

MULTIMEDIA TECHNOLOGIES: AN EFFECTIVE TOOL FOR TEACHING AND LEARNING IN THE COVID-19 ERA

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Abstract

The coronavirus pandemic has forced almost all educational programmes all over the globe to come to a stand-still, especially the face to face method of teaching and learning. As a result of that, both the teacher and the students are left with challenges on how to go about with the educational achievement. Multimedia technology as one of the most effective tool for teaching and learning become the final solution. This paper is aimed reviewing the meaning of coronavirus, impact of coronavirus on learning in Nigeria, impact on graduates and school leavers, the paper also examines the concept of multimedia and it's element benefits of multimedia in learning, challenges of using multimedia in learning and recommendations were also made conclusion was also drown at the end.

Keywords: Multimedia, technology, teaching, learning

Introduction

Coronavirus disease 2019 (COVID-19) emerged in December 2019 in Wuhan, the capital of Hubei province, China. It is a contagious newly identified virus that has an enormous public health impact with substantial fatal outcomes in high-risk groups and economic and societal disruptions. This highly contagious disease is currently spreading across the world, with a daily increase in the number of affected countries, confirmed cases and infection-related deaths. Based on the high levels of global spread and the severity of COVID-19, on 11 March 2020, the Director-General of the WHO declared the COVID-19 outbreak a pandemic Debajyoti, Vajirasak and Syamal (2020)

In order to curb the spread of the disease by fattening the “growth curve”, measures that are appropriate and proportionate to each phase of the epidemic are immediately put in place to interrupt human-to-human transmission chains; nationwide lockdown, social distancing and work from home are the new streaks that are being adhered to strictly by majority of the countries of the world today. The educational sector is no exception to this regard, as it has witnessed closure of all level schools, colleges, universities and other similar institutions. This led to digitalization of the teaching learning process by resorting to an “online” studies. Online education is not a new concept, but their purpose served mainly as an add-on in addition to the traditional face-to-face classroom set-ups. In view of the current pandemic, globally there has been a paradigm shift from a “mixed-mode” (offline + online) of education delivery to an “online-only” exclusivity model.

Accordingly, we presume that in order to maximize the effectiveness and relevance of such a delivery model, it is essential to have some idea related to the multimedia experience obtained by the students in such a learning environment (Debajyoti et al., 2020). All through from the 1990s, the concept of multimedia took on a new meaning, as with the capabilities satellites, PCs, sound and video merged to make new media with huge potential, combined with the advances in hardware and software. These advancements had the capacity to provide enhanced learning facilities with thoughtfulness to the specific needs of individual users.

Coronavirus and Its Impact on Learners in Nigeria

On January 30, 2020, the World Health Organization (WHO) announced that this outbreak had constituted a public health emergency of international concern (Mahase 2020). The novel coronavirus was initially named 2019-nCoV and officially as severe acute respiratory syndrome coronavirus 2 (SARSCoV-2). As of February 26, COVID-19 has been recognized in 34 countries, with a total of 80,239 laboratory-confirmed cases and 2,700 deaths (WHO 2020). According to recent research, similar to SARS-CoV and Middle East respiratory syndrome coronavirus (MERS-CoV), SARSCoV-2 is zootoxic, with Chinese horseshoe bats (*Rhinolophus sinicus*) being the most probable origin. Also The Chinese Preventive Medicine Association (2020) accounted pangolins as the most likely intermediate host of the virus. In Nigeria, the outbreaks of Lassa fever, bird flu, monkey pox, Ebola disease and others didn't weigh down the socio-economic and educational system as of the case of coronavirus, this has been raising dust in the country, educational system and heartfelt burden to the concern personnel, knowing well the possible effects of the prolong holidays as a result of the pandemic.

Going to school is the best public policy tool available to develop skills and potentials, school time can be fun, and from an economic point of view the primary point of being in school is that it increases a child's ability to become a useful and acceptable member of the society. Even a relatively short time in school has a longer impact in the life of a child; a short period of missed school may have consequences for skill growth in future. This is why we cannot estimate how much the COVID-19 interruption will affect learning; it is only the visible effect we can see, the gradual decay of inbuilt abilities may not be easily noticed very precisely. We are now in a new world far different from the things we use to know. The school time tables and schedules have changes, and in fact at the resumption of the school after the lockdown, so many grounds needs to be covered in order for the educational system of Nigeria to be able to compete with the world's educational system. Facilities in schools are been underutilized during lockdown, some might have damaged as a result of not been used for a long period of time.

Impact on Education: Graduates and School Leavers

There is no doubt that students in terminal classes in lower and higher levels of education system of Nigeria have been held on a spot; they were unable to graduate or even move to the next level in their academic pursuit this has led to the set a great back of the smooth running of educational sector of Nigeria and the world at large. What makes education beautiful and fulfilling is the progress in terms of moving to the next level, graduating and becoming a useful and acceptable member of the society after being exposed to the teaching-learning processes in the school. The careers of this year's university graduates may be severely affected by the COVID-19 pandemic. They have experienced majorly teaching interruptions in the final part of their studies, interruptions in their assessments, which may likely to affect their graduation at the beginning of a major global recession. There is no doubt there will be global recession in the economy of the world at large at the end of the pandemic lockdown. While there was boom in the economy of Nigeria in the past, some graduates still find it difficult to get their desired jobs in the labor market, now that there is every tendencies that the economy of the country could experience a drastic meltdown after the covid-19 pandemic, how will graduate get menial jobs talk less of their desired jobs. Unfortunately if this persists for a longer period of time, there might be a great hit on the smooth running of the economy, educational and other sectors of the country at large. Evidence suggests that poor market conditions at labour market entry cause workers to accept lower paid jobs for survival first, and that this has permanent effects on the careers of some graduate because they have been doing the jobs far related to their area of specializations for so many years which on the long run has made them not been fulfilled in their choice careers.

Concept of Multimedia and Components

"Multimedia" is a term frequently heard and discussed among educational technologists today. According to Abdullahi (2013), multimedia is referred to as the use of a variety of instructional

materials such as audio tapes, slides, transparencies, filmstrips, motion pictures, still pictures, animation and text in a single presentation. He further emphasized that they are combination of media combined for communicating information to students. The term can alternately mean “a judicious mix of various mass media such as print, audio and video” or it may mean the development of computer-based hardware and software packages produced on a mass scale and yet allow individualized use and learning. In essence, multimedia merges multiple levels of learning in to an educational tool that allows for diversity in curricula presentation which is characterized by the presence of text, pictures, sound, animation and video; some or all of which are organized into some coherent program” (Alfar, 2009).

Multimedia is classified as any combination of text, graphics, sound, animation, and video delivered and controlled by the computer via electronic or digital manipulated means. In order to create a good multimedia project, you need to be creative, technical, organizational and business skills. When the user is allowed to control what and when these elements are delivered, it become an interactive multimedia or can be called hypermedia, which refers to a system of multimedia information representation in which the information stored in various media are connected normally via the internet (Abdullahi, 2013). In general, multimedia has been moderately fruitful in light of the fact that it draws upon more than one of the five human senses, using the two essential senses vital for information reception, sight and sound. Because of movement and sound, it can likewise trigger attention, intrigue and inspiration simultaneously. However, multimedia alone is captivating, best case scenario and does not require the user to be effectively controlling or fundamentally contemplating what is being displayed.

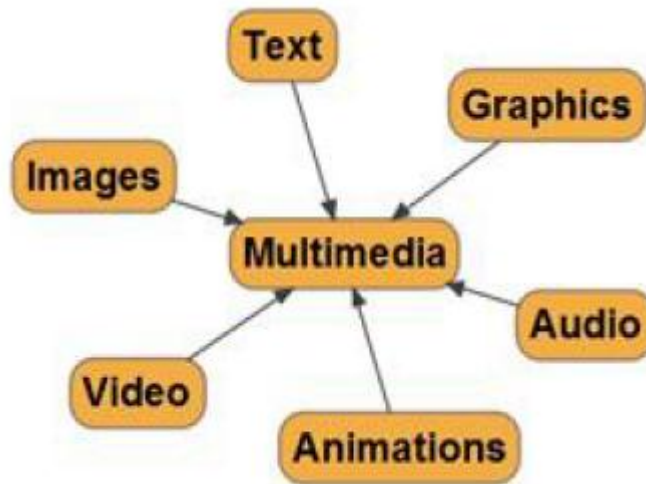
Component of Multimedia

Multimedia is a combination of more than one media type such as text (alphabets or numeric), symbol, images, pictures, audio video and animation’s (Guan et al, 2018). It supports verbal instruction with the use of static and dynamic images in form of visualization technology for better expression and comprehension. (Alemdagi and Cagiltay, 2018. Cheng and Liu, 2008) the hardware and software used for creating and running of multimedia applications is known as multimedia technology (Kapi et al, 2017) Multimedia Technology is an important aspect of ICT that deals with how information can be represented and presented digitally using different media such as text, audio, video among other (Guan, et al 2018). Multimedia component include: Text, Images and graphics, Audio, Video, and Animation. Texts, images and graphics are three elements static (do not move) whereas the other three elements: audio, video and animations are moving objects or dynamic object within a multimedia application.

Images and Graphics

Graphics make the multimedia application attractive. They help to illustrate ideas through still pictures. There are two types of graphics used: bitmaps (paint graphics) and vector (draw graphics). Bitmaps images are real images that can be captured from devices such as cameras or scanners. Vector graphics are drawn on the computer and only require a small amount of memory. There are different kinds of image formats like the Captured Image Format and the format when images are stored. The captured image Format is known by two main factors that is spatial resolution which is specified as pixels x pixels (225 x 225) and color encoding, which is specified by bits per pixel. Both factors depend on hardware and software for input/output of images. The Stored Image Format is when we store an image; we are storing a two-dimensional array of values, in which each value represents the data associated with a pixel in the image. These types images can be edited with the help of few of the software like general drawing GIMP, and paint, adobe Photoshop, Photos cape etc. The PNG format was developed as a patent-free replacement for the GIF format. PNGs can use an alpha channel to define transparency in a graphic. Import PNG files into any of the Macromedia tools as an alternative to GIF files, especially if you need 24-bit graphics or graphics with transparency. Use this format in Web-native content only when delivering to newer browsers; some older browsers do not support the PNG format also display PNG graphics files. Most Web browsers can display GIF and JPEG graphics files. The two most popular graphic formats for online training and Web pages in general are GIFs and JPEGs. Both are bitmap files

that are relatively small in size. The two formats compress images differently, each excelling at compressing different types of graphics.



Elements of Multimedia

Text

Text is very important for communication in any medium. It involves the use of text types, sizes, colors and background colors. In a multimedia application, other media or screen can be linked through the use of text. This is what you call Hypertext. You can create text directly within an authoring application or import it from external text files. Examples of text are ASCII/Unicode, HTML, Postscript, PDF, Note and Word pad.

Audio

Audio is the best way to attract attention. A multimedia application may require the use of speech, music and sound effects. These are called audio or the sound element. To catch the interest of the audience. Audio is effective for training and educational application. There are two types of audio analog and digital audio. Analog refers to the reproduction and transmission of sound stored in a digital format. The digitizing and storage of sound or music on a computer or compact disc. Sound Wave Characteristics: Two main characteristic in sound waves are FREQUENCY and AMPLITUDE. Frequency in the number of cycles a sound wave creates in one second. A cycle is measured from one wave peak to another. The standard measurement for frequency is called HERTZ (Hz). Amplitude is the volume or loudness a particular sound makes. The louder the sound, the higher the amplitude will be. The unit of measure for loudness or volume is decibel (dB). Audio Formats: MP3 audio (.mp3), Wav audio (.wav), Sound (.snd), Real audio (.ra, rm), Audio File Format (.aiff) , MIDI (.mid) ,Windows Media Audio (.wma).

Video

Video is the technology of electronically capturing, recording, processing, storing, transmitting, and reconstructing a sequence of still images representing scenes in motion. Video is more towards photo realistic image sequence / live recording as in comparison to animation. Video makes use of all of the elements of multimedia, bringing your products and services alive, but at a high cost. Although video requires lots of bandwidth to download, it is very useful for conveying certain information. Using video in e-learning helps realistically demonstrate equipment and processes among other things. For instance, an e-learning course in botany might show a video of a sprouting seed. A course about the features of an airplane might show a video of a crewmember properly closing and securing a door for takeoff. The intricate level of detail visible in video is also ideal for illustrating subtle, nonverbal information. For example, to teach sales skills you could use a video to demonstrate an interaction between a salesperson and a customer, then have the learners analyze the body language of the people involved in the transaction. Video Formats: Video file format are Motion Pictures Expert Group (.mpg), QuickTime (mov), Audio Video Interleaved (avi), Windows Media Video (wmv), Adobe Flash video (.flv). There

are three standard digital video formats: Quick Time, Video for Windows, and MPEG. Video files tend to be large so they really aren't appropriate for delivery on modem connections. You may choose to include video in your e-learning course if you are delivering it over an intranet or to users with relatively high bandwidth connections. There are many open source video editing tool and open shot is one such popular tool.

Animation

Animation is a process of making a static image look like it is moving. In multimedia, digital animation is used. Digital animation can be categorized into two broad areas: 2D (2 Dimension) and 3D (3 Dimension) animations. 2D animation refers to creating movements in basic objects. These objects are put into various situations or positions and have movement on the screen. 3D animation refers to creating movements to three dimensional digital objects from photographs. Movements like spinning and flying across the screen are some samples of animations. Since animations usually involve graphics, they are highly dependent upon the size and file type of the graphics that are being animated. Animation Formats: There are many ways you can create animations. Author ware, Dreamweaver, Director and Flash can all create animations. An animation created within an authoring program is usually smaller and more efficient than an animation created in another tool and then imported in your authoring program. This is particularly true when an animation is based on shapes created with the software's drawing tools rather than with imported bitmaps. For example, Flash excels at creating vector graphics and animations. Although Flash can animate bitmap graphics, animations made predominately with vector graphics in Flash are considerably smaller than animations created with bitmap graphics.

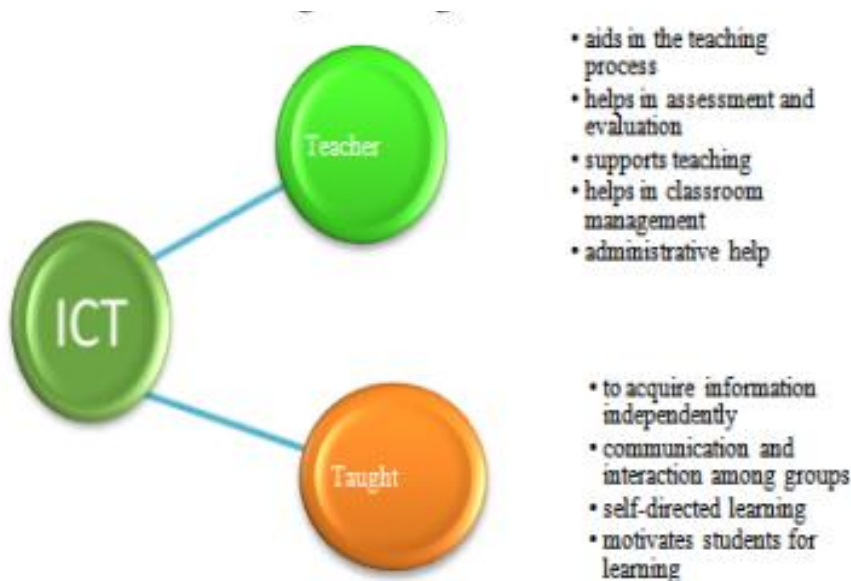


Fig 1: Showing benefits of ICT for teacher and taught

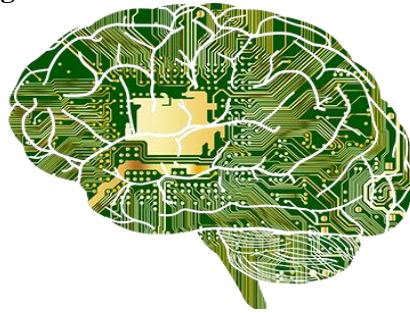
Benefits of Multimedia Learning

“Multimedia is characterized by the presence of text, pictures, sound, animation and video; some or all of which are organized into some coherent program” (Phillips, 1997).

While there is no doubt that the interest in technology education is rising, the fast progression in the past years has been impressive. Investments as well as the school spendings are on the rise.

One might wonder why. This is the reason why we are going to explore five of the benefits multimedia learning brings to the 21st century classroom, which could be contributing to the recent edtech boom.

1. Deeper understanding



Deeper understanding.png Source: Pixabay

According to research, a benefit of multimedia learning is that it takes advantage of the brain's ability to make connections between verbal and visual representations of content, leading to a deeper understanding, which in turn supports the transfer of learning to other situations. All of this is important in today's 21st century classrooms, as we are preparing students for a future where higher-level thinking, problem solving and collaborative skills will be required.

2. Improved problem solving



Problem solving.jpg Source: Unsplash

A large percentage of the human brain dedicates itself to visual processing. Thus, using images, video and animations alongside a text stimulates the brain. Student's attention and retention increase. Under these circumstances, in a multimedia learning environment, students can identify and solve problems more easily compared to the scenario where teaching is made possible only by textbooks.

3. Increased positive emotions



Positive emotions.jpg

Source: Unsplash

According to psychologist Barbara Fredrickson, experiencing positive emotions makes people see more possibilities in their lives. Using multimedia during instructions impacts student's mood during the learning process. With a positive attitude they learn better and tend to be more proactive.

4. Access to a vast variety of information

Variety of information.jpg



Source: Unsplash

With computers, tablets, smartphones and the internet, students are today better equipped than ever to search and find the information they need. A study revealed that 95% of students who have access to internet, use it to search for online information. Sharing the information and participating in class discussions is done in a more confident way when access to information is as easy as today.

5. World Exploration



World exploration.jpg

Source: Unsplash

There is no surprise here. With the help of multimedia children can explore and learn about places they would never been to. In a geography class, students can explore different cities of the world, the tallest mountains and the most dangerous jungles. In a science class, space and planets exploration is now possible. In a biology class, the dissection of rare animals and different habitats exploration are like a walk in a park for students benefiting of a multimedia learning environment. Altogether, multimedia learning environments have a direct effect on learning and even on growing as a person. An effect that differs and can't be achieved as easy whilst using traditional education materials. Therefore, it is no wonder the edtech business is increasing and schools desire more and more to create multimedia learning environments for their students.

Challenges of Using Multimedia in Learning

1. Information overload. Because it is so easy to use, it can contain too much information at once and therefore distract attention during learning.
2. It takes time to compile. Even though it is flexible, it takes time to put the original draft together
3. It tends to be costly: Multimedia makes use of a wide range of resources, which cost a large amount of money.
4. Problem of Compatibility: Some computers will not accept materials from other computers
5. Self-regulated learning: Some learners are not ready to deal with the opportunity given by hypertext-based multimedia.

6. Low interactivity: Even though the interactivity between the learner and multimedia applications is increasing, it is still considered restricted compared to the elaborated human-human interactivity. Henceforth, computers can't substitute for individual to-individual instruction, however just improve it.
7. Computer screens are not paper: The content on screens may not be as easy to read as the content on paper. If there are large chunks of information, it is probably best to view such a document on paper. Books and journal, articles may still be better to read as print-outs.
8. Non-Availability of computer, especially in remote area. Most of students are leaving in rural areas do not have access to computer and cannot afford smart phone to enable them carryout their studies.
9. Lack of Internet facilities: Due the hard economic hardship that is experiencing during the covid-19 era, most of students cannot afford internet facilities.
10. Power Outage that is experienced in most part of the country constituted another major challenge as the computer cannot be operated without power supply.

Recommendations

- The information should be sorted and select the important ones relevant to the subject matter.
- Learner should always be ready to access the information that is purposely design to them.
- Apart from the soft copies, the hard copies of the materials should be provided to the learners.
- Internet facilities should be adequately provided and if possible at the cheaper rate to meet the need and demand of the learner.
- Alternative means of power supply should always be readily available in such situations where there is no electricity.

Conclusion

To date, coronavirus spreads all over the world, a great effort was made to make sure learning keeps going with the help of multimedia technology. Learners from privilege and well-off families can afford computers and multiple devices while the under privilege hardly afford simple devices. They may likely also not have internet facilities at home. Nevertheless, Multimedia is flexible and unaffected by the distances and tailored to individual learning style which increase collaboration between teachers and students about the virus itself and also teach them basic hygiene for instance, the cartoon musical video about hand washing, the other precautionary measures to protect people from the virus has gone viral.

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