

The Role of Information and Communication Technology-Based Curriculum in the Realization of the Objectives of Vocational and Technical Education Programme in Nigeria Tertiary Institutions

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Abstract

The objectives of vocational and technical education programme in Nigeria tertiary institutions cannot be realized effectively without the utilization of Information and Communication Technology-based curriculum because ICT is a major enabler of globalization which facilitates worldwide flows of information, capital, ideas, people, and products. If the objectives of vocational and technical education programme in tertiary institutions are to be attained in Nigeria, governments, National Universities Commission, private sector and other stake holders must make great effort to solve the problems militating against the utilization and progress of ICTs in Nigeria vocational and technical education programme. This paper examines the relevance of ICTs and the vital role it can play in the realization of the objectives of vocational and technical education programme in Nigeria tertiary institutions. It also identified the challenges to ICT utilization in Nigeria and further emphasizes the need for Nigerians to embrace ICT production, training and retraining of Nigerians to be ICT experts so as to contribute and benefit immensely from the global village and the world economy which is a necessity for attaining the objectives of vocational and technical education programme in Nigeria tertiary institutions.

Introduction

In today's complex and fast changing world, Information and Communication Technology (ICT) is an indispensable tool for achieving sustainable national development. This is because the development of any nation is usually measured by the degree and extent of the socio cultural, socioeconomic and political improvement that are brought to bear through the activities of Information and Communication Technologies (ICTs). It is the extent of utilization of (ICTs) in a nation that defines a nation as developed or underdeveloped. Margaret (2005) defined Information and Communication Technology (ICT) or Information Technology (IT) as an umbrella term that includes any communication device or application encompassing: radio, television, cellular phones, computers and network hardware and software, satellite systems as well as the various services and applications associated with them, such as video conferencing and distance learning. Information and Communication

Technology was also defined by Nwabueze and Ozioko (2011) as a broad based technology (including its methods, management and applications) that supports the creation, storage, manipulation and communication of information.

Information and communications technologies (ICTs) cuts across a variety of technologies including: computer, microelectronics and related technologies including microchip and microprocessor-based technologies; multimedia and other information processing technologies and systems; telecommunications technologies and infrastructure (fixed line, wireless, satellite based and mobile infrastructure); and communication network technologies and infrastructure (including local and wide area communications and computer networks for voice, data and video). Other technologies that forms part of ICTs include: broadcasting networks and technologies including radio and TV networks; production-based technologies including those used in computer-integrated manufacturing and production systems and operations, robotics technologies, biotechnology-related equipments and systems; and the internet as a globally-based delivery platform - incorporating elements of computers, telecommunications, communications technologies and networks and other multimedia development and delivery technologies to form an integrated multimedia transmission and communication delivery infrastructure and platform with a global reach (World Development Report, 2009).

The revolutionary potentials of ICT lie in their capacities to instantaneously connect vast networks of individuals and organizations across great geographic distances at very little cost. As such ICTs have been key enablers of globalization, facilitating world wide flows of information, capital, ideas, people and products. They have transformed business, market, and organizations, revolutionized learning and knowledge sharing, empowered citizens and communities and created significant socio-economic growth in many countries. There is no doubt that ICT has found its niche in every sphere of Nigeria polity. The ICT industry according to Nworgu (2007) appears to be making significant inroads into the Nigeria society but public awareness of ICT and its application was low due to the factor of "digital divide" prevalence in Nigeria and other developing countries.

The concept of digital divide is the disparities in the availability and utilization of ICTs between people living in different parts of the world due to their level of technological

development. The digital divide, a disparity in access to ICTs between countries and communities is caused by many factors such as: inadequate infrastructure, high cost of access, inappropriate or weak policy regimes, inefficiency in the provision of telecommunication network, language divides (language differences), poor economy and lack of locally created content (Mutula, 2004). The digital divide is a disadvantage and reduces access rate at which Nigerians and other developing nations can contribute and benefits from the information age and global communities.

This was buttressed by Al-saadi, (2006) who lamented bitterly on the over dependent of Nigeria and other developing countries on ICT consumption instead of ICT production which consequently keeps them in perpetual bondage of underdevelopment and poverty. Al-saadi broadly divided ICT into two components namely. ICT production and ICT consumption. According to him ICT production is the creation of hardware and software components of ICT, provision of ICT infrastructure, ICT consultants and trainers, web designers, internet service providers (ISPs) and Data Service Providers (DSPs), while ICT consumption is the use of ICT amenities in applications like e-learning, e-medical, e-commerce, e-government, e-environment among others.

It is obvious that ICT has come to stay because it is the hub and bedrock for global and national development in the 21st century. It is a paramount and indispensable tool for global recognition and accomplishment in research and teaching in institutions of learning at all levels of schooling. It is the king pin for Research and Development (R & D) activities in industries to improve productivity and industrialization. The relevance of ICT to the development of Nigeria nationally and globally cannot be underestimated. It is on the basis of this premises that it becomes necessary to examine the role of information and communication technology-based curriculum in the realization of the objectives of Vocational and Technical Education (VTE) programme in Nigeria tertiary institutions.

Overview of Vocational and Technical Education Programme in Tertiary Institutions.

Vocational and Technical Education (VTE) programme is a programme designed to train Vocational and Technical teachers to teach effectively in all aspects of Technical Vocational Education and Training (TVET) institutions as well as to function effectively as skilled technicians in the industries in specific occupational areas. The National Policy on Education (FRN, 2013) described TVET as a comprehensive term referring to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life. Specifically the National

Policy on Education (FRN, 2013) stated that the goals of TVET shall be to: provide trained manpower in the applied sciences, technology and business particularly at craft, advanced craft and technical level; provide the technical knowledge and vocational skills necessary for agricultural, commercial and economic development; and give training and impart the necessary skills to individuals who shall be self-reliant economically.

In Nigeria school system, the TVET teachers and instructors are basically trained through the Vocational and Technical Education programme. The aim of establishing Vocational and Technical Education (VTE) programme is to train individuals to equip them with teaching skills and technical skills in specific occupational area of specialization to enable them function effectively as Vocational and Technical teachers at TVET institutions (technical colleges, vocational schools, training centers among others) as well as skilled technical personnel in industries or in specific occupational areas. The major objective of Vocational and Technical Education (VTE) programme is to produce qualified skilled technical teachers to enhance implementation of effective TVET programmes in Nigeria. The graduates of VTE programme is also trained on how to teach Basic Science and Technology (formerly Introductory Technology) at the junior secondary school level as well as other vocational and pre-vocational subjects at secondary school level.

In Federal University of Technology Minna, the specific occupational area of specialization covered by Vocational and Technical Education programme include: Automobile Technology, Building Technology, Electrical / Electronics Technology, Metalwork Technology as well as Woodwork Technology. In some other tertiary institutions, the VTE programme is called different names such as Industrial and Technology Education, Vocational Teacher Education Industrial Technical Education or Technology Education. Despite the changes in nomenclature from one higher institution to the other, the basic objectives of the programme remain the same in Nigerian tertiary institutions.

For instance at the Federal University of Technology Minna, Vocational and Technical Education programme is called Industrial and Technology Education (ITE). The specific objectives of the programme according to ITE Departmental Handbook (2019) are to:

1. Develop a department of repute for training graduate and postgraduate students that are employable, enterprising and self-reliant.
2. Equip students with appropriate techniques to solve problems affecting Industrial and Technology Education and Technological innovations.
3. Provide specialized training for technical teachers, curriculum developers and

supervisors of technology education at all school levels.

4. Enable students acquire additional professional knowledge, skills and experience so as to be able to relate to others meaningfully.
5. Acquaint students with creative teaching strategies at the elementary, secondary and tertiary levels of education.
6. Contribute meaningfully to the multidisciplinary nature of Industrial and Technology Education.
7. Equip students with design and research skills.
8. Vigorously promote quality consultancy for excellent service delivery and generate funds.
9. Encourage staff and students of the department to be ICT compliant and for the programme to be ICT driven.

Achieving the laudable objectives of Vocational and Technical Education programme in Nigeria tertiary institutions, demand the use of Information and Communication Technology-based curriculum. This is because the ICT-based curriculum increases access to technical information and skill requirements needed for sustainable development and self reliance in the 21st century place of work.

Overview of ICT -Based Curriculum in Vocational and Technical Education Programme

Curriculum can be described as the totality of all the learning experiences which learners are exposed to under the guidance of the school. Drake and Burns (2004) described curriculum as the planned programme content to be delivered to the student under the guidance of the school to enhance achievement of educational goals. In the present dynamic society where change is inevitable, curriculum also encompasses all the unplanned learning experiences which learners are exposed to in a training institution.

Information and Communication Technology (ICT)-based curriculum is a new type of curriculum that emanated from developments in technology. The ICT-based curriculum is an ICT driven curriculum that organizes learning experiences into structured forms that increases learners access to curriculum content through various computer-based technologies and internet enhancement to learning experiences, learning materials as well as computer-based assessment tasks that foster effective knowledge and skill acquisition. The ICT-based curriculum is learner-cantered and eliminates too much burden placed on the teacher to initiate teaching and learning process.

The ICT-based curriculum gives a definite focus to the educational process in the school system. It shows that school life is a continuation of learning experiences both within and outside the vicinity of the institution. The common types of curriculum among others include subject centered curriculum, learner-centered curriculum, hidden curriculum and core-curriculum (Atsumbe, 2010). The federal government of Nigeria in realization of the relevance of curriculum to qualitative teacher education, established the National Commission for Colleges of Education (NCCE) and the National Universities Commission (NUC) as regulatory bodies for the supervision of teacher education programmes at NCE level and at the Universities level respectively for all categories of Nigeria Certificate in Education(NCE) and Bachelors degree awarding institutions in Nigeria.

Since inception, the NCCE and NUC have been involved in a lot of activities that focus on pursuing quality assurance in teacher education programmes in Nigeria. A careful analysis of the curriculum for Vocational and Technology Education programme in Nigeria tertiary institutions shows that the curriculum is stereotyped, outdated and does not compete effectively with best practice in curriculum content and implantation in technologically advanced countries. There is a big mismatch between the current curriculum content and the demand of the labour market.

Research has revealed that the existing Vocational and Technical Education curriculum is deficient in meeting the needs of the teacher in modern society. Thus, if the Vocational and Technical Education programme is to remain relevant to the educational needs and society it is intended to serve, it must do more than it is presently doing. It must prepare teachers with knowledge and skills required to teach effectively at the different levels and areas of vocational and technical education programmes without neglecting the needs for higher education. This calls for the need to examine the role of information and communication technology-based curriculum in the realization of the objectives of Vocational and Technical Education (VTE) programme in Nigeria tertiary institutions.

The Role of ICT-Based Curriculum in the Realization of the objectives of (VTE) programme in Nigeria

In the current technological world, the realization of the objectives of (VTE) programme in Nigeria is impossible without utilizing ICT-based curriculum. Development is impossible without ICT because ICTs is a major enabler or catalyst of development in all sectors of the economy. This is evidence in the continuous innovation in ICT which has dramatically changed our way of life. A change from analog to digital, a change from uni-media to multi-media, a change from copper wire communication system to either fibre optics or wireless

cellular and even the satellite systems; a change from mono-component to hybrid component of telephone, TV and computer all in one and a change from manual to robotics. All these changes are due to innovations in ICT which serves as the primary indicator of progress and technological development of any nation.

Enhancing poverty reduction: The utilization of ICTs to support the overall development of various sectors of the economy is having great positive effect for overall productivity nationally and globally in various countries. For instance the growth of the telecommunications sector in Nigeria and several number of African countries in recent years has created avenues for poverty reduction and hunger reduction through the creation of jobs for the youth in both urban and rural areas. Also the use of ICT to support farmers and agricultural research organizations has greatly lead to new innovations and production of new and improve varieties of agricultural products and also increase food production so as to reduce hunger and prevent food insecurity. The use of ICT in governance and in the private sector also facilitate internal information flows, accountability, procurement of goods and services that could positively contribute to reduction of poverty.

Enhancing Instructional Delivery: Facilitating teaching and learning through the use of ICTs has greatly help to ensure efficient instructional delivery at all level of the educational system. The use of ICTs in education creates opportunities for the physically challenge to also have access to education and training which in turn leads to the achievement of universal primary education. Utilizing ICT in education creates wider access to education and reduces physical and social barriers to education. ICT makes it possible to improve access to limited educational resources to a larger population through various forms of schooling such as e-learning, e-education and other ICT enable educational platform.

Promoting gender equality in education: For a long time gender inequalities has greatly affected women and their contribution to development in Africa. Access to ICTs is for all irrespective of gender type. This reality has made many African countries to implement specific projects and initiatives targeted at the use of ICT to empower women in various sectors. Setting up multimedia communication centres for women to improve their access to ICTs utilization will go a long way to promote gender equality and empower women in Nigeria. Empowering women in Nigeria can best be done by government ministry and other stake holders involve in handling women affairs.

Provision of scholarship opportunities targeted at increasing the enrolment of women in ICT related educational and training programmes in Nigerian tertiary institutions will greatly facilitate the active involvement and contribution of women in various sectors of the economy.

Disseminating health care information: Employing ICTs in disseminating health care information to the general public through health education and awareness to pregnant women and those nursing children will cover wider population and truly reduce infant mortality rates. The utilization of ICT in disseminating health care information should be targeted towards the poor and the economically vulnerable groups within the society who usually reside in rural areas where access to quality health care information is usually lacking.

Some African countries have started using various telecommunication gadgets to disseminate health care information and conduct training in rural and urban areas to bridge the health service delivery gaps between the urban and rural areas.

Utilizing ICTs in various health care training and retraining programmes in Nigeria hospitals, pre-natal and post-natal centres will contribute greatly in reducing child mortality rate in Nigeria.

Reducing maternal mortality rate: Adopting ICTs and ICT related technologies to support health education, health care delivery service and administration and e-health related issues to mothers in rural and urban areas in Nigeria will have significant effect in improving maternal health in Nigeria. The ministry of health at various levels should develop e-health initiatives that focus on promoting the use ICTs to link health professionals in rural and urban areas to each other and to reliable sources of information including by using geostationary satellites, modem-to-modem telephone links and internet. This will help to reduce maternal mortality ratio and improve maternal health in Nigeria.

Combating HIV/AIDS, malaria and other diseases: Deploying ICTs in Nigeria in the dissemination of health education in rural and urban areas will help to enlighten a lot of people on the causes and dangers of ill health and illnesses at various stages.

This effort should also impact and focus on health consciousness and awareness creation targeted at combating HIV/AIDS, malaria and other related disease as well as improving maternal health and reducing child mortality rates in Nigeria. This will also go a long way to achieve universal access to treatment for HIV/AIDS for those who need it.

Ensuring environmental sustainability: Ensuring environmental sustainability relates to a pattern of resources use that aims to meet human needs while preserving the environment so

that these needs can be met not only in the present, but also for future generations. Exploring the use of ICTs in handling environmental issues in Nigeria will help to ensure environmental sustainability and a functional e-environment. According to Clement (2010), a functional e-environment is (a) the use and promotion of ICTs as an instrument for environmental protection and the sustainable use of natural resources. (b) the initiation of actions and implementation of projects and programmes for sustainable production and consumption and the environmentally safe disposal and recycling of discarded hardware and components used in ICTs and (c) the establishment of monitoring systems, using ICTs, to forecast and monitor the impact of natural and man-made disasters, particularly in developing countries, less developed countries and small economies.

Developing global partnership for development: Deployment, exploitation and active utilization of ICTs within developing countries has greatly enabled many developing countries to partner with developed countries and such collaborations through ICTs has allowed developing countries to benefit immensely and to have access to new innovations in technologies, health care, financing methods, and other special needs which helps to develop their global partnership and enhance development.

Challenges to ICT Usage Towards Achieving the objectives of Vocational and Technical Education programme in Nigeria

Below are some prevailing challenging factors in Nigeria that can limit the roles of ICTs or the extent to which ICTs can help in realization of the Vocational and Technical Education programme:

1. Erratic and inadequate electric power supply.
2. Poor funding and misappropriation of ICT funds.
3. High cost of purchasing modern ICT facilities and devices.
4. High rate of corruption, poverty and uneven distribution of public utilities.
5. High cost of specialized ICT training in Nigeria.
6. Inadequate ICT infrastructures and general shortage of skilled ICT human resources (ICT experts and instructors) in Nigeria.
7. Poor orientation of Nigerians on the importance of ICTs to national development.
8. Low access to ICT services due to the factor of “digital divide” and poor availability of ICT facilities and devices.
9. Too much emphasis on ICT consumption against ICT production due to the deplorable state of ICT training institutions and ICT departments in Nigeria tertiary institutions.

10. Unfriendly atmosphere in Nigeria due to terrorism, wanton bomb blast, kidnapping. Chaos, ritual killings and several other vices.

Recommendations

Based on the review above, the following suggestions were made:

1. Provision of stable and adequate electric power supply.
2. Adequate funding of ICT training institutions and ICTs related departments in tertiary institutions by the various governments, private sector and other stake holders in Nigeria.
3. Government in collaboration with the National Communication Commission (NCC) should purchase relevant ICTs facilities /devices and make them available to the masses for utilization at various ICT training centers.
4. Re-orientation of our value system and creating awareness through various media on the importance of ICTs to national technological development.
5. Strict monitoring of NCC activities in terms of utilization of ICT funds and implementation of ICT policies in Vocational and Technical Education programme in tertiary institutions.
6. Periodic ICT policies performance review, implementation and access in tertiary institutions.
7. The government should set up powerful V-SATs and pay for adequate size of bandwidth in all ICT training institutions, federal and state tertiary institutions.
8. Ensuring a stable and friendly atmosphere to attract skilled ICT experts and instructors that can train and retrain Nigerians on ICT production.
9. Governments at various levels should lay more emphasis on ICT production rather than ICT consumption.
10. The ICT content in Nigeria educational curriculum in Vocational and Technical Education programme in tertiary institutions should be increased so that Nigerians can learn to think, love and embrace ICT.

Conclusion

For Nigeria economy to prosper and achieve the objectives of Vocational and Technical Education programme in Nigeria tertiary institutions, the challenges confronting the progress of ICTs in Nigeria must be recognized and fought vigorously by governments at all

levels, the private sector and other stake holders. We must embrace ICTs and channel adequate financial resources towards ICTs production, mass training and retraining of Nigerians to be ICT literate and experts in various sectors of the economy so as to cope with global competition in the world's global village. Nigerians must be enlightened to be aware that it is ICT that defines the status of development of a nation. It is only ICTs that determines the leaders of our world and those that are perpetual followers. It is only ICTs that will make our country recognized, resilient, sustainable, competitive and diversified. Information and Communication Technology-based curriculum is a necessity for the realization of the objectives of Vocational and Technical Education programme in Nigeria tertiary institutions

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