process of the continuing education of the manager to keep him abreast of every new management development (education or training). It is a cycle that begins with planning and ends up with feedback on organization, implementation and evaluation.

Akorede and Onuka (2008) observe that professional staffs are an essential ingredient of the emancipation of a people in terms of development. He further stated that many African institutions of higher learning are in a state of crisis; implying that they are currently ill-equipped. Emunemu and Onuka (2008) contend that education is the major tool for development, thus stakeholders in education industry must pay the desired attention to the sector and ensure that appropriate level of investment is committed thereto. Onuka and Emunemu (2008) found out that there was very high correlation between university education and leadership performance in Nigeria. This finding portends that education plays vital role in national development and should, therefore, not be toiled with. However, it has been found by various scholars that research also engenders educational advancement/development. (Odinko 2001)

Sustainable development, on the other hand, is an organizing principle for human life on a finite planet. It posits a desirable future state for human societies in which living conditions and resource-use meet human needs without undermining the sustainability of natural systems and the environment so that future generations may also have their needs met.

Sustainable development ties together concern for the carrying capacity of natural systems with the social and economic challenges faced by humanity. As early as the 1970s, 'sustainability' was employed to describe an economy "in equilibrium with basic ecological support systems". Scientists, in many fields have highlighted the limits to growth and economists have presented alternatives, for instance, a steady state economy to address concerns over the impacts of expanding human development on the planet (Manning et al. 2011).

The concept of sustainable development in the past has most often than not been broken

out into three constituent domains: environmental sustainability, economic sustainability and social sustainability. However, many other possible ways to delineate the concept have been suggested. For example, distinguishing the four domains of economic, ecological, political and cultural sustainability their important sources refer to the fourth domain as 'institutional' or as good governance' (Reinecke et al. 2012)

Statement of the Problem

The socio-economic, cultural and political transformations are essential ingredients for sustainable development. Recently due to the advent of modern and sophisticated technology, there has been a need to explore ICT as part of the ingredient. In fact, studies have shown the strength of education in promoting sustainable development across the globe, hence, there is need for introducing specific independent variables. Therefore, the study focuses on evaluating the perceived contribution of ICT and higher education system respectively and collectively to sustainable national development in Nigeria. In addition, the study specifically addressed the perceived contributions of ICT and higher education to sustainable development in Nigeria.

Research Questions

The following questions were raised to provide answers to the problem the study set out to address.

1. What are the perceived contributions of ICT to sustainable development in Nigeria?
2. What are the perceived contributions of higher education to sustainable development in Nigeria?
3. What are the perceived contributions of both ICT and higher education to sustainable development in Nigeria?

Literature Review

Higher Education for Sustainable Development

Education empowers people for their role in society and, therefore, is of vital importance to promote the sustainable development of our glo-

bal community. The Millennium Development Goals adopted by the UN General Assembly in 2000, and the WEHAB initiative proposed by the UN Secretary General Kofi Annan during the 2002 World Summit on Sustainable Development (WSSD) in Johannesburg both underscore the role of education in improving peoples' lives. While it is broadly understood that literacy and education for all play a crucial role in preparing people for their future in a highly connected, interlinked and globalized world; higher education in particular occupies an important position in shaping the way in which future generations will learn to cope with the complexities of sustainable development. In nine of the forty chapters, Agenda 21 noted the key role universities have to play to achieve sustainability.

Universities form a link between knowledge generation and transfer of knowledge to society in two ways. First, they prepare the future decision-makers of society for their entry into the labour market. Such preparation includes education of teachers who play the most important role in providing education at both primary and secondary levels. Second, they actively contribute to the societal development through outreach and service to society. (UNESCO 2002)

Universities as Actors in Society

Globalisation has spurred technological, economic, social and cultural change as well as the greater mobility of capital, technology, information and labour. This phenomenon has created a growing demand for society's capacity to acquire process, disseminate and apply knowledge. Universities as important centres of research and learning, play an important role in this context. In addition to fundamental research, universities also have to undertake innovative, action-oriented research. They should be particularly attuned to the provision of appropriate knowledge and skills relevant for sustainable development to the local community as local knowledge centres. In addition to their traditional teaching functions, universities must consider their role in retraining school teachers as well as other local professionals to contribute to learning for sustainable development.

In this observation, universities are important actors in the community, as employers, purchasers and service users. They are also businesses where prudent use of resources saves

money and safeguards reputations. Thus, universities can be perceived as models for society in the pursuit of sustainable development. Universities are expected to contribute to innovation, to contribute to reflection on values and ethics, and to contribute to the transformation to a more sustainable society. The provision of knowledge as a “public good” is one of the tasks of higher education, and unhindered access to knowledge is a prerequisite for sustainable development. Of particular importance are qualitative factors imparted by the education system, such as orientation towards innovation and learning, creativity and the willingness to take risks. (UNESCO 2012:2)

According to UNESCO, in considering the roles and functions of the university in promoting sustainable development, the following issues should be particularly addressed:

- increasing the relevance of teaching and research for the societal processes leading to more sustainable and discouraging unsustainable patterns of life,
- improving the quality and efficiency of teaching and research,
- bridging the gap between science and education, and traditional knowledge and education,
- strengthening interactions with actors outside the university, in particular with local communities and businesses,
- Introducing decentralized and flexible management concepts.

Higher Education and Knowledge Transfer to Society

The problems of the society are very complex; hence there is need for multidisciplinary approaches to solve them. The contest for higher education institutes is to create gorgeous learning environments that prepare learners for their roles in society. This implies that learning environments should: offer access to scientific knowledge of good quality that enable students to obtain the aptitudes needed to work together in multi-disciplinary and multi-cultural teams in involved processes, and bring the global aspect into individual learning environments.

Through the processes of education, outreach and service to community and region, universities and other higher education institutes constitute ties between knowledge generation

and application of this knowledge in society. This bridging function is of great importance for innovation, development and creation of welfare. The learning environments created in higher education should enable learners to understand their physical and social environment; to develop a positive attitude towards cultural, environmental multiplicity, and life-support environmental processes; and to use their knowledge and attitude in a way that is responsible with respect to the well-being of their own society, other societies and of the planet as a whole.

Higher education should not only critically reflect on learning environments and learning processes for students studying for their first degree in higher education, rather they should also reflect on their role in creating an infrastructure that supports and enhances life-long learning processes. Higher education has a specific place within the educational system because it constitutes the learning environment for all educational professionals including those for primary and secondary education. Therefore, it is important that the learning environments for educational professionals provide a source of inspiration for the development of innovative learning processes as well. For that purpose, the opportunities offered by new media and information and communication technology (ICT) certainly deserve attention. (UNESCO 2002)

Higher Education and the UN Decade Education for Sustainable Development

Knowledge is a key factor for sustainable development. Yet without the appropriate context and applications, knowledge cannot successfully catalyse sustainable development. Therefore, education should be considered as an enabling infrastructure for all sectors of the economy, for democracy and for good governance. The challenge for higher education is to innovate traditional learning environments and learning processes in such a way that they not only support the learning process of children and young adults in formal education, but life-long learning, training and informal learning as well. Higher education institutes are challenged to co-operate together in networks that constitute a supportive infrastructure for life-long learners.

Co-operation between universities is however not enough. To fulfil their outreach/service function at regional, national and international

levels as well, universities and higher educational institutes will have to be active knobs in not only national and regional but international networks with other partners such as primary and secondary schools, vocational education, science centres, small and medium sized companies, chambers of commerce, NGOs, national and regional governments, etc. The challenges for higher education in the context of the Decade are, thus, colossal, but the opportunities as well. New media and ICT offer many possibilities to enhance human activities in the field of education by providing flexible access to educational resources, assisting in information management and facilitating active discussions. Emphasis should not only be on competition at a global scale, but also, and even much more, on co-operation and sharing of knowledge at a global scale.

The Role of ICT in Achieving Development Goal

United Nations Global Alliance for ICT and Development (2012), succinctly described that in the United Nations' Millennium Summit a set of development goals were created with an aim to improve some of the most critical social, economic, and environmental issues in the developing world by 2015. The eight goals are:

- ♦ Goal 1: Eradicate extreme poverty and hunger
- ♦ Goal 2: Achieve universal primary education
- ♦ Goal 3: Promote gender equality and empower women
- ♦ Goal 4: Reduce child mortality rate
- ♦ Goal 5: Improve maternal health
- ♦ Goal 6: Combat HIV/AIDS, malaria, and other diseases
- ♦ Goal 7: Ensure environmental sustainability
- ♦ Goal 8: Develop a global partnership for development

How Does ICT Help Advance Sustainable Development?

The prime cause of poverty is isolation from the rest of the global community. Access to the internet and mobile networks can allow impoverished people around the world to access banking, medical services, and markets. Remote weather stations can be set up in new locations

and connected via mobile networks to allow researchers to better study the local and global impacts of climate change.

The Importance of Access to the Internet

Providing laptops to students in the developing world like the one laptop per child program does, allow children in developing countries to communicate with other children in advance countries like US and even to work on class projects together. The potential of such interaction is invaluable. Learning to use technology to expand the reach of a child in a small village in Africa expands the horizons of their possibilities infinitely. For the children in the developed world the lessons will also be of great value. For example, in a country like Uganda due to the importance of the transfer of knowledge, a dedicated news network, South-South News, has been set up to help reach the Millennium Development Goals through the use of Information, Communication, and Technology.

Access to Mobile Networks

In just the last two decades, most of Africa has leapfrogged the communication infrastructure divide from having no telephones to having widespread cellular networks. This has allowed the rapid spread of mobile banking services, allowing people to make secure transactions and secure small business loans. Besides, being currently developed is a system that allows for minimally-trained local medical workers to easily diagnose malaria, obtain prescriptions, and register cases with mobile technology. Mobile networks can also help disseminate information by allowing farmers access to best practices for irrigation and fertilization. Unfortunately, cost is still a major barrier to the effective use of mobile technology. African countries should monetize their extremely valuable mobile communication spectrum to invest in major infrastructure improvements.

Are There Downsides to Expanded Access to ICT?

Enabling access to ICT to over six billion people sounds like a waste nightmare in the making. There is certainly a need to have serious discussions about the environmental impli-

cations. Systems must be put in place to allow for effective recycling of laptops and mobile devices. There are also serious considerations around the impact of the infrastructure, cellular networks, telephone switching equipment, servers and satellite-based equipment. Finally, in addition to connecting farmers and workers to markets, will access to ICT also move the rest of the world towards Western-style consumerism? Rather than fearing the consequences of others following in the West's destructive footsteps, it is our responsibility to lead by example and extend a hand to our global brothers and sisters to elevate their quality of life and alleviate extreme hardship. ICT, for the first time, makes this a possibility.

METHODOLOGY

Research Design

This study adopted descriptive survey research design to investigate the role of ICT and higher education in sustainable development.

Population/Sample

The population of this study comprises mainly all the 650 lecturers in some selected universities. Simple random sampling technique was used in the selection of the lecturers. The sample size of this study consists of one hundred and thirty-one university lecturers (N=131)

Validity and Reliability of Research Instrument

A structured questionnaire was used to elicit information from the respondents. The instrument was validated by the experts in the same field and Cronbach alpha was used to measure its reliability. The reliability coefficient is $r=0.87$. The instrument was divided into two sections; section 1 required respondents' bio-data, while section 2 contained three parts. Part 1 contains items/indicators on ICT and sustainable development. Part 2 contains items/indicators on higher education and sustainable development and part 3 contains items on the role of ICT and higher education for sustainable development. Likert modified response scale was used. The response range from Strongly Agree – Strongly Disagree.

Data Administration and Analyses

The instrument was administered to the respondents in their various universities with the support of research assistants. The administration was completed in 10 days. Data collected was analyzed using descriptive and Chi-Square statistics

RESULTS AND DISCUSSION

Research Question 1: What are the perceived contributions of ICT to sustainable development in Nigeria?

The analysis on the contribution of ICT to sustainable development in Nigeria reveal that factors such as effective ICT integration will promote sustainable development, Robust and effective ICT policy will enhance sustainable development; and the supply of high tech ICT facilities will sustain development in Nigeria have the highest significant contribution to sustainable development in Nigeria with (Mean 4 and SD of .00000). This is followed by lack of creativity and willingness to change hinder sustainable development and High cost of sustainability of technology can hinder development with (Mean 3.4 and SD = .49862). Next to these factors is piloting the chosen of ICT-based model will enhance sustainability with (Mean 3.41 and SD of .494). The results also revealed that lack of ICT competences will affect sustainable development in Nigeria and also the accessibility to internet and mobile networks will enhance sustainable development (Mean 3.709 and SD of .4555) respectively. This implies that all the ICT factors identified here have the capability of contributing significantly to the sustainable development.

Research Question 2: What are the perceived contributions of higher education to sustainable development?

It reveals that the development and adequate maintenance of infrastructures in institutions of learning can promote sustainable development in Nigeria contributed mostly to sustainable development in Nigeria with (Mean of 4 and SD=.000). The next factors of higher education that made significant contribution to sustainable development are the autonomy for higher education system that can enhance sustainable development in Nigeria and the positive attitude of higher education leadership will affect sus-

Table 1: Descriptive statistics on ICT and sustainable development in Nigeria

	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>Std deviation</i>
Effective ICT integration will promote sustainable development	131	4.00	4.00	4.0000	.00000
Robust and effective ICT policy will enhance sustainable development	131	4.00	4.00	4.0000	.00000
Robust and effective ICT policy will enhance sustainable development	131	4.00	4.00	4.0000	.00000
Piloting the chosen of ICT-based model will enhance sustainability	131	3.00	4.00	3.4122	.49412
Difficulty in linking ICT to the curriculum may affect sustainable development	131	3.00	4.00	3.7328	.44418
Lack of ICT competences will affect sustainable development in Nigeria	131	3.00	4.00	3.7099	.45554
Lack of creativity and willingness to change will hinder sustainable develop	131	3.00	4.00	3.4427	.49862
Lack of ICT skills and experts will militate against sustainable development.	131	3.00	4.00	3.7099	.45554
High cost of sustainability of technology can hinder development	131	3.00	4.00	3.7099	.49862
Limited access to computer and software can affect sustainable development	131	3.00	4.00	3.7099	.45554
Accessibility to internet and mobile networks will enhance sustainable development	131	3.00	4.003	3.7099	.45554
Effective recycling of laptops and mobile devices can promote sustainable development	131	3.00	4.00	3.2672	.44418
Valid N (list wise)	131				

Table 2: Descriptive statisticshigher education and sustainable development in Nigeria

	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>Std deviation</i>
The positive attitude of higher education leadership will affect sustainable development in Nigeria	131	3.00	4.00	3.3728	.44418
The development and adequate maintenance of infrastructures in institutions of learning can promote sustainable development in Nigeria	131	4.00	4.00	4.0000	.00000
Overhauling of Computer Assisted Instruction programmers in institutions of learning will enhance sustainable development	131	3.00	4.00	3.3893	.48947
Human capacity building programs in our institution will positively affect sustainable development	131	3.00	4.00	3.7099	.45554
Political interference in higher education system will militate against sustainable development	131	3.00	4.00	3.7099	.45554
Adequate funding of higher education can promote development	131	3.00	4.00	3.7099	.45554
Bad education policy and planning will hinder sustainable development	131	3.00	4.00	3.7099	.45554
Lack of clear Language and educational content development can militate against development	131	3.00	4.00	3.7099	.45554
Training and retraining of staff in educational institutions will promote sustainable development	131	3.00	4.00	3.7099	.45554
Valid N (list wise)	131				

tainable development in Nigeria with (Mean 3.733 and SD of .444) respectively. Next to this is overhauling of Computer Assisted Instruction

programs in institutions of learning will enhance sustainable development with (Mean 3.389 and SD of .490). Other factors of higher education

Table 3: Other roles of ICT and higher education for sustainable development

S.No.	Items	No.	Mean	SD
1	Promoting and enhancing government policies and operational procedures	131	3.98332	.48766
2	Help to recover, revamp as a well as update obsolete government policies with credible indices for wealth creation	131	3.7854	.44445
3	contribute to the intense growth and urbanization of remote as well as rural areas with little or no knowledge of ICT	131	3.5444	.43245

that exert significant contribution to sustainable development in Nigeria are: Human capacity building programs in our institutions will positively affect sustainable development; political interference in higher education system will militate against sustainable development; adequate funding of higher education can promote development; bad education policy and planning will hinder sustainable development; lack of clear Language and educational content development can militate against development training and retraining of staff in educational institutions will promote sustainable development. All of these are with (Mean 3.710 and SD .4556). This is an indication that all the higher education factors identified significantly have the capability of contributing to sustainable development in Nigeria.

Research Question 3: What are the perceived contributions of ICT and higher education to sustainable development in Nigeria?

The roles of ICT and higher education to the sustainable development identified by the respondents in an open ended format include promoting and enhancing Government policies and operational procedures with (Mean 3.98 and SD .488). This is followed by helping to recover, revamp as well as update obsolete government policies with credible indices for wealth creation with (Mean 3.544 and SD of .444) while contributing to the intense growth and urbanization of remote as well as rural areas with little or no knowledge of ICT followed with (Mean 3.544 and SD of .433).

CONCLUSION

Universities are important actors in the community, as employers, purchasers and service users; they are also businesses where prudent use of resources saves money and safeguards reputations. Thus, universities can be perceived as models for society in the pursuit of sustainable development. Higher education should not only critically reflect on learning environments and learning processes for students studying

for their first degree in higher education, they should also reflect on their role in creating an infrastructure that supports and enhances life-long learning processes. In examining the development of ICTs in schools, universities and training, an important distinction should be made. In the case of schools, teachers primarily use ICTs in the school as an instructional device. "Distance" learning is rarely part of school teaching. In the case of higher education and training, students are more likely to use ICTs partly to learn at a distance from the instructor.

From the findings, factors such as effective ICT integration will promote sustainable development, robust and effective ICT policy will enhance sustainable development; and the supply of high technology facilities will sustain development in Nigeria have the highest significant contribution to sustainable development in Nigeria with (Mean 4 and SD of .00000).

Concerning the role of higher education; the development and adequate maintenance of infrastructures in institutions of learning can promote sustainable development in Nigeria contributed mostly to sustainable development in Nigeria with (Mean of 4 and SD= .000000). Concerning the role of ICT and higher education in sustainable development, the findings revealed that; promoting and enhancing Government policies and operational procedures with (Mean 3.98 and SD .488) have the greatest contribution.

RECOMMENDATION

It was however recommended that attention should be paid on the indicators listed above so as to enhance sustainable development in Nigeria.

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