

ICT-Based Innovative Instructional Designs in the Post Covid-19 Pandemic World

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Abstract

This study described ICT-based innovative instructional designs in the post Covid-19 pandemic world. Thus, the use of emerging technologies became inevitable in the society, especially in education industry, to reduce personal contact to the barest minimum. The paper was divided into four different parts in order to do justice to it. The first stage covers the important of using ICT-based instructional media in the post covid-19 pandemic world. Second stage explained the use of Innovative pedagogical approaches. In the third stage the paper listed and discussed some ICT-based innovative instructional designs. The last part covers some benefits of emerging technology. This study made use of published journals, e-books as foundation of its secondary data collection. Sequel to the above expose, some important recommendations were made. The use of ICT-based instructional designs in the classroom teaching and learning is very important because emerging technologies have become a profound means of teaching students today in their different location at the same time. Governments should enhance research by equipping research institutes with emerging technologies which facilitates research activities. By using these emerging technologies, students learning at their convenient and in their different locations in their learning activities. Therefore, ICT-based instructional designs, emerging technologies, facilitates learning and makes easier for educators and students to update themselves in the recent discoveries in education industry.

Keywords: Covid-19, emerging technology, e-learning, innovative pedagogical and instructional design

Introduction

The world from the earliest time has been experiencing global emergency crises. Different occurrences of world out breaks have occurred in the form of natural disasters: like earthquakes, famine, wars, flooding, fire-outbreaks, and disease pandemic (NCDC, 2020 & UNESCO, 2018). Accordingly, Aneke and Ibiam (2023) maintain that a typical example of a global crisis or emergency was the recent COVID-19 pandemic that broke out in February 2020 across the world. Deepanjah and Adesh (2022) posit that over 200 hundred countries of the world were heavily affected during the pandemic in the mid April, 2020. These countries represent 1.58 billion learners

across the globe. According to their report, some higher institutions which were closed affected 23.8 million population of students which is 91 percent of students around the world who couldn't secure admission following the next academic year. From the global perspective, global emergencies or crisis left an indelible impact on education industry especially amongst the teachers ranging from pre-nursery to tertiary institution teachers (Deepanjah & Adesh, 2022).

The Covid-19 pandemic period has come and gone but the devastating effect and experience have remained. Education sector was badly hit that some achievements made toward vision 2030 agenda for education were completely lost to the pandemic (UNESCO, 2021). After the pandemic experience, education sector has not recovered fully from the devastation effect of the pandemic. Though some schools have reopened but vulnerable learners were mostly affected. (UNESCO, 2023). The above experience of the pandemic didn't spare Nigeria's education at all. The Federal Ministry of education ordered the complete closure of all the schools starting from pre-nursery to tertiary institutions nationwide because of the out-break of the pandemic with the its devastating effect (Abdulraheem & Adebawale, 2021). At the time of this outbreak of Covid-19, Nigerian education system operates on the level of traditional or conventional mode of learning known as face to face (F2F) mode. This means by its very nature that every contact must either be in a particular venue or close interactions on the part of the student, his lecturers, and fellow students for the purpose of participating in the key activities of his academic programme, such as lectures, assignments, tests, examinations, practical, projects, library research, seminars, workshops, and conferences, among others. This means, therefore, that throughout the period of the global emergency like COVID-19 lockdown, all the aforementioned academic activities were disrupted or suspended. The ravaging effect of the global pandemic affected 95 percent of students around the world which amounts to 1.7 billion of students worldwide. In more than two hundred countries of the world government ordered the closure of universities and all levels of education ranging from kindergarten to postgraduate (Abdullah, Askar. & Ahmed, 2021).

In the effort to curb the menace of the global emergence on the education system, many countries in the west and developing countries resorted to distance learning model that is based on the electronic learning (e-learning) format (Schleider & Reimers, 2020; Oyediran et al., 2020). In view

of the above, educational system in the world resorted to e-learning system of education through ICT which brought many advantages and benefits, opportunities and challenges. As investigations show, Adeyeye, Akeem, Ganiyu & Amusat (2021) maintain that private universities are the first institutions to use e-learning in Nigeria and this brought innovation in education and it made teaching and learning flexible and operational. However, some public schools were not so eager to embrace e-learning platform to help their students and the society at large (Adeyeye et al., 2021). Going further Adeyeye et al. (2021) posited that many other contributory factors militated against the use of e-learning in those schools like: student population, training of lecturers and students, and lack of internet facilities, amongst others. The mission of this paper, therefore, is to examine ICT-based innovative instructional designs in the post covid-19 pandemic era. The focus of this study is to x-ray all the innovative instructional designs used in teaching and learning and implementation of curricula in the post pandemic era. In doing justice to the above this study will look into: Prospects of migrating to e-learning, Innovative pedagogical approaches, Some Ict-based innovative instructional designs and some benefits of emerging technology.

Importance of using ICT-Based Instructional Media in the Post Covid-19 Pandemic World

Migrating from traditional system of teaching and learning to e-learning has a lot of prospects. According to Deepanjah and Adesh (2022) maintain that our world today is highly interconnected through the emerging technologies which have drastically reduced the formal traditional way of learning, reduced the extent of gathering in a venue to receive lectures and physical contact for learning purposes is becoming obsolete and less relevant. In this digital world learners are becoming more and more dissatisfied with face to face approach to education especially the pattern of delivering content: where attendance, venue and mode of participation are dictated. To alleviate this problem the Global Education Coalition established a new prototype of international cooperation which produced an innovative response ameliorate the after effect of the crises on countries (UNESCO, 2023). Be that as it may the new normal teaching processes is managed and enhanced through technology, human beings, organizational bodies and teachers in a holistic way (Katyendo, OliveIra1 & SOUZA, 2022).

Furthermore, Katyeudo et al., (2022) maintains that digitization comprises of organized system of work motivated by ICT, emerging technologies and ingenious businesses. This consist not just implementing solutions using technologies, it also comprise of automated and electronic devices, human capital and organizational factors which is the fourth industrial revolution (4IR). The new technologies that lead to new ways of working are gaining serious awareness in the entire human endeavour. Through the internet, computer and digital transformation introduced by fourth industrial revolution human beings have transformed all areas of human activities (Adelowotan, 2021). The 4IR has eliminated distance barriers between material or physical, electronic and biological sphere. This is the aim of fourth industrial revolution to provide learners with cognitive, social, interpersonal, technical skills, among others, in the face of global challenges (Katyeudo et al., 2022).

Nevertheless, introducing ICT-based innovative instructional design to educational systems in this crisis era is very important and must be adopted in the content delivery. This will provide learners with all the necessary skillfulness and expertise needed in educational system to build a productive society. More so, Abdullah et al, (2021) postulated that information and communication technology (ICT) as learning tool is the fundamental basis for online learning and its innovative instructional design components such as web, videos, audio, presentations and e-books enhance the way of learning where learners can study, listen and communicate with each other. These innovative instructional components facilitate communication and interaction amongst students, educators and students through emerging technologies viz: zoom chats, WhatsApp, and other social media means.

In this period of digitization of teaching and learning as maintained by Katyeudo et al (2021) schools must adapt to use those technologies in order to furnish learners with right skills needed in the society, also to equip students with the skills needed to create a comprehensive and developed school environment. In this case through what is learnt students can develop digital skills that can be used to promote human activities and reduce problem based learning. Thus, innovative instructional designs, therefore, are of the essence in helping students to actively participate in the modern day digital classrooms. In this period of fourth industrial revolution the

multifaceted world needs proficiency in technology and interconnected through emerging technologies to meet up with day to day changes in the technological world (Katyendo et al, 2021). Therefore, onus lies on Schools to come up with adequate learning facilities of instructional media, such as innovative instructional design, technology design and skill acquisition especially in information and communication technology. This knowledge will help students to develop all around and equitable society.

Innovative Pedagogical Approaches in the Post Covid-19 Pandemic World

The Covid-19 pandemic effect led to challenging times in every sphere of human endeavors and this mitigated the closure of many institutions and different schools integrated ICT to sustain education during the pandemic. In particular, Adelowotan (2021) maintains that system of education in all the strata of learning: nursery, primary, secondary and tertiary, were severely affected around the world and they utilized innovative instructional designs for teaching and learning. This led to the manufacturing of some instructional aids like some of the emerging technologies such as: Simulation-based training; Virtual Reality (VR) and Augmented Reality (AR); Flipped classrooms; Teleconferencing and Social-media based platforms (Adelowotan, 2021). Smart Classrooms, Digital libraries, Free software with training for online courses, Free online courses for academic pursuits and upgrading skills to reorient career options, Free online training on teaching and conducting exams, Training on big data, Learning Management Systems (LMS) with training UNESCO (2022), these and more are the innovative pedagogical approaches during the pandemic.. Furthermore, various online courses have been developed around this subject (ICT-based innovative instructional design) during and post pandemic period. This has brought great challenges to teaching and learning across various academic, technical and vocational disciplines. The introduction of these innovative instructional media in all the sectors of learning rejuvenated online teaching and learning through smart system facilitated by human and technology interaction (Adelowotan, 2021).

It is worthy of note that ICT-based innovative and instructional design became the means of teaching and learning during the pandemic when all schools were closed and e-learning system immediately replace the face to face traditional way of learning. During the period of Covid-19

pandemic, ICT was the fastest way of disseminating information and knowledge amongst students, and educators were using it to teach their students irrespective of distance barriers. In giving credence to the above Abdullah et al. (2021) posited that students and educators can produce files online, change and correct them any time the need arises, and can share them with other colleagues in the school or outside the school and interact with others anywhere in the world as well. Thesis and dissertations can be delivered through electronic copies to the library, during proposal or defense. Then school management according to Abdullah et al. (2021) can manage those files by publishing them in the school journals, online and some of their colleagues around the globe.

Some ICT-Based Innovative Instructional Designs

Covid-19 albeit was a pandemic that ravaged the world but it seems seemingly a blessing in disguise to the developing countries like Nigeria. Consequent upon that educational system gained a lot of opportunities like saving time in content delivery, less expensive in learning, introduction of more technologies into learning system and it made instructional media available online which some leveraged on the opportunity to learn at the comfort of their homes. It opened myriad avenues for students who are interested in improving their learning strategies. There are many ICT-BASED innovative instructional designs in this era of emerging technologies that have become popular due to the ability to produce massive information in seconds and distribute them accordingly (Deepanjah & Adesh, 2022). These technologies as maintained by Deepanjah and Adesh (2022) have become popular due to their high-performance computing systems and are capable of processing massive information in real-time with high precision and visualizing them in different dimensions providing an unmatched experience to the users. Examples of these technologies are viz: Virtual Reality (VR), Augmented Reality (AR), Big data systems, Flipped classrooms, Smart Classrooms Teleconferencing, Digital libraries, Social-media based platforms, Big Data Technology, Learning Management System (LMS), etc have changed system of teaching and learning in the intellectual market in this post Covid-19 era.

Virtual Reality (VR)

Virtual reality is a technology that attempts to regenerate computer images and videos to produce real-life visual experiences that are beyond those achieved on the ordinary computer monitor and phone. It is the use of computer technology to create a simulated environment which can be explored in 360 degrees. Unlike traditional interfaces, VR places the user inside the virtual environment to give an immersive experience. This is all about using 3D video or image to produce a 3D world in which the operator can manipulate in a real time experience by using the virtual reality. This gives a feeling of the real world because it creates a life size image. This ICT-BASED innovative instructional design makes teaching and learning far easier than traditional face to face mode of learning

Augmented Reality (AR)

Augmented reality (AR) this is one of the innovative instructional design that combines the real world and computer generated content to give a superb experience to the learner. The content makes use of different sensory modalities such as visual, auditory, olfactory etc. to operate. This machine uses three basic features like a combination of real and virtual worlds, real-time interaction and it can create 3D registration of virtual and real objects. It produces sound, visual elements, and sensory stimuli through technology (UTAS-A, 2021). This sophisticated machine is prevalent among mobile computing companies to improving their operations. Augmented reality uses the existing real-world environment and puts virtual information—or even a virtual world—on top of it to enhance the experience.

Flipped Classrooms

Flipped classroom is a means of teaching that involves individual as against group gathering. Flipped classroom creates an interactive environment where the educator and the learner can have a dynamic interactive learning environment where concepts are applied and engaged creatively in the subject matter (The Flipped Learning Network, 2014). This is quite good for teaching and learning because it enhances lecture or instruction outside of class time. With the flipped classroom students are free during class time for activities that involves higher thinking. In a flipped classroom learning system takes a new dimension. Learning system takes up face to face interaction and individual study through the help of technology. For example students can study

at home with recorded videos while doing their homework and latter come to classroom armed with questions with pre-knowledge

Teleconferencing

Teleconferencing is essentially a live, interactive audio or audio-visual meeting that ensues between geographically dispersed participants. Here, participants communicate via telecommunication networks using their tablets, mobile phones, laptops, desktop computers, and even specially designed tech-enabled meeting rooms. Teleconferencing means meeting through a telecommunications medium. It is a generic term for linking people between two or more locations by electronics. There are at least six types of teleconferencing: audio, audio graphic, computer, video, business television (BTV), and distance education. The methods used differ in the technology, but common factors contribute to the shared definition of teleconferencing.

Smart Classrooms

Smart classroom is quite different from the traditional classroom where a teachers stands before the student to teach or deliver his lectures. It comprises of computer interactive white board and a projector (CLASSVR (2023)). Smart classroom is an educational technology upgraded classroom that is installed audio, video, animations, images and multimedia electronic gadgets to facilitate teaching and learning during instruction. In a traditional classroom, during the content delivery teachers stand in front of the class to teach but with the use of innovative instructional designs like smart classroom students are provided with golden opportunities to interactive session with their teachers, fellow students and content that is being delivered. No more the use of pen, pencil, paper and texts books because every student has their computer. This allows the teacher to be versatile in his teaching styles to meet up with the demand of his students. *Teachers can support their students' educational and additional needs, and cater for each child's individual learning plan* CLASSVR (2023).

Digital Library

This is an electronic library used to gather all organized collection of electronic information and electronic tools use in creating files and saving them in the archives. It can be used in sourcing

files and sharing information, researching and working with facts that can be accessed electronically. Digital library differ from built complex libraries or traditional libraries because it exists in software or electronically in computers and internet worldwide web as against the physical library complex built in different schools and around the world. Through the digital libraries millions of electronic information or documents can be stored Examples include hypertexts, archival images, computer simulations, digital video, and, most uniquely, real-time scientific data such as temperature readings from remote meteorological instruments connected to [the internet](#). Some of the information or documents stored in form of digital objects are viz, e-books, magazines, audio recordings, video recordings and other [documents](#) that are accessible electronically. Digital library is a resource centre where students have access to a wide range of current data for research and it helps some professionals seeking to stay relevant and current on the latest developments in their field. It makes available to users out of print materials that might be difficult or impossible to locate in physical libraries.

Big Data Technology

This is a software-utility that designed to analyze, process and extract information from millions of data set and huge technological set of extreme complex structures (JavaTpoint, 2021). It is far beyond traditional data software processing. Big data technology amongst other technologies are widely associated with other emerging technologies like, deep learning, machine learning, artificial intelligence and internet of things that are hugely increased. With the combination of all these technologies BDT technology focuses on handling of real time data and batch-related data.

Learning Management System (LMS)

Learning Management System makes available for the educators and learners an online classroom that improves the process of learning. Through online classroom educators and learners alike enjoy the process of learning which supports an inclusive education where everybody experiences academic progress. Learning Management System encourages group collaboration, professional training, interaction and discussions, and communicating with one another amongst interceding structures for learning processes (Vaughn, 2021). In this case, teachers balance learning strategies with LMS innovative technologies for teaching using the guideline from curriculum. Learning

management system helps teachers to enhance and improve discussions online, create room for online activities and set standard expectation for the learners with available choices to make in solving academic problems especially during decisions (Dias & Dinis, 2014; Jung & Huh, 2019). Deepanjah. and Adesh (2022), rightly observed that with the presence of a teacher in a learning management system it helps in creating an interactive and engaging environment. This motivates students to always retain their autonomy, enthusiasm to learn with LMS.

Benefits of Emerging Technology in the Post Covid-19 World

Emerging technologies in this 21st century have changed the world in general and specifically the education industry. There is no gainsaying that technology has tremendously metamorphosed education to an enviable height even the way it is delivered to people across the globe (Deepanjah, S. and Adesh, 2022, Darren, Ritesh and Jo, 2020), this is because through technology many countries have transferred knowledge from one person to person and from one country to another. (Ghavifekr & Rosdy, 2015). Nowadays the use of emerging technologies in interaction is prevalent in teaching and learning. In the area of learning ICT- interactive multimedia has effectively enhanced teaching and learning process in most schools (Teguh, 2017). In the recent time, the system of stand and teach within a stipulated venue is becoming anachronistic as rightly posited by Adi (2010) so many changes and improvements have been developed in the education sector in recent times. For example using ICT in the classroom has jettisoned traditional way of teaching, teacher and learner interaction in the classroom has been toppled by on-line communication and other innovative instructional media have replaced the old system.

In the post Covid-19 pandemic world, emerging technology has great and unquantifiable benefits and what it has achieved can never be undermined. Grabe (2007) rightly captured it when he maintains that the application of emerging technologies in the classroom has changed our school system, people's worldview and the society at large. Technology has made the world a global village in such a way that distance is no longer barriers to what one wants to achieve in all areas of life. Also, in the world of intellectual market, benefits of ICT-based innovative instructional designs can never be over emphasized. Students have become active learners simply because of introduction of ICT in the classroom. Through this they can easily source for information they

needed and improve their knowledge (Nigar, 2021). Access to Ict-based innovative instructional designs in the school makes students develop culture of researching and less dependent on teachers. It makes it easier for researchers to find information they need and develop research gap

Thus, with ICT in the schools newest revisions and editions of books and journal in education industry are made available, very much accessible and don't take longer time. It makes collaborative learning very dynamic and possible and makes learning system neither limited to the school compound nor school hours, demography limits and teachers. The availability of internet has made e-learning the choice of students in sourcing information anytime and everywhere. Students in the rural areas share knowledge with their counterparts in the urban and as well have access to real information through the internet which enables them to interact with teachers and their colleagues all over the world (Adi, 2010). This has been made possible through the introduction of ICT in the classroom teaching and learning, it is dynamic and it is proactive (Arnseth & Hatlevik, 2012). Incorporation of ICT in the school system has brought tremendous improvement in learning activities such as increased quality education, accessibility of facts and cost effective in course and content delivery to students (Albirini, 2006, Ghavifekr and Rosdy, 2015). This has also helped learning-communities to overcome some challenges posed by pandemic crises in the current globalization. Teachers are key players in the use of ICT in education which also is computer based communication that prepares students for the current digital era (Ghavifekr and Rosdy, 2015).

Conclusion and Recommendations

Emerging technologies have brought enormous boost to educational system in the present world especially amongst developing countries. In the world of intellectual market, teaching and learning have been revolutionized through digitization and digitalization. This revolution has affected methodology of teaching and learning, office documentation and management of files and the whole business of managing the institution at large. These technologies have made easy the work of non-academic staff of tertiary institutions ranging from payment of bills, student tuition which facilitates cashless policy and management of all other documents in the educational system. In the case of monitoring staff's movement and attendance, teachers' attendance, and students'

attendance, biometric technology has proved efficiency and has replaced the use of thick cover notes for attendants. In the area of security the installation of security gadgets like CCTV at strategic places in the institutions can assure a profound secure environment through the AI machines like image-processing machines which can help to forestall mishaps and environmental security breaches. The use of emerging technology in the educational system has come to stay. Its benefits and ingenuity can never be over emphasized to education system in the post Covid-19 pandemic world. Onus lies on every school or institution to transform its system to emerging technology in education industry.

Sequel to the pandemic crises that hit the world in 2020 so many developing countries have reverted to the use of emerging technologies in all the areas of human endeavors. Therefore, they should strive to imbibe the emerging technologies in their educational system:

- 1) Thus they should provide at all cost and as a matter of urgency these modern technologies that facilitate distant interactivity and learning for use in teaching and learning. This is to avert any occurrence of epidemic in the future.
- 2) Governments should enhance research by equipping research institutes with emerging technology which facilitates research activities. Government should also imbibe to develop an educational technology platform using artificial intelligence to provide personalized learning and improve overall student learning.
- 3) In this present day education system students are expected to be self-motivated, self-directed and self-learning through the use of ICT assisted learning process. This will make them to be ready and efficient to respond to dynamic informative innovations that are coming up every day in the society.

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