# Implementation of Information Communication Technology in the Teaching/Learning Process for Sustainable Development of Adults in West Africa Sub Sahara Region

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**Abstract**
This study examines the implementation of information technology in the teaching/learning process for sustainable development of adults in West Africa Sub Sahara Region (WASSR). Three research questions and two hypotheses guided the study. The population for the study was 3071 participants and instructors drawn from 10 education centres that were selected for the study. The sample for the study was made up of 823 participants and 30 instructors that were selected. Simple random sampling technique was used in drawing the sample for the study. Questionnaires were administered to the 853 sample population in countries that make up the region. The result indicates that it is necessary to implement information communication technology in the teaching/learning process for the benefits of sustainable development for adults. The following major findings emerged: The participants believe that information technology will make them independent in their studies. The educators are of the opinion that information technology can expand the community of learners to include virtually anyone who wishes to obtain information and who is not excluded by policy or cost. The major recommendations: that government through the schools should initiate effective programmes to create mass awareness by educating the participants about the benefits of computer literacy in this 21st century. The schools should offer face-to-face workshops; self-placed learning modules and online courses that assist with the development of the essential skills. Formulating approaches to the use of information and communication technology and incorporating it into the curriculum of formal and non-formal education of adults and other learners with exceptionalities for sustainable development.
**Keywords:** Information Communication Technology, Teaching/Learning Process, Sustainable Development.

## 1.   INTRODUCTION

In the last few decades, we have witnessed one of the most important events in human history thus far-the digital and web revolution brought about through information and communication Technologies (ICTs). Information and Communication Technology is not only changing the way that we work, study, play, and conduct our lives, but it is doing so much more quickly than any other revolution (such as the Industrial Revolution), with impacts that are far more reaching. It is possible that all we have seen is the tip of the iceberg of ICTs. The ICT revolution has facilitated development in all areas of human life. Computerized systems in general and web based systems in particular can be found today in even the smallest businesses. It is also impossible to run a competitive business without a computerized information system.Indeed, global competitive pressures and continuous innovations are forcing many organizations to rethink how they do business. To do so required the ability to successfully incorporate electronic commerce, knowledge management, customer relationship management, and mobile computing into an organization (Ugwuegbu, 2003).

Education recognizes ICT as a powerful weapon that can effectively accelerate development initiative and make them sustainable in many ways. It is for this reason, that higher institutions of learning have been mandated to facilitate and fast-track human capacity building through the use of ICT (FRN, 2004).

Everywhere in the world, the rave of the moment is information and communication technology (ICT). It is used in research, teaching/learning, economic transactions, and in the processing and disseminating of information. Knowledge of this development is therefore a sine qua non for effective teaching/learning and also for sustainable development.

Therefore, there is a need for people, especially the adult learners and facilitators to maintain and improve their quality of life, adapt to changes, have a better living, acquire skills and knowledge and achieve sustainable development for the nation. The National Policy for Information Technology (Federal Republic of Nigeria, 2001), stipulated the integration of ICT in all levels of educational institution in Nigeria. It is therefore incumbent on universities to play a leading role in ensuring that ICT is embraced for the purpose of enhancing the performance of teaching, learning and research. In support, Lopez (2003) observed that information and communication technology have provided innovative opportunities for teaching/learning as well as enhancing the performance of facilitators and learners and they have engendered advances in research especially about how people learn thereby brining about rethinking the structure of education for sustainable development. Information and communication technology employs independent judgment in decision-making with the help of creating an enabling environment that may bring about desirable changes in behavior for sustainable

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development (Onuma, 2007).

Currently, information communication technology is the foremost method of improving the teaching/learning process in order to have sustainable development. Haag (1998) defined Information communication Technology "as a set of tools that can help provide the right people with the right information at the right time". In education, ICT tools comprise electronic devices which are utilized for information and communication needs of institutions, organization, staff and individuals. These devices include, computer (hard and soft ware) networking, telephone, video, multimedia and internet. (Onuma, 2007).

According to United Nations Organization (2001), sustainable development is the development that meets the needs of the present without compromising that ability of the future generation to meet their own needs. Sustainable development implies economic growth together with the protection of environmental quality, each re-enforcing the other.

Information Communication Technology has changed the scenario of education, making the teaching/learning process more productive, creating collaborative, learner-centered and interactive global learning environments This function in the 21st century may enhance participation in an information rich society, where knowledge is regarded as a Herculean task as one had to travel far and wide to develop this information. Information rich societies are developed and dominating and they are controlling the information throughout the world. Information encompasses and relies on the use of different channels of communication presently called Information and Communication Technologies (ICTs) and would be incorporating better theories in the methods of the teaching/learning process to cope with such emerging situations (Hussian, 2005). Therefore, Information Technologies are assumed to play a constructive role in making the teaching/learning processes more productive through collaboration in an information rich society. Hence the researchers' interest on implementation of information technology and teaching/ learning process for sustainable development of adults in West Africa sub-Sahara region

## 1.2 Statement of Problem

Observation has shown that many learners and facilitators in sub Sahara Africa do not seem to appreciate the importance and roles of ICT in teaching and learning. Some facilitators seem to show a lukewarm attitude towards the use of modern technology.

Education in Africa continuously needs new systems as provided through ICT to make education more functional and productive in terms of teaching and learning. But despite the benefit derivable from ICT, it is not clearly known whether ICT facilities are available in teaching/learning environments, if they are, the extent to which they are utilized are not also known. Applying ICT will enhance teaching and learning, reduce occupational stress and improve learners' academic performances.  These are the major issue this study is trying to address. In this 21st century, higher education globally rely more on information communication technologies (ICTs) to enhance educational performance. Therefore, the facilitators and learners in West Africa sub Sahara cannot be left behind. It is based on this premise that the researchers investigated the implementation of information technology and teaching / learning process for sustainable development of adults in West Africa sub-Sahara region.

## 1.3 Purpose of the Study

The general purpose of the study was to examine the effect of the implementation of Information communication Technology on the teaching/learning process for sustainable development of Adults in West Africa Sub Sahara Region (WASSR)

## 1.4 Research Questions

1.  What are the roles of Information Communication Technology in the teaching/learning process of sustainable development for Adults in West Africa Sub Sahara Region (WASSR)?
2.  What are the challenges that inhibit Information Technology in the teaching/learning process for sustainable development of adults in West Africa Sub Sahara Region (WASSR)?
3.  What are the solutions to the challenges of Information Technology and the teaching/learning process of sustainable development of adults in West Africa Sub Sahara Region (WASSR)?

## 1.5 Hypotheses

1.  There were no significant differences between the mean ratings of facilitators and adult learners on the challenges of ICT in teaching/learning in WASSR.
2.   There were no significant differences between the mean ratings of facilitators and adult learners on the solutions to the challenges of ICT in teaching and learning in West Africa sub Sahara.

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## 2.0 Methodology

The study adopted a descriptive survey research design. It seeks to ascertain the implementation of information communication technology in the teaching/learning process for sustainable development of adults in West Africa sub-Sahara region (WASSR).

According to Ali (2006) a descriptive survey design uses the sampled data in an investigation to document, describe and explain what is in existence or non existence or present status of existence of the phenomena being investigated. Therefore, the descriptive survey research design was appropriate for this study because it seeks to investigate, document, describe and explain what is in existence or non-existence or present status of its existence of the phenomena being investigated.

The research study covered countries in West Africa Sub Sahara Region (WASSR). The population of the study was 3,071 adult learners (participants) and adult educators (instructors) on Information communication Technology and the teaching/learning process for sustainable development of Adults in West Africa Sub Sahara Region (WASSR)

The researchers used about thirty percent (30%) of the total number of participants in five selected programmes which gives 823 participants. The entire 30 instructors were used because of their manageable number, resulting to a total number of 853 sample items. Simple random sampling technique was used in drawing the sample.

The instrument used for data collection was a structured questionnaire, which was design by the researchers. The questionnaire was organized on a 4-point rating scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). There are two parts in the instrument. Part A sought to collect personal data on the respondents, for example, the sex of the respondents etc. Part B which has 13 items was arranged in three clusters to elicit information from participants and instructors other knowledge about information communication technology in teaching and learning.

Copies of the questionnaires were presented first to other colleagues and to experts in educational research for scrutiny and vetting.

The instrument was further subjected to trial testing using participants and instructors who are involved in Information Communication Technology and teaching/learning process for sustainable development of Adults in West Africa Sub Sahara Region (WASSR), but was not used in the study. Their responses were collated and analyzed to determine the reliability of the instrument. Internal consistency reliability was estimated using Cronbach Alpha method for section A, B and C were computed. The co-efficient were 0.81 for section A. 0.83 for section B, 0.82 for section C and 0.82 for overall instrument.

The researchers administered 853 copies of the questionnaire to the respondents. At the end of the administration, all the 853 copies of the instrument were collected representing 100% return rate.

The researchers used the mean score in analyzing the data collected. The cut-off point for accepting an item is 2.50. Any item from 2.50 and above represents agreed, while mean score of an item below 2.50 indicates disagreement with the item. The hypotheses were tested using t-test analysis at 0.05 level of significance.

## 3.0 Results

**Table 1:** What are the roles of Information Technology in teaching/learning processes for sustainable development of Adults in West Africa Sub Sahara Region (WASSR)?

Mean Ratings ($\bar{x}$) and the standard deviation (SD) of the roles of Information Technology in the teaching/learning processes of sustainable development for Adults in West Africa Sub Sahara Region (WASSR)

| S/N | Questionnaire items | $\bar{x}$ | S | Decision |
|-----|---------------------|-----------|-----|----------|
| 1. | Information Technology helps provide easier learning for adults. | 2.86 | 1.16 | Agree |
| 2. | The Integration of ICT in training of participants would help achieve the objective of sustainable development. | 3.14 | 1.11 | Agree |
| 3. | Utilization of ICT for communication | 2.71 | 1.02 | Agree |
| 4. | Utilization of ICT for networking | 2.97 | 0.96 | Agree |

**TABLE 1** represents the mean ratings of the respondents on information communication technology and the teaching/learning process for sustainable development for adults. The four items are rated above the cut-off point of 2.50 on the four point rating scale. Items 1, 2, 3 and 4 have corresponding mean scores of 2.86, 3.14, 2.71and 2.97 with standard deviation of 1.16, 1.11, 1.02 and 0.96 respectively by the respondents. This implies that Information Technology helps provide easier learning for adults and the Integration of ICT in training of participants would help achieve the objectives of sustainable development.

**Table 2:** What are the challenges that inhibit Information Technology in the teaching/learning process for sustainable development of adults in West Africa Sub Sahara Region (WASSR)?

Mean Ratings ($\bar{x}$) and the standard deviation (SD) of the challenges of Information Technology and the teaching/learning process in sustainable development for Adults in West Africa Sub Sahara Region (WASSR)

| S/N | Questionnaire items | $\bar{x}$ | S | Decision |
|-----|--------------------|-----------|------|----------|
| 5. | Poor power supply | 3.19 | 1.12 | Agree |
| 6. | Capital intensiveness of ICT facilities | 2.99 | 1.11 | Agree |
| 7. | Poor staff development on ICT | 3.33 | 1.01 | Agree |
| 8. | Lack of ICT facilities in the teaching/learning centres | 2.82 | 0.95 | Agree |

**TABLE 2** represents the mean ratings of the respondents on challenges of information communication technology and the teaching/learning process for sustainable development of adults. The four items are rated above the cut-off point of 2.50 on the four point rating scale. Items 5, 6, 7 and 8 have the corresponding mean scores of 3.19, 2.99, 3.33 and 2.82 with standard deviation of 1.12, 1.11, 1.01 and 0.95 respectively.

**Research Question 3.** What are the solutions to the challenges of Information Technology and the teaching/learning process of sustainable development of adults in West Africa Sub Sahara Region (WASSR)?

**Table 3:** Mean Ratings ($\bar{x}$) and the Standard Deviation (SD) on the solution to the challenges of Information Technology and the teaching/learning process of sustainable development of adults in West Africa Sub Sahara Region (WASSR)?

| S/N | Questionnaire items | $\bar{x}$ | S | Decision |
|-----|--------------------|-----------|------|----------|
| 9. | Training of staff in the use of ICT | 2.53 | 1.01 | Agree |
| 10. | Adequate funding | 2.55 | 1.03 | Agree |
| 11. | Regular maintenance of ICT facilities | 2.73 | 0.97 | Agree |
| 12. | Regular power supply | 2.95 | 0.89 | Agree |
| 13. | Availability of ICT experts | 2.75 | 0.99 | Agree |

Table 3 presents the mean ratings of the respondents on the solutions to the challenges of information communication technology on the teaching/learning process for sustainable development of adults in WASSR. The five items are rated above the cut-off point of 2.50 on the four point rating scale. Items 9, 10, 11, 12 and 13 have the corresponding mean scores of 2.53, 2.55, 2.73, 2.95 and 2.75 with standard deviation of 1.01, 1.03, 0.97, 0.89 and 0.99 respectively.

**Hypothesis One**: There is no significant difference between the mean ratings of facilitators and learners on the challenges of ICT in teaching/learning in WASSR.

**Table 4**: t-test analysis of facilitators and adult learners on the challenges of ICT in teaching/learning in WASSR.

| Group | N | X | SD | t-Cal | t-critical Value | Level of Sign | Decision |
|-------|-----|------|------|-------|------------------|---------------|----------|
| Facilitators | 30 | 3.1 | 1.04 | 1.17 | 1.96 | 0.05 | 853 Accept |
| Learners | 823 | 3.41 | | | | | |
| | 853 | | | | | | |
| Total | | | | | | | |

**TABLE 4:** Presents the t-test statistics of the difference between the mean ratings of facilitators and adult learners on the challenges of ICT in teaching/learning in WASSR. The t-calculated value is 1.17 at 853 degree of freedom (df) and 0.05 level of significance. Since the calculated value 1.17 is less than the table value of 1.96, the first null hypothesis of this study is accepted. It can therefore be concluded that there is no significant difference in mean ratings of facilitators and learners on the challenges of ICT in teaching/learning in WASSR.

**Hypothesis Two:** There is no significant different between the mean rating of facilitators and adult learners on the solutions to the challenges of ICT in teaching and learning in West Africa sub Sahara.

**TABLE 5**: t-test analysis of facilitators and learners between the mean rating of facilitators and adult learners on the solutions to the challenges of ICT in teaching and learning in West Africa sub Sahara.

| Group | N | X | SD | t-cal | t-critical Value | Level of Sign | Decision |
|-------|-----|------|-------|-------|------------------|---------------|----------|
| Facilitators | 30 | 3.4 | 0.592 | 0.57 | 1.96 | 0.05 | 853 Accepted |
| Learners | 823 | 3.72 | | | | | |
| | 853 | | | | | | |
| Total | | | | | | | |

**TABLE 5:** Presents the t-test statistics of the difference between the mean rating of facilitators and adult learners on the solutions to the challenges of ICT in teaching and learning in West Africa sub Sahara.

The t-calculated value is 0.57 at 853 degree of freedom (df) and 0.05 level of significance. Since the calculated value 0.57 is less than the table value of 1.96, t second null hypothesis of this study is accepted. It could therefore be concluded that there is no significant difference in mean rating of facilitators and adult learners on the solutions to the challenges of ICT in teaching and learning in West Africa sub Sahara.

## 4.0 Discussion of Findings

The result of table one indicates that Information Communication Technology can enhance teaching and learning for sustainable development. The findings are in line with the submission of Ozoji (2003) who asserted that Information and communication technology (ICT) in education has become imperative in the present realities of global socio-economic development. The world today is knowledge driven and information age has held sway in virtually every human endeavor. ICT has become a veritable tool not only in education, but also in economic and industrial organizations. In support, Lopez (2003) observed that information and communication technology have provided innovative opportunities for teaching/learning as well as enhancing the performance of facilitators and learners and they have engendered advances in research especially about how people learn thereby brining about rethinking the structure of education for sustainable development. Supporting these also, Branson (2001) stated that with adequate Information Communication Technology, students with mild learning disabilities learn not only by the teacher but they also learn along with the teacher and by interacting with one another. Indeed, diverse students can learn much via ICT for sustainable development.

The Findings of the study also revealed that there are challenges of ICT in teaching and learning situation in WASSR. The respondents agreed on the challenges in the utilization of ICT facilities which include poor power supply, capital intensiveness of ICT facilities amongst others in the teaching and learning situation. The findings is in line with Menon (2000), who said that one of the challenges facing the use of ICT in Africa today is how to provide, increase effective and sustainable information services. Supporting this view Ugwuegbu (2004) admitted that reduction in funding of Universities is a global phenomenon. It can be said that Universities in WASSR have been hugely affected by this trend and the most visible action to reduce funding for Universities is that most of them no longer acquire new ICT equipments or pay for ICT subscription. Therefore, the challenges in the use of ICT facilities depend on adequate funding for software's, hardware maintenance, acquisition and upgrading.

The respondents also agreed on the ways ICT can enhance their performances which include adequate funding, training of staff in the use of ICT, regular maintenances of the ICT facilities amongst others. Supporting this view Ogbaji (2004), asserted that fund should be provided for ICT related programmes to be effectively managed for the procurements of ICT facilities for the provision of the services to enhance teaching and learning.

## 5.0 Recommendations

The following recommendations were made based on the findings of this research:

1. WASSR must muster the will power to upgrade ICT facilities for teaching and learning in their Institutions. This will help improve ICT for capacity building in the institution and make them comparable to other learning centres and institutions of the world.
2. Though the findings revealed that there are prospects available for capacity building through ICT the government and the institutions of higher learning need to implement the existing prospects to its letters. This will help fast-track the use of ICT for capacity building among institutions of learning.
3. The funding agencies of ICT development such as the Government, NGOs and International organizations may need to monitor the release of fund to ensure that they are used for the purpose they are meant for. Perhaps it might be necessary to establish a regulatory and monitoring agency for all Institutions with ICT facilities.
4. There is equally the need for government or the relevant ministries to streamline ICT packages and programmes in all higher institution of learning. This will create room for uniformity in the programmes offered.
5. Emergence of the notions of the 'Knowledge Economy' and the learning society should be considered.
6. ICT should be incorporated in the philosophy of education and training with institutions of all kinds of formal and informal, traditional and alternative public and private having new roles and responsibilities for learning.
7. Need for curriculum reform emphasizing student-centered, teacher guided learning in ICT.
8. Community involvement; promotion of a sense of civic responsibility, providing leadership opportunities for community members.
9. There should be need for introduction of Information and Communication Technology in schools.

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