

An Assessment of ICT Education in South Western Nigeria: Trends, Prospects and Challenges

Adeyanju Oluwafunmilade Joel, PhD.,

Gbenga Olaniyi Efunwole, PhD.,

Faculty of Education, Obafemi Awolowo University, Ile Ife Nigeria

Faculty of Education, Ajayi Crowther University, Oyo, Nigeria.

*Corresponding author: e-mail:

Abstract

The application of information and communication technology, ICT to teaching, research and administration will continue to be relevant to the successful building of the education industry and sustainable national economy of knowledge and work. ICT integration into the classroom learning and its development is fraught with challenges and added to the problem is the teacher multifarious training needs that are not often met. These make the teachers role in propagating teaching and learning more demanding and attention getting. ICT is now a household concept and its adoption globally is unavoidable being a tool that changes human life and work. This paper provides information on some of the researched ICT Policies, strategies and guidelines; the e-Learning and its relevance to education as perceived by the learner and the teacher. The Centres for Distance Learning across the Southwest and other regions are active patroniser and direct beneficiaries of the technologies; findings on its deployment is provided in some of the research output.

Introduction

Over the last few decades, the task of teaching and research has received a boost essentially because the tool technology; Information and Communication Technology get deployed to teaching. The realisation that ICT is the new normal reflects in the programmes of pre – service and in - service teachers who tend to motivate the self and get acquainted with the tool that helps in meeting the set goal of teaching and instructional delivery with minimal stress. Most tasks of teaching are now accomplished through the use of visual, audio, audio visual, real objects and contrived materials because they appeal to the senses of sight, hearing and touch. In addition, teachers are also becoming familiar with the rudiment of designing which is an activity based process of teaching and learning with consideration to an enriched environment.

In the commercial world of work, successful businesses have also tapped into the wonders of this technology, so are the administrators and learners. The need to define technology, educational technology and ICT will suffice in the understanding of the current development.

Technology is defined as the systematic way of applying scientific or other organized knowledge to practical task. It is a process as well as a product. The process involves application while product is viewed

as the outcome of application of the process. Such products are seen as hardware and software materials. The process is described as a step by step approach or Systems Approach to the achievement of an effective outcome that involves planning, designing, implementing and evaluating the situation of an object or event. When technology is viewed as a product, the thinking refers to all skills involved in the systematic process that leads to the production of physical materials and equipment that could be used to facilitate an instructional event.

Put simply, technology involves men, machines, methods, procedure, systems and techniques of doing things. The machines, equipment, tools and engines are the products of the field of Educational Technology while the methods, application and use of skill and knowledge; procedure for making and doing things refers to the process. From mans daily experiences, technologies have been found to forcefully invade our private and public lives and its impact is assumed to be beyond our imagination. An unexpected phone call to a farmer living in the village from a family member living in the USA or the United Kingdom for example, can influence the activity of the day.



In the last century, technology was described as being on our palms. While the popular saying that the world is a global village (McLuhan 1967) seems not to hold any longer as experiences of decades that follow has proved the new century technology to have shrink the world further; such that the world is now on mans' "finger tip"

Arising from the various ways that the new technologies is perceived, technology is also a practical way of thinking out solutions to a giving problem using men material resources and machines managed by man. Educational Technology is a course of study that has different meaning to different people that belong to different professional calling. Technology as defined would eventually take us through the concept of educational technology with more understanding. However, the term education or "educare" evolves from the Greeks.

It has often been said that if anyone thinks that education is expensive, let him/her try ignorance. Education has been defined by the Philosophers, the Scientists, teachers and parents, but B.F. Skinner in the "New Scientist" (1964) defines education as what survives, when what had been learnt has been forgotten. Edward Wilkins an author also defines education as the sum total of all the experiences of our life. It is therefore a continuous process. Adeyanju (2020) defines education as comprising series of experiences gained from learning to do things. Getting actively involved in learning what ought to be learned would assist the learner in knowing those things that would enable him/her to live an approved and acceptable life where ever he/she may find himself or him / herself.

The term Educational Technology frightens the neonate, the pre - service teacher sees the course as production of teaching aids. The in-service teachers refers to it as use of methods involving visual and audio visual materials that enriches the teaching and learning activity for which when they are carefully

used, are perceived as the application of machines in teaching. To this group of people, the sight of a camera, use of video tape, projector, carousel, microphones, photocopy machine and the like tend to convey the term educational technology to them. However, Educational Technology concepts mean more than that.

The "heart" of Educational Technology is the deployment of its tools for effective, efficient and successful communication. Meaning that, all the devices borne of communication revolution, inclusive are the modern developed communication gadgets, the human thinking ability, and the organisation and management of his ideas that is directed at providing solution to the challenges of teaching and learning.

Unfortunately, useful as these technologies are, in-service teachers and trainers as well as educationists seems to create more gaps because the various technologies are seen as a threat. Some teachers see technologies as making professionalism incapable and obsolete; this feeling that convey the impression of "you are no longer needed" is affecting its relative deployment into the classroom. Teachers are adherent of traditions and this attitude invariably cannot sustain national development. In the light of this attitude, Dr. Hedayat Ahmed Ahmed (UNESCO PPOP, 1990) submits that the cultural technological gap that is being created would result in serious consequences in the output of human resources if the problem is not resolved at the educational planning stage.

Objective

The thrust of the paper addresses, ICT and teacher education, its integration in teaching and learning and challenges and prospects; the Policies, government support and findings from few researches are documented. An examination of some of the e-learning platforms that are used in the southwest region of Nigeria and justification for strategies that could guide the users are provided. The Obafemi Awolowo University Radio and its deliberate use for teaching dove - tails into the discussion.

The National Policy on Education (FRN 1981) states that:

- (i) Teacher Education will continue to take cognizance of changes in methodology and in the curriculum, and that teachers will be regularly exposed to innovations in their profession, and

(ii) Government will introduce measures to enable teachers participate more in the production and assessment of instructional materials.

The assessment of the above policy may be at variance because, most innovations excludes the players. The teacher who is saddle with the implementation of the new policy has most of the time been left out at the planning and the process stages; such that, she / he has had little or no training to handle the new knowledge, ICTs inclusive. It is felt that with total absence of training, policies are mostly on paper and not workable as being determined.

Defining Educational Technology

Using the National Policy Statement as a prelude, Educational Technology is an eclectic field that borrows ideas and skills from a number of disciplines; inclusive are the field of sciences, psychology, sociology, engineering. It is a discipline that see the instructional system as an avenue that ought to be used to bring about effectiveness and efficiency in teaching and learning process. It focuses on the dare need for the teacher, instructor, and designer of programmes; such that they would be armed with a “working drawing” a plan, that is based on specific and achievable objectives within the designed plan of instruction. The field targets learners’ attitude and skills acquisition and the transfer of adequate knowledge through effective teaching such that learners would be empowered to solve related problems as at when the challenge evolves.

The American Educational Committee on Technology (AECT 1979) defines Educational Technology as a complex integrated organization of men and machines, ideas of procedure and management. This definition seems old, but it explains clearly the import of the term. Men of different vocations work with ideas on machines following systematic procedure and managing ideas, machines and organize men for the purpose of solving problems.

Wittich and Schuller (1973) defines Educational Technology as media borne of communication revolution that can be used for instructional purpose along side the teacher, text book and the chalk board. Agun and Imogie (1988) refer to Software Approach as the application of theories of learning and principles of learning to teaching and learning process. The process Approach involves; planning for details i.e.

task analysis, designing instruction effectively, providing statement of instructional objectives, programming of learning activities, use of relevant methods, reinforcing learning, motivating learning and use of well thought out strategies. Ingle sees educational technology as an integrated and systematic method of designing, planning, implementing and evaluating the total process of learning and teaching in terms of;

- Stating specific objectives
- Collating and use of research information on human learning and
- Close monitoring of the process of communication.

The pre – school and post school teachers should be thoroughly prepared to engage new innovations that would add new knowledge to what they are already familiar with. This will invariably lead to effective teaching and such is demand of the 21st century ICTs that revolutionises ways things should be done for the purpose of an improves instruction. The definition of information and communication technology is required at this stage for clear understanding.

Definition of ICT Education / ICTs

Curtin, 2002; Buridice & 2002; Tricaus 2003; Oguiagben and Iyamu 2005, have examined and define ICT in the context of their use as a set of activities facilitated by electronic means; including capturing, storage, processing, transmission and display of information. ICT is assumed to be a tool technology for handling information, use of multi-media, the internet, devices such as video camera and mobile telephone. Usually ICT is regarded as PC and laptop conceited to perform activities on the internet for accessing information and for the distribution of communicable materials.

The combined technology inherent potentials of computer telecommunication and electronic media uses digitisation that has revolutionaries’ the world. Its powerful force is rapidly changing how human live; because, diverse information through electronic devices is bombarding the senses of human mind; the sight (visual) the ear (added) and even the tactile sense organ.

Information and communication technology is also an extensional term for information technology (IT) it

encompasses the unique role of unified communication and integration of telecommunication (wireless signals and telephone lines) and super computers connected to the necessary software, middle wave storage and audio-visual systems. The line enable the user have access, store, transmit and operate information. It is also the convergence of telephone and audio – visual networks with computer networks via a single link.

Generally, ICT is an umbrella term that describe any communication device, including radio.

The numerous services and applications of the facilities and devices enable successful communication and distance learning centres that use video conferencing is an example. In the field of education, ICT is seen as a broad subject area that is continuously evolving in thought and in practice. It covers the products that will assist in retrieval, manipulation, transmission, receiving information electronically via digital television, email, robots and personal computers are inclusive.

The Origin of Information and Communication Technology (ICT)

Information and Communication Technology originated about 3000 years B.C. then it came up as a tool technology that was exploited for work efficiency. The innovation and design of Abacus quickly come to mind as it was then used for counting purposes and for minimal calculation work; it was used also in learning and for commercial ventures. Modern ICT is however traced to the 16th century (Greene, 2013) as postulated, this opinion lend credence to the inception, growth and effect of information technology and the industrial revolution. The activities of the industrial revolution included the use of technology for improving production process. Currently, institutions of higher learning haven realise the needs and its importance have cash in on the use of ICT for training Development and delivery in various ways, as well as for administrative purposes.

From the African perspective, the ‘Opon - Ifa’ has the distinction of being known as a source where information about spiritual and physical matters are sourced through incantations and sometimes by breaking ‘Cola-nuts.’ Thereafter, revelations regarding matters of importance as it may affect the

individual, a group of people and even the community is often revealed. Incidentally, in the Southwest region of Nigeria, His Excellency, Ogbeni Rauf Aregbesola, former Governor of the State of Osun had introduced the use of (Opon Imo) meaning, computer for learning in selected secondary schools. The intention was good but the end of the implementation was open to criticism. The young student users rather “explore” than utilise the device for pure education and learning strayed into the use for other purposes. Another reason adduced for the misuse of the Opon – Imo; is the omission of giving training to the in service teachers that are guide of the beneficiaries, these are the secondary school aged learners.

Information and Communication Technology concept

This refers to a set of technological tools and resources used for creating, dissemination, storage, manage information and essentially for communication purposes. The technologies include computers, internet and broadcasting technologies and television; these are regarded as (traditional). Put together, they form a network and the tools generate; process, store and retrieve, distribute as well as exchange information over and across the globe. ICT is a powerful tool for virtual participation in activities based enterprises, global market; political accountability promotions, improvement of delivery of basic services that could assist the provision of local developmental activities are made possible with ICT, (UNDP 2006)

Commitment of the Federal Government of Nigeria to Development of ICT

The first and second launching of the satellite in 2005 and 2007 were directed at bringing ICT to the reach of Nigerians. Though slow in growth because of the state of the Nigerian economy and her political state, the advent of the Global Mobile System that came up in year 2000 has fast track the development of ICT and the education on Nigerians. National policy on computer Education, 1988.

The observation assumed that this step also alerts the commitment of the Federal Ministry of Education (FME) on the need for entrenching ICT in Nigeria education system. The primary school computer education integration of ICT targets the rudimentary

skills of basic computer in order to facilitate learning; text writing computation and data entry. (NPE 2014). There is also the Federal Government input in the integrating ICT in the secondary schools education system.

Capacity building in secondary schools

At the junior secondary school level, computer was made prevocational elective but vocational elective in the senior secondary school level. At the tertiary education level (FRN 2001) re emphasized the need for ICT integration bearing in mind some gains to accomplish if adequately implemented. They are:

- Empowerment of youths with ICT skills for global competitiveness,
- Integrate ICT into the main stream of education and training
- Establish ICT multifaceted institutions as centres of excellence on ICT. With the commitment of the federal government to actualise the objectives at the secondary school level and back up with needed funds and facilities, the hopes are heightened for the growth of ICT in the economic sectors.

New teaching and learning modes are on the website and this has revolutionized education. With several applications that can be downloaded to make learning easy, several specialists all over the world now converge to discuss pertinent issues such that learning is no longer localize. The teachers' at all the levels of education need to key into utilizing the ICT technology tools for promoting personal growth as they learn the skills required for the 21st century teaching. The teaching and learning at the current information "magic age" could influence the usher as unimaginable experiences are made realistic for him and at a very great speed.

The education sector have seized the opportunity that ICT offer and are noticed to manage it to get the best for the services for human, material and socio economic development of Nigeria. Some of the selected supervised researches on ICT by graduate students are as presented.

Reviewed Selected Research in South Western Nigeria

In the South western region of Nigeria, the Centre's of Distance Learning have subscribed to kernel of e –

LCS of some other institutions, partly to facilitate collaboration in research and to fast track development.

Ugbome -Toun and Adeyanju, (2020) studied the pattern of adoption of ICT in selected institutions that run Centre for Distance Learning in Southwestern Nigeria and found that online and hybrid strategy are mostly appreciated and used.

Abimbade experimented with mathematics teaching among the secondary school students in Ibadan using ICT Tools. The result led to an improved performance of skill acquisition and as a result, led to the adoption of the tool for use for the West African Examination.

In another study, Abimbade (2011), investigated digitized multi – media approach for classroom instruction. The in - service teachers were target and were purposefully selected for the study. The verbal and non verbal recording of the sample respondent was played – back, transcribed and coded. Result showed low level of multi – media digitize knowledge. However, assessment of the in - service perception of teachers on multi – media digitized benefits was high and knowledge of hindrances ad factors mitigating its use for teaching were identified.

Odefunsho (2020) wrote a position paper on the integration of socio media use in secondary school for teaching. The paper espouses the benefits and challenges of social networking sites. The paper concluded on the need for policy that would guide the usage and acquisition of technical skills for its effective deployment, use and its integration in the schools curriculum.

Adeyanju, Ojo, & Alawiye, (2015) researched on instructional mobile technology packages to determine students' academic performance in introduction to computer science in colleges of education in Osun state and found that most of them are familiar with using mobile phones for learning.

Ogunlade & Amoron (2019) investigated the utilization of instructional technology and observed that sound qualification of the instructor influenced academic performance of students. The result found no relationship in utilization and academic performance. The authors recommended IT Centers in the technical colleges where experts would train teachers and students in Ekiti State.

Sofowora (2011) in a research paper on new trends in education highlights the implications for the teacher and learner. It is imperative to put in place the skill training needs of users of any new innovation; the facilities, its maintenance, adaptability from foreign to the new environment and attitudes as well as motivation are some of the challenges that technology would bring.

Aside the move made by the Osun State government to integrate ICT learning through the ‘Opon – Imo’ there were also efforts made to carry on teaching using a strategy known as ‘education on the wheel.’ The Southwest States made concerted efforts to teach using the radio to reach out to the secondary school students who were waiting for their various school examinations during the lockdown. Subject and topics in English Language, Science and Social Studies and Arts were on air.

From the point of view of Instructional Designers and Communication experts; on evaluation of the activities involved in planning and execution of the learning events, the dividend though considered low as it may have been did usher in a new approach to instruction delivery online.

Liu, Mary Ann (2002) and Aderounmu, (2001) in their different experiments on Intelligent Software agents concluded that mobile agent would perform several knowledge and labour / intensive tasks within a short time automatically to the advantage of the learner and instructors; reduce information workload provide adaptive support for learner, using e-learning software.

Akanbi’s (2020) study of the development of an intelligent multi – agent architecture for collaborative e – Learning courseware systems, developed an intelligent multi – agent mediation software architecture (MACA) for sharing learning objects among diverse courseware systems in selected institutions using Java agent development environment and Java Servlet Technology (JST).

The tool determined the collaboration costs, and time, bandwidth consumption costs and faults occurring in the node. The conclusion drawn was that multi – agent based mediating architecture performed better than the existing mediating architecture.

The policies on ICT are now enumerated.

Information and Communication Technology Policies

The National Policy on ICT recognises the needs for improved teaching, learning and practice. Arising from this, six statements were carved out and they address;

- Attainment of qualitative education,
- ICT procedure
- Destruction of record procedure
- Email and bulk messaging procedure
- Information classification procedure and
- Soft management procedure

There are three (3) new ICT Policies that were created as backup in October 2019; they address information and communication technology policy, Cyber Security Policy and Information Management Policy. In addition, Information Technology has also developed six procedures and a framework to support the six Policies. They are:

- ICT Cyber Security Exceptions Procedure
- Destruction of record procedure
- Email and bulk messaging procedure
- Information classification procedure and
- Soft management procedure
- Information Governance and Management Network.

(University of Queensland – <https://staff.uq.edu.au/information-and-services/information-technology/web-publishing/central-website>)

Jana Mel Polder, (2014) explained further the three nature of the Policies which are; restrictive, regulatory and facilitating policies. The author advanced that ICT best practices should be used in development; school policies should embrace ICT best practices, people using ICT and users need understanding about the local environment and they need also to use appropriate tools. As strategy, ICT use iterative project planning cycles, and the author further suggested that monitoring and evaluation should be built in from its inception. The option of the ICT policies presupposes that the listed guidelines suffice for a determined user for its success.

Trends in African Secondary Education Policy

Mary Burns (2020) comment on her experience of the development in the sub- Saharan (SSA) as observed, the develop countries of the world has continued to pump new ideas and infrastructures to the African settings, with the hope of raising standard of the

peoples economy. It is felt that whatever technology they deploy to Africa (SSA) is viewed as the end point. Contrary to this opinion, the author advances the trends of an improved situation in basic infrastructure and that the sub-Saharan region is acclaimed to be one of the fast growing technology compliance in the world.

As can be noticed, most activities are imbibing the strategy of online automated transactions, banking and commerce, administrative, teaching and self-learning, e-education and so on, etc. Research is on going pertaining to the effectiveness and efficient use of information technology. The satellites, VCRs, CD-ROMs, computers, telephone, very small aperture terminals (VSATs) Optical Faber and wireless; loops to some extent have revolutionizes ways by which tasks of work and communication are carried out with less strain in Africa, Nigerian institutions of higher learning are example.

Some Critical Challenges of Higher Institutions

Admissions into over 220 institutions of higher learning in Nigeria and the resultant effect of overbearing are partly due to the bottlenecks in admitting students into the higher institutions. There is poor human and material resources management; poor funding of the institutions, pressure from candidates that are eager for admission, management's oversight of the overstretched facilities; acute shortages of relevant academic and support staff and paucity of instructional materials to teach with, are just some of the added problems. Many are the problems of higher institutions but technology application is seen to solve the problems. Some of the areas of concerns are as discussed.

Registration for Courses

Right from year 2013, the examinations into the tertiary institutions has experience enhanced progress in terms of strategy adopted. Results of candidates in their hundreds of thousands were retrievable in less than 24 hours. At present, as soon as examinations are concluded, except for administrative evaluation, result is instantly delivered to the candidates.

Human and Material Management

The power of ICT applications has solved this challenge, virtually the procedures that would take an endless time to resolve is being done very fast online. Some universities in the Southwest have been able to

process transcripts online successfully. Human worries and time has thus been saved.

Teaching and Learning and submission of Assignments

In parts of the southwest Nigeria, the incursion of Covid-19 Pandemic and the determination of the faculty have imbibe the new culture of online teaching and learning. Assignments of large courses are now done with less stress. The use of relevant APPs is making it possible to accomplish things that could be a burden. However, in special cases, the hybrid of f2f combined with online has been in use. The Senates of Obafemi Awolowo University Ile Ife - Osun state, at one of her special meetings in April, 2021, gave approval for online teaching of students that exceed (250) two hundred and fifty student. This is a development that has increase the use of new technology.

Online Conferences and Workshops

Most universities in the southwest in the last two years float conferences, workshops and faculty meetings online. Certificate of participation does not require physical presence anymore and activities involved have been carried out successfully. The United Kingdom University that was established in 1969 happen to be the first educational institution in the world whose dedicated services has been directed at the development of Open and Distance Learning. The ICT technology in use has been radio, and television, but online programming is currently being used as supplement to the print media in use. (Adeyanju 2007; Cuban, 2006)

The Southwest region has advanced in utilising the gains of ICT just like some other regions have cashed in on the opportunity that opened up during the year 2020 lockdown in Nigeria. Some of the observed efforts that were made using ICT modes to keep learning and teaching on going despite the uncomfortable period and some backup researches are as presented.

Adeyanju, 2019, 2020, and 2021, cashing in on the covid-19 Pandemic lockdown, advance the need for the use of radio for instruction in the Obafemi Awolowo University campus at Ile - Ife in Osun State. The e-learning platform is considered to be very cheap to use per students costs of education; it was also easy to use. As usual, the threat of a machine taking over

the space and role of the teacher and the psychological effect of not physically meeting the students directly made the clarion call to attract meagre percent of lecturers that eventually used the radio online strategy for teaching. Traditionally, teachers will prefer doing their teaching the way they were taught. This is a challenge that the system can tackle creatively. Clips on the training process of how to teach from the broadcast radio and its procedural steps have been provided for interested distance learners and the enthusiastic university teachers; they are accessible from the OAU Great F.M.94.5 MHz station.

In the month of January and February 2021, the need for the university system to get back to her normal academic and administrative activities was proposed as the normal contact with the students and staff of the university was still being hampered for safety purpose. The partial lockdown and rules that were put in place by the federal government of Nigeria regarding contact was important. The university administration adopted creative a way of making sure that the academic session was completed. She requested the INTECU / Computer Science department to mount a workshop for all the lecturers, irrespective of their status. That was an interesting and intensive “coaching” exercise, which though tasking but productive. The trainings on the use of APPS suited the context and environment of that period. Gladly, students were reached online; the goal was met but as expected, there were constraints and complain from the students and the lecturers ends. As usual, the developing countries challenges also surfaced; (connectivity, access, data and overloads in some cases of the recipients with volumes of textual materials) by their lecturers. Interestingly, most students were happy getting back to school though online.

Incidentally, a large number of lecturers had before the innovative workshop trainings already acquire the technology and skills of reaching out to their students through the use of other APPS, like the Face book, the Google Classroom, Google Meet; YouTube and Tweeter and so on. It is remarkable to note that some of the Universities in the southwest still use the online approach to reach out to their numerous students for their academic engagement. However, hybrid

approach has taken over the strategy of teaching and learning especially at the tertiary level of education. There are some disadvantages in the integration of ICT in specific areas of subject teaching that should not be over looked.

Grey Areas in ICT Deployment

- ICT cannot be used to teach all the subject areas for instance in the medical field, practical operations and surgery are not easy.
- In the Agricultural discipline, Fine and Applied Arts, ceramic and sculpture; it is human knowledge and skills that show the finesse regarding the product output.
- There is gap in the classroom practice and assessment of learners in terms of management.
- It is noted that ICT is a tool as a result; it cannot totally replace the teacher where production expected.

Conclusion

The paper highlighted the concepts of technology, education and educational technology and Information and Communication Technology ICT and the policies. The assessment of its availability, utilisation and modes in South western Nigeria; its appreciation by the users and the commitment of the Federal Government of Nigeria that ensure that the in service teacher is abreast of the modern technology development. The few research reports from the South western region as documented are indications of growth in the ICT especially in the education industry.

Recommendations

The Policy statements on ICT integration across the tiers of the educational system are due for overhaul. Support of the federal, states and the Local government are required and private organisations should be encouraged to participate more actively in ensuring that school children are given the needed opportunity to learn with computers in schools. Teachers needs update training from time to time and they should be motivated; provision of personal computers and data for their teaching is appropriate.

References

- Abimbade A, (2011) ICT In The Classroom: Implication For E-Learning Naemt, 32 Interntional Conference Proceedings. Vol.3, 16-24

- Adeyanju, J.O., Ojo, O. A. & Alawiye, O. M. (2015). Effects of instructional mobile technology packages on students' academic performance in introduction to computer science in colleges of education in Osun state, Nigeria. *The African Symposium, 15 (2)*, 28-34.
- Adeyanju, J.O. (2020) Inaugural Lecture Series 352. From the Studio to Overcrowded Classrooms: The Use of Media Arts and Technology for Instructional Process Enhancement in Nigeria. Obafemi Awolowo University Press, Ile Ife - Nigeria
- Adeyanju, L.J., (2007) Radio Lectures in Ghana: An Innovation for the 21st Century Instructional Delivery. *Journal of School Educational Technology. Touch tone for Vitl an Viable Curriculum I- Managers India* Pp.18 – 22
- Adeyanju, L. J., (2021), Learning and Teaching in the 21st Century. The Role of Instructional Designer. Problems and Prospects (Eds. Adeyemi, B.A., Adeyanju, L.J, Aladejana F.O, Jegede P.O. Education in the 21st Century.Pp.44-60. Tetfund Education Trust Fund.
- Adeyanju, L.J.; Adelokun A, and Abidoye A. (2019) Effectiveness of ICT Usage and their Applications among the Students in the Colleges of Education in Ondo State. *JEMT, Volume 25: 1:1*, pp 1-13
- Adeyanju, L. J., Adelokun A, and Abidoye A. (2019) Secondary Schools Teachers Attitude and Utilisation of Information and Communication Technology, (ICT) in Ondo State - Nigeria. *Journal of Educational Media and Technology (JEMT) Vol. 25: Issue 1, No 1, Pp. 1-9.*
- Adeyanju L.J. (2020) eds. *Journal of Nigerian Association for Educational Media and Technology, JEMT, Vol.26:1:1, 2020. Vol.26:2:2020.*
- Adeyanju L.J., Kankam G, Ajibade Y., Adekomi B., Oyewusi L., Oyeniran M. (2009) Instructional Television Lecture Broadcast: An Innovation in a South Western Nigerian University. Proceedings of AICTTRA International Conference on Application of Information and Communication Technologies to Teaching, Research and Administration. (Eds). Adagunodo E.R., Adeyanju, J.O., Aderonmu G.A. pp 205-212.
- (AECT 2016) *Journal of Educational Media and Technology (JEMT) Vol. 22: No 2, Pp. 1.*
- Agun, I, and Imogie, A.,(1988) *Educational Media Management. Fundamental of Educational Technology. Y- Book Publishers Ibadan.*
- Cuban I. (2006) *Teacher and Machines: The Classroom use of Technology since 1920.*New York. Teachers' College Press.
- Curtin R, (2002) Promoting Youth Employment through ICT. Retrieved: http://www/ybiz.com/Abizweb/resourcecentreICTandYouthEmployment_RC.pdf
- Davis, N., (2000) International Contrasts of Information Technology in Teacher education; Multiple Perspective of Change. *Journal of International Technology for Teacher Education. 9(20 2000* Retrieved: 1st February, 2021. <http://www.triangle.co.uk>
- Dr. Hedayat Ahmed Ahmed (UNESCO PPOP, 1990)
- Efunwole G.O., and Adeyanju, L J (2017) Development and Validation of E-Workshop Instructional Package – An Intervention to Infrastructural Deficiencies in Nigerian Junior Secondary Schools Basic Science and Technology. *Journal of Educational Media and Technology (JEMT) Vol. 21, issue 1 No 1, Pp.*
- Federal Republic of Nigeria (2001) Nigerian National Policy for Information Technology (IT) (Electronic version). Retrieved January 20, 2014, from: <http://www.nitda.gov/docs/policy/ngitpolicy.pdf>
- Federal Republic of Nigeria (2004).*National Policy Education, 4th Edition.* NERC.
- Field, A. (2013). *Discovering statistics using IBM SPSS Statistics, (4th Edition).* London: Sage.
- Jana Mel Polder, (2014) University of Queensland – <https://staff.uq.edu.au/information-and-services/information-technology/web-publishing/central-website>

- National Policy on Education (FRN 1981) Federal Ministry of Education, Lagos.
- National Policy on Computer Education, (1988), Federal Ministry of Education, Lagos.
- Ogunlade B.A & Amoron, O.B. (2019) Development in Science and Technology: Challenges of ICT Integration in Technical Education as Sustainable Option for Teacher Education. *Journal of Educational Media and Technology*, Volume 25:1:1, Pp. 157 – 162.
- Omiunu, O.G., (2017) Pedagogical Modeling of the Negative Uses of ICT AND Implications among Secondary School Students in Oyo State Nigeria. *Library Philosophy and Practice*. (e journal) 1485.
- Pullen, D., Swabey, K., Abadooz, M., & Sing, T. K. R. (2015). Pre-Service Teachers' Acceptance and use of Mobile Learning in Malaysia. *Australian Educational Computing*, 30(1).
- Sofowora, A., (2011) New Trends in Education and their Implications. *International Journal*. Vol .3. Issue 3(1) 54-59
- Trucano, M., Liu, J. & Iglesias, C. J. (2012). Surveying Mobile Learning around the World (part one). Retrieved from <http://blogs.worldbank.org/edutech>
- Ugbome -Toun G, and Adeyanju, Lade Joel (2020) Perception of Distance Learning Student's Online Instructional Delivery Modes on Ease of Use and its Adequacy Among South Western Nigerian Universities. *Journal of Educational Media and Technology (JEMT)* Vol. 26, No 2, Pp.221-228.
- UNDP (2006) Information Communication Technology for Development Pp. 1-7. Retrieved from <http://.unl.edu/# one>
- University of Queensland – <https://staff.uq.ed.au/information-and-services/information-technology/web-publishing/central-website>
- Whitish W. A, & Schuler, C.F, (1973) *Instructional Technology, Its Nature and Use*. FIFTH Edition, Harper and Row Publishers.