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nrdajpapers@gmail.com

Information and Communication Technology: A Veritable Instrument for Distance Education

Owuamanam Catherine Nkechinyere (Ph.D)
School of Education, National Institute for Nigerian Languages, Aba

Abstract: *The problem of demand for education versus actual supply of educational services contributed to the acceptance, growth and implementation of distance education programmes as it bridges the gap between demand and supply. In view of the above, this paper examines the role of Information and Communication Technologies (ICTs) in Distance education. It examines the concepts of Distance education, Information and Communication Technology, Technology-based media for Distance education and factors that need to be put into consideration before utilizing ICTs for instruction.*

Key words: Distance education, Information and Communication Technology, Technological-based media

Introduction

Education is very relevant for the development of an individual and as a weapon against ignorance, conflict, disease and poverty. It demands organized information processing systems which will help to coordinate and transform vital ideas, emotions and feelings into life supporting operations (FME, 2007). Education is the basic need of every human being and today's technology has a big part in every sphere of life (Bates, 1995).

Distance education is a set of practices to plan and implement educational activities when there is a separation between teaching and learning. That separation may result from distance, time or other barriers (Mujibul, 2008). According to Barron (1999a), distance education is "a form of education in which students are remote from the distance education institution. The instructors and the students are not in the time or space for a significant portion of their learning".

Similarly, Garrison (as cited in Timothy, 2018) proposed three criteria that would define the field: First, distance education implies that the majority of educational communication between teachers and students occurs non-contiguously. Secondly, distance education involve two way communications between teachers and students for the purpose of facilitating and supporting the educational process and thirdly, distance education uses technology to mediate the necessary two- way communication.

Distance education offers a way to overcome this separation, chiefly through its learning materials and the use of ICTs to provide tutoring, linking learners to the system and each other, use of feedback and student support systems (Mujibul, 2008). ICTs are the acquisition,

processing, storage and dissemination of vocal, practical, textual and numeric information by a micro-electronic based combination of computing and telecommunication. In the words of Iwu (2006), ICTs is:

> *an umbrella term that includes any communication devices or application, encompassing radio, televisions, cellular phones, computer networks, hard ware, soft ware, electronic mail, facsimile, satellite system as well as the various services and applications associated with them. This includes but not limited to videoconferencing, internet technologies, audio conferencing and multimedia utilization.*

The application of new technologies in the distance education context provides appropriate starting point for delineating the knowledge base required of expert teachers in today's global society. Teaching the distance learners requires different skills to prepare relevant learning materials to facilitate the construction of knowledge and learning. Technology –mediated instruction uses ICTs to mediate the learning experience and interactions without requiring that learners and instructors to be located together (Graham and Dziuban, 2006).

Distance education may utilize any/or a combination of the following four technologies: Printed materials, Audio/voice technologies, Video technologies and Computer technologies. This also fall into four instructional uses such as tools for retrieving information, tools for communication, tools for electronic/multimedia production and presentation, integrated mixture of tools that support text and so on (Mujibul, 2008). ICTs however, have provided avenue for enriching the quality and quantity of instructional content offered through distance education. It has also provided avenue for facilitating interaction between the teachers and group of students or among students.

In utilizing ICTs for instructional delivery and other purposes, a number of factors need to be put into consideration. These factors include: affordability, availability, access and the unique pedagogical characteristics of the particular technological application, instructional objectives, financial resources available at the institution and student personal resources (Victoria, 2002). In view of the above facts, this paper examines the role of ICTs in distance education.

Distance Education

Education is the process of developing knowledge ability in learners in such a way that knowledge is utilized to improve themselves and their society (FME, 2007). Education familiarizes individual members with the physical features of the society together with its cultural patterns and practices as well as the effect of these on the individual's behaviour and competence. While enabling him to constantly bear in mind the social realities, education also constantly makes him have a mental picture of a hoped for physical and social arrangements that would produce the congenial environment for development (Onwuka, 1996).

The word "distance" in itself denotes separation or isolation. Distance education

therefore, is defined as a form of education and training delivered in which students are remote from the distance education institution. The instructors and the students are not in the same location. Learners are separated from instructional base or teachers either in time or space for a significant portion of their learning (Barron, 1999a). According to Mujibul (2008, p. 1), distance education "is any type of education that occurs, while location, time or both separate the participants". In distance learning, the teacher, through the use of technology, delivers instruction to a student at a separate location. The teacher then receives feedback, either immediately or delayed from the student.

Distance education is a method of education in which the learner is physically separated from the teacher and the institution sponsoring the instruction (Mielke, 2003). According to him, in any distance education process, there must be a teacher, one or more students and a course of curriculum that the teacher is capable of teaching and the student is trying to learn. The contact between teacher and learner requires that the student be taught, assessed, given guidance and where appropriate prepared for examination that may or may not be conducted by the institution. This must be accomplished by two-way communication. Where distance teaching materials are provided to learners, they are structured in ways that facilitate learning at a distance.

According to United States Distance Learning Association (as cited in Andrianes, 2013), "distance education is any mediated instruction that occurs at a distance-regardless of the technology involved". So, although you probably imagine online degrees that involve using websites, e-mail and video casts, corresponding through regular mail or taking over the phone are methods that also technically qualify. Buttressing, they state that in practical terms, most of what constitutes distance learning today is done by using electronic means. Teaching programmes utilize not only computer but satellites, video phones, interactive graphics, response terminals and more. It is also something that occurs in a wide variety of field and locations reaching well beyond k-12 and college campuses to include corporate, government and military training, telemedicine and anyone interested in lifelong learning.

Distance learning is especially important for those who lived in rural or otherwise underserved communities as well as individuals whose own physical and mental limitations impair their ability to attend traditional educational settings. Key players in distance education typically include students, faculty, facilitators, support staff and administration, each of whom have very different roles. The success of any distance education effort depends primarily on its faculty (Andrianes, 2013).

Distance education is planned learning that normally occurs in a different place from teaching necessitating special techniques of course design, instruction , special method of communication by electronic, other media, special organization and administrative arrangements. In the same vein, Keegan (1995) says that distance education and training result from the technological separation of teacher and learner which frees the student from necessity of traveling to a fixed place at a fixed time to meet a fixed person in order to be trained.

Similarly, Moore (1989) defines distance education as "the separation between learner and teacher such that the communication between the two necessary in the educational

transition is transmitted through print, broadcasting, telecommunications, mail, audio and video recording, computers, various combinations and variation of these". Filipezak (as cited in Timothy, 2018) also defines distance education as:

> *an event or a process that involves direct two-way communication between people; it does not include traditional correspondence courses or the Computer-Based Technology (CBT) software you get in the mail. It does include audio-conferencing, video-conferencing and docu-conferencing a relative new comer to the distance learning arena that allows many people to collaborate on a shared document via computers separated by a few feet or several time zones.*

Distance education must involve a teacher, students, materials and a contract that defines roles between teacher, students and the institution. Distance education can involve face- to-face (video in real time) or independent instruction; the student is given guidance and access to instruction in a two way communication; learner are separated from the sponsoring institution; materials can take several forms-not necessarily designed exclusively for distance education-the requirement is that they be suitable for the learning event (Rumble, 1989).

Furthermore, Keegan (1996, p. 50) gives a more precise definition characterized by the following:

- The quasi-permanent separation of teacher and learner throughout the length of the learning process (this distinguishes it from conventional face to –face education;
- The influence of an educational organization both in the planning and preparation of learning materials and in the provision of student support services (this distinguishes it from private study and teach-yourself programmes);
- The use of technical media-print, audio, video or computer to unite teacher and learner and carry the content of the course;
- The provision of two-way communication so that the student may benefit from or even initiate dialogue (this distinguishes it from other uses of technology in education);
- The quasi-permanent absence of the learning groups throughout the length of the learning process so that people are usually taught as individuals rather than in groups with the possibility of occasional meetings, either face-to-face or by electronic means for both didactic and socialization purposes.

Implicit in this definition is the assumption of teacher-learner separation but not permanent; the assumption of individual learning and autonomy but not exclusively and the use of technology but not exclusively with increasing variety and more often than not, interactive. Distance education may include contact, no contact and part time learning (FRN, 2004).

Distance education offers unique opportunities for: life-long learning to working adults; out of school programme for children and youth who are unable to attend ordinary school as a result of disability, illness or remote location, educational opportunities for nomadic and itinerant groups and pre-service teachers' preparation and in-service development, among others (UNESCO, 2002). Models of distance education include: distance learning, open studies, remote instruction, correspondence study, home study, extension education, independent study, teaching at a distance, off-campus study, open learning, flexible learning, continuous education and distributed learning (Timothy, 2018).

Common characteristics of distance education variously defined are:

- The majority of communication is noncontiguous,
- There is two-way communication between teachers and students,
- Education is usually technologically mediated,
- The patterns of institutional control over the learner are changed,
- Reflection is at the heart of the process,
- Self-assessment of personal or professional development is expected,
- Learners, in varying degrees, have a stake in the planning of their programmes and the nature of the learning experiences undertaken (Barron, 1999a, Butcher, 2003 and Keegan, 1996).

Distance education has several benefits which include:

- It is convenient for both students and instructors,
- Flexible and thus provided students option to participate in education on an individual bases,
- It is as effective as traditional instruction when appropriate methods and technologies are used,
- It is a cheaper form of education,
- The use of multisensory media provides for optimal combination of media and interaction,
- It offers increased opportunities for increase interaction with students,
- It ensures equity in educational opportunity,
- It fosters the development of higher order thinking, and
- It encourages the development of skills for lifelong learning (Barron, 1999a, Keegan, 1996 and Timothy, 2018).

Information and Communication Technologies (ICTs)

Technology has remained the most outstanding human invention. The impact of technology in all aspects of human endeavour has been widespread and felt. Thus, technological breakthrough in communication, education, information technology and other human endeavours, to mention have been observed. The term "information and communication technologies" will be better understood if the words are explained fully.

According to Wendy (1992, p. 18), information "is knowledge derived from data. Data in turn is recorded as facts or figures". Buttressing Wendy (1992), identifies four qualities of good information thus:

- Information must be pertinent: The information statements must relate to the business at hand and to the matters that are important to the person who has requested the information. Information should help the person deal in some way, with the issues in his or her world.
- Information must be timely: It must be available when needed.
- Information must be accurate.
- Information must reduce uncertainty: In short, good information involves differences that make a difference.

Technology on the other hand is man's answer to a great deal of his cosmic and environmental limitations. According to Okafor (1988, p. 2), technology connote "the practical arts ranging from hunting to animal husbandry, from agriculture, transportation and communication mechanism to production of military hardware". Technology, he continues, has brought the use of aspirin, penicillin, automobiles, airplanes, telephones, radio, television, printing machines, computers and calculators, while science has uncovered the regularities of magnetism and electricity, valence and quantum theory.

When information and technology are combined together we have "information technology". Information technology is a set of tools for working with information and the process of improving knowledge by acquiring information (Stephen, Maeve & Donald cited in Adiele, 2005). Supporting the above idea Adiele (2005) states that information technology is the acquisition, processing, storing and dissemination of vocal, pictorial, textual and numeric information by a micro-electronic based combination of computers and telecommunication. UNESCO (as cited in Osuagwu, 2004) sees information technology "as the scientific technological and engineering uses in information handling, processing and their application; computers and their interaction with man and machines; associated socio-economic and cultural matters".

Communication as a concept has its origin from a Latin word "Communicare" which means to share or to establish commonness. According to Daramola (2005, p. 157), communication can be seen as "the transfer of a message to another party so that it can be understood and acted upon". Murphy (as cited in Daramola, 2005) captures the importance of communication when in an introductory note to students in his book he writes:

> *Communication is the essence of humanity. Through communication individuals bridge their island of loneliness and through communication societies are formed. The ability to communicate is essential both to individual success and to group activity. Communication is such a basic and crucial feature of human life, it is important that we understand precisely what it is. This term has been defined in a variety of ways over the years, but*

> *implicit in every definition has been a recognition that communication rests upon the ability of the source to encode a message and pass it through a channel (air, sound or intermediate transmitter) to a receiver or a given destination.*

When information technology is combined with communication the result is an integrated package of data gathered, organized, processed, stored, retrieved and made available to users. The fusion of information technology and communication gave rise to "Information Communication Technology" (ICT). According to Adamu (2006, p. 8), ICTs are "a diverse set of technological tools and resources used to communicate, to create, disseminate, store and manage information". Explaining further, he states that ICTs are generally relate to those technologies that are used for accessing, gathering, manipulating and presenting or communicating information. The technologies could include hard ware (e.g. computers and other devices), soft ware applications and connectivity (e.g. access to the internet, local networking infrastructure and video conferencing). What is most significant about ICTs is the increasing convergence of computer-based, multi-media and communications technologies and the rapid rate of change that characterizes both the technologies and their use.

Similarly, ICTs are the acquisition, processing, storage and dissemination of vocal, practical, textual and numeric information by a micro-electronic based combination of computer and telecommunication. ICTs are the use of computer-based information systems and communication systems to process, store and transmit data. It is also a way to describe exciting and innovative ways to provide lifelong learners with global access to information, learning and support. It is an umbrella term that includes any communication devices or application, encompassing radio, televisions, cellular phones, computer networks, hard ware, soft ware, electronic mail, facsimile, satellite system as well as the various services and applications associated with them. This includes but not limited to video conferencing, internet technologies, audio conferencing and multimedia utilization (Iwu, 2006).

Furthermore, ICTs are the combination of the potentials of computer, telecommunication and electronic media using the digital technology. ICTs have the potential for not only introducing new teaching and learning practices but also for acting as a catalyst to revolutionize the education system. It can empower teachers, learners and promote the growth of skills necessary for the 21st century workplace (UNESCO, 2005a). In line with the above, ICTs are often spoken of in particular context, such as ICTs in education, healthcare, military or in management.

Hence in education, recent advances in ICTs allow for the delivery of individually customized information and instruction to mass audiences simultaneously. This mass individualization has been increasingly popular and important in education and training communities (Van-Merrienboer, 2005). For example, the development of computer technology has provided a powerful tool for developing and implementing sophisticated instructional systems generating individual tailored instructional proscription (Debra, Santic and Brusilovsky, 2003).

Examples of ICTs in Distance Education

Distance education is a set of practice to plan and implement educational activities when there is a separation between teaching and learning. This separation may result from distance, time or other barriers. Distance education offers a way to overcome this separation, chiefly through its learning materials, the use of ICTs to provide tutoring, linking learners to the system and each other and the use of feedback and student support systems (Mujibul, 2008).

The ICTs used in distance education systems include mail, telephone, face-to-face sessions, radio, television, audio and video cassettes, compact disks, e-mail, other computer connections and tele-conferencing systems (Mujibul, 2008). This can be grouped into the following four technologies:

- Print materials,
- Audio technologies,
- Video technologies,
- Internet technologies.

Distance learning may utilized any/or a combination of the above four technologies.

Print Materials

Print is the foundation of all education and dominates in distance education. In distance education print serves as the primary source of instruction or may be supplemental. It can be in form of textbooks, posters, letter, circular workbook and so on (Owuamanam, 2011). Print is a viable distance tool for study guides, course syllabi, case studies, support text and so on (Mujibul, 2008

Advantages of Print

Print has the following advantages:

- Spontaneous: Print materials can be used in any setting without the need for sophisticated presentation equipment,
- Instructionally transparent: The medium of delivery should enhance, not compete with the content for the learner's attention. If the student reads well, the print medium is the most transparent instructional medium of all,
- Non-threatening: Reading is second nature to most students. As a result, they are easily able to focus on the content, without becoming mesmerized or trusted by the process of reading itself,
- Easy to use: Given adequate light, print materials can be used anytime and anyplace without the aid of supplemental resources such as electricity, viewing screen and specially designed electronic classrooms. The portability of print is especially important for rural learners with limited access to advanced technology,
- Easily reviewed and referenced: Print materials are typically learner-controlled. As a result, the student rapidly moves through redundant sections, while focusing on areas demanding additional attention (Andrianes, 2013).

Limitations of Print

Print has the following limitations:

- Limited view of reality: Print, by its reliance on the written word, offers a vicarious view of reality. Despite the use of excellent sequential illustrations or photos. For example, it is impossible to adequately recreate motion in print.
- Passive and self-directed: Numerous studies have shown that higher learner motivation is required to successfully complete print-based courses. To a certain extent, the passive nature of print can be offset by systematic instructional design that seeks to stimulate the passive learner. Still, it takes more motivation to read a book or work through a written exercise than it does to watch a television programme or participate in an audio-conference with an instructor encouraging student participation and response.
- Feedback and interaction: Without feedback and interaction, instruction suffers regardless of the delivery system in use. By nature, print materials are passive and self-directed. Even with print materials incorporating feedback mechanisms and interactive exercise, it is easy for learners to skip to the answer section.
- Dependent on reading skills: Thanks to television, most students have developed fairly good viewing skills by age four. These same children, however, often fail to develop adequate reading skills by age 12. Reading skills must often be improved. Lack of ability in this area cripples the effectiveness of even the most instructionally sound print material and must be overcome if print is to be used effectively (Andrianes, 2013).

Audio Technologies

Audio technologies include the following: two-way audio transmission. Example is audio/phone conference and one-way audio transmission which includes radio broadcast and prerecorded audiotapes provided to students. Audio technologies use various means which include radio, audio cassette, telephone, voice mail and audio conferences (Mujibul, 2008). Radio is a major form of audio media. It is used all over the world as a medium of instruction in schools and colleges by integrating it into school programmes. When instruction is broadcasted through the use of radio medium, it is called Radio broadcast. Cassette tape as an audio media is a self-contained reel-to-reel system with the two reels permanently installed in a rugged plastic case.

Teleconferencing is an improvement of the conventional one to one telephone conversation. The use of teleconferencing becomes more reasonable and likely if the participants are few. The technique may be found useful in tutorials, discussions, seminars, providing information, lectures, advising, training and meetings. Okwo (1996) identifies three types of teleconferencing, namely: Operator-connected conference calls, Loudspeaker unit and Orator. Under the Operator-connected conference calls, up to 18 persons can be connected using their own telephones.

However, the Loudspeaker units enable small groups of persons to participate at each telephone through the amplification of the sound. Some modern telephone sets have built-in-loudspeakers. The Orator enables two or more small groups of persons at different locations to be connected by direct dialing. It involves audio conferencing which is audio conference that

uses standard telephone lines to transmit voices to and from the parties involved in the conference (Iwu, 2006).

Advantages of Audio technologies

Audio technologies have the following advantages:

- Radio is portable and cheap and comes in various sizes. It can use batteries and this makes people to use it anywhere with or without electricity,
- A radio lesson reaches a wide audience than a class. A teacher can teach several classes at the same time. It can be used in teaching several subjects,
- Cassette tapes are durable, virtually immune to shock and abrasion (Chimezie, 2006),
- Teleconferencing, is useful in tutorial, discussions, seminars, proving information lectures, advising, training, and meeting,
- Tele conferencing is more efficient in task achievement (Okwo, 1996).

Limitations of Audio technologies

Audio technologies have the following limitations:

- Physical and practical skill oriented lesson cannot be conducted by audio because visual and physical demonstrations cannot be experienced directly by the students,
- Because radio is a one-way medium of instruction, there is no interaction between the presenter and the audience. The latter has no means of given the former feedback on the effectiveness of his programme,
- Longer cassette tapes, especially C-120s sometimes become stuck or tangled in the recorder due to the thickness of the tape (Chimezie, 2006).
- Inadequate telephone service. Most homes and places do not have telephone and where it is available; the services rendered are not reliable.
- Ignorance on the part of Users. Many potential users of this technique are not aware of its importance in distance education.

Video Technologies

These include: Two-way video with two-way audio (also referred to as two-way interactive video), one-way video with two-way audio, one-way live video and one-way prerecorded video (including prerecorded videotapes provided to students and television broadcast and cable transmission using prerecorded video) (Mujibul, 2008). Video media include video tape, satellite delivery, microwave, broadcast video, desktop video and also integrated multi-media (Butcher, 2003).

Educational television broadcasting is broadcasting of educational or instructional programmes through the use of television medium. Instructional television refers to those telecast (either broad cast or closed-circuit) designed and scheduled specifically for use with special classes or groups for particular learning situations. Such programmes emanate from a studio or classroom with a teacher or from pre-recorded video tapes or films (Chimezie, 2006).

Video conferencing is a system of using video to conduct distance learning. Video conferencing is of different types, namely:

- Small room video conferencing: This system is designed primarily for small groups (1-12 participants) at all sites seated around a conference table.
- Class room video conferencing: This type of system usually uses high quality AV components, codec and an interface that allows all participants to be seen on the monitors.
- Desktop videoconferencing: This system utilizes a personal computer and videoconferencing software (Andrianes, 2013).

Advantages of Video Technologies

Video technologies have the following advantages:

- In instructional television, motion and visuals can be combined in a single format so that complex or abstract concepts can be illustrated through visual simulation.
- Instructional television is an effective way to take students to new environments (the moon, a foreign country or through the lens of a microscope).
- Interactive video allows real time visual contact between students and the instructor or among students at different sites.
- Interactive video supports the use of diverse media; blackboards, handwritten documents and videos may be incorporated at all sites.
- Interactive video enables connection with experts in other geographical locations (Andrianes, 2013).

Limitations of Video Technologies

As with other technologies, video technologies have its limitations:

- Video production is time consuming and can be technically demanding, often requiring relatively sophisticated production facilities and equipment.
- Most prepackaged Instruction television video courses use a mass media approach to instruction aimed at the average student. As a result, they can be ineffective in serving students with special needs.
- In interactive video, unless a strong effort is made by the instructor, students not located with the instructor may remain uninvolved in the course.
- In interactive video, if visuals, like handwritten or copied materials are not properly prepared, students may have a difficult time reading them.
- In interactive video, if the system is not properly configured, class members may observe an audio echo effect. The result is audio interference that detracts from the learning environment (Andrianes, 2013).

Internet-based Technologies

These include: Internet courses using synchronous (i.e. simultaneous or “real time”) computer-

based instruction (e.g. Interactive computer conferencing or Interactive relay chat) and Internet courses using asynchronous (i.e. not simultaneous) computer-based instruction (e.g. e-mail, list-serves and most World Wide Web-based courses) (Mujibul, 2008). Computer is equipment designed to facilitate storage, processing and retrieval of information (Onyejemezi, 1990). Owolabi (2001, p.1) sees computer as "a set of electronic equipment that accepts data as input, processes them with the aid of predefined instructions called programme and produces useful output for management or any other people' use".

The word "internet" is derived from two words: - interconnection and network. Internet is the "network of computers that are connected to one another, thus enabling the sharing of data, information, communication and other type of subject matter among its users via file-sharing protocols". It is a world of wild network system of computer networks through which sharing of information is not only possible but also easy (Orji, 1999).

In line with the above, Johnson and Johnson (2006) state that Local-Area Networks (LANs), Wide-Area Networks (WANs) and the global version of the latter (the internet) provide a variety of media. Examples are: tools for cooperation such as e-mail and text messaging, chart rooms, bulletin boards, conferencing systems, web pages, blogs and specialized group ware. Huge amount of resources and services are available in the internet. These include electronic mail (e-mail), newsgroups, file sharing and topic searching, the World Wide Web (WWW), surfing the net, chatting, electronic and internet addresses. The WWW is an important knowledge-management tool while electronic mail (e-mail) is a transfer of information in electronic form from one computer user to another usually over a network (Iwu, 2006)

Advantages of Internet-based Technologies

Internet-based technologies have the following advantages:

- ★ Computers are a multi-media tool, with integrated graphic, print, audio and video capabilities. Computers can effectively link various technologies. Interactive video and CD-ROM technologies can be incorporated into computer-based instructional units, lessons and learning environments.
- ★ Computer increases access. Local, regional and national networks link resources and individuals wherever they might be.
- ★ Electronic mails (e-mail) can be used to send and receive messages to and from friends, organizations and families around the world.
- ★ It helps students to participate on-line especially practicum oriented courses like medicine and teaching (Andrianes, 2013).

Limitations of Internet-based Technologies

Internet-based technologies have the following limitations:

- – Computer networks are costly to develop. Although individual computers are relatively inexpensive and the computer hard ware and soft ware market is very competitive, it is still costly to develop instructional networks and purchase the system soft ware to run them.

- The technology is changing rapidly. Computer technology evolves so quickly that the distant educator focused solely on innovation. Not meeting tangible needs will constantly change equipment in an effort to keep pace with the latest technical advancements.
- Students must be highly motivated and proficient in computer operation before they can successfully function in a computer-based distance learning environment.
- Some students might hesitate to contribute to computer conferences or to send e-mail because of lack of familiarity with the proper protocols (Andrianes, 2013).

ICT as an inevitable Instrument for Distance Education

Distance education is a set of practice to plan and implement educational activities when there is a separation between teaching and learning. This separation may result from distance, time, or other barriers. Distance education offers a way to overcome this separation, chiefly through its learning materials and the use of information and communication technologies.

In a typical distance education programme, a variety of ICTs is commonly used. It might include a print component in the form of course text, readings, schedules or syllabi accessed through the internet. Two-way interactive audio and / or video can provide real-time face-to-face and voice-to-voice interaction. Live audio / video media can incorporate guest speakers, mentors and content experts who would otherwise not have the opportunity to be in class.

Communication among teachers, mentors and peers can be accomplished through computer conferencing, electronic mail and online forums. Pre-recorded videotapes can be used for class presentations. Distribution of assignments and announcement can also be transmitted via Fax. Collaborative problem solving among global partners that culminates a mutually developed project can be conducted using current information telecommunications media (Mujibul, 2008).

The purpose of good education is to help each person become more effective in life. Accessing information is a highlight of the new technologies. ICTs through the internet, videos, CD-ROMs and so on can generate knowledge which changes a person's mental models and perspective of how one views things. With relatively little space and low costs, ICTs can provide access to a wealth of information resources that cannot be matched by local libraries and resource rooms. Videotapes and video-conferencing may be used for networking, study groups, interactive courses, access to educational resources and research. These technologies can be used to automate, expedite and organize the extensive informational resources available.

Web-based modules can be designed to operate as independent segments or they can be combined into a whole course. A web-based course can include links to the class syllabus and to online readings and database, with an explanation of appropriate uses of the information and uses that would infringe on copyright. Web pages also link to bulletin boards, to interactive multimedia texts and other materials that are helpful to students with different learning styles and to real-time conversation sessions. With increased availability of the appropriate hardware, future course participants will even be able to see each other in small, real-time TV-like windows right on their computer screens (Mujibul, 2008).

In addition to synchronous-group discussions through online virtual meeting places or

desk top video-conferencing connections, many distance courses include asynchronous group communications. For example, through e-mail and posted comments on limited list serves. Indeed, with the increased availability of e-mail, distance students are finding that they are engaging in more frequent communication and getting to know their lectures and fellow students better than in the typical situation where they are trying to coordinate almost impossibly busy schedules (Mujibul, 2008).

Similarly, computer application has made distance education effective. Computer application for distance education falls into four broad categories namely:

- Computer Assisted Information (CAI). This uses computer as a self-contained teaching machine to present discrete lessons to achieve specific but limited educational objectives. There are several CAI modes including: drill and practice, tutorial, simulations, games and problems solving.
- Computer Managed Instruction (CMI). This uses the computer's branching, storage and retrieval capabilities to organize instruction and track student records and progress. The instruction need not be delivered via computer, although often CAI (the instructional component) is combined with CMI.
- Computer Mediated Communication (CMC). This describes computer applications that facilitate communication. Examples include electronic mail, computer conferencing and electronic bulletin boards.
- Computer-Based Multimedia (CBM). HyperCard, hyper media and a still-developing generation of powerful, sophisticated and flexible computing tools have gained the attention of distance educators in recent years. The goal of computer-based multimedia is to integrate various voice, video and computer technologies into a single and easily accessible delivery system (Andrianes, 2013).

ICTs serve as a tool to support, enhance and extend learning through challenging real-life tasks. The following indicators below reflect characteristics of technologies that support meaningful learning experiences:

- All members of the learning community are able to access rich resources within and beyond the school and to use, interact and exchange data in different formats and progammes.
- The technological design applies standards of interoperability and user-friendliness to promote engaged learning.
- The instructional design allows students engage in collaborative projects and create products that present new knowledge or tools (Mujibul, 2008).

Yusuf and Yusuf (2009) posit that distance learning enhanced through ICTs provide flexible learning opportunities with collaborative aspects and rapid communication among learners and between the learners and academic mentors. ICTs remove age, distance and time constraints from any learning process and provide effective library service, make for interactive learning using a learner-centered and activity oriented teaching approach and energize the students.

Encourage deeper understanding about data collection, save time on measuring and recording and help in analysis (Adamu, 2006). The appropriate use of ICTs has provided information access to all students in remote, rural and urban areas as well as across nations.

The geographical, social-economical, political and cultural background of distance learners can influence their ability to learn using ICTs. A number of factors need to be taken into consideration when deciding upon the use of any one or combination of available technologies for course delivery and other purposes. These factors include:

- Affordability of the technologies,
- Availability of the technologies,
- Accessibility of the technologies,
- The unique pedagogical characteristics of the particular technological application,
- Instructional objectives,
- Financial resources available at the institution, and
- Student personal resources (Victoria, 2002).

Conclusion

Education is the basic need of every human being and today's technology has a big part in every sphere of life. The problem of unsatisfied demand for education versus actual supply of educational services contributed to the acceptance, growth and implementation of distance education programmes as a means to bridge the gap between demand and supply. Distance education offers a way to overcome this separation chiefly through the use of ICTs to provide tutoring, linking learners to the system and each other, the use of feedback and student support systems.

ICTs are the acquisition, processing, storage and dissemination of vocal, practical, textual and numeric information by a micro-electronic based combination of computing and telecommunication. Distance education may utilize any / or a combination of the following four technologies: Printed materials, Audio / voice technologies, Computer technologies and Video technologies. ICTs however, have provided avenue for enriching the quality and quantity of instructional content offered through distance education. It has also provided avenue for facilitating interaction between the teachers and group.

Finally, in utilizing ICTs for instructional delivery and other purposes, a number of factors need to be put into consideration. These factors include; affordability, availability, access and the unique pedagogical characteristics of the particular technological application, instructional objectives, financial resources available at the institution and student personal resources.

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