IJORP
International Journal of Research and Publications

Coronavirus effect and sustainable education in Nigeria.

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Abstract

Technology is gradually dominating the present world in all facets and ramifications. This work titled: Coronavirus Effect and Sustainable Education in Nigeria is aimed at exploring the concept of sustainable learning and education (SLE) and vitrine its relatedness with e-learning, then x-ray the challenge of sustainable e-learning in Nigeria. Adopting the Integrated Model Framework proposed by Picciano (2017), the work is based on content analysis approach. The finding is that the rate of acceptability of e-learning is still very low owing to critical factors such as: low computer literacy level, mass unawareness, and cost among others. We recommend that Nigeria should leverage on the effect of the pandemic (coronavirus) to build a sustainable educational system by improving on educational funding as UNESCO recommended 26% of the annual budget. Government should by any means possible improve and sustain steady supply of power as well as improve the bandwidth for connectivity. As a major stakeholder, government should provide the legal framework, policies and structures that will carry sustainable learning and education by all stakeholder. Private or public.

Keyword: Coronavirus (COVID-19), sustainable learning and education (SLE), e-learning, bandwidth and quality education.

Keywords: e-learning, Covid-19, Technology, CoV, Education.

Introduction

Corona viruses (CoV) are a large family of viruses that cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). A novel Corona Virus (CoV) is a new strain that has not been previously identified in humans (WHO, 2020). Corona viruses are zoonotic, meaning they are transmitted between animals and people. Common signs of infection include respiratory symptoms,

fever, cough, shortness of breath and breathing difficulties. In more severe cases, infection can cause pneumonia, severe acute respiratory syndrome, kidney failure and even death (WHO, 2020; Arikekpar, 2020). The major challenge and mystery shrouding the virus is the means of transmission. Ever since the novel disease, lots and lots of reports trail the pattern of communication, some allude that the virus is air borne while others refute that assertion. However, NCDC and WHO confirms that when a person with coronavirus coughs or exhales, droplets land on objects and surfaces around the person. Other people then catch the virus by touching these objects or surfaces, then touching their eyes, nose or mouth. (NCDC, 2020).

Since, March 26, 2020 the Federal Government had ordered the closure of schools and other public places in what the Presidential Task Force (PTF) set up by the president for the containment of the virus, termed lockdown in response to the pandemic. Education have been on standstill, even when some sectors have been allowed to operate.However, only exiting classes at the primary and secondary levels were allow to write examination. The implication is that the pandemic has blown our roof open to show how porous our education system has been.

There is an underlying belief amongst proponents of sustainable education that transformation of existing practices and systems is necessary to produce (and sustain) transformational learning, itself requisite to viability, at the individual, organizational, community, societal, and global levels (Hammond and Churchman 2008; Sterling 2001; Thomas 2009 in Hay & Reinders, 2020). Producing graduates with the capabilities vital in the 21st century will require dramatic reinvention of the content and process of education, a point underscored by Karl Haapala and John Sutherland (2005), Mitchel Resnick (2003) and others with respect to ecological and sustainability thinking and acting by citizens. (Hays 2013). SLE hinges on and produce consciousness: vigilant attentiveness and mindfulness, continual awareness of internal and external conditions and ongoing assessment of the effectiveness of acting in the world, filtered through a lens of ethics, responsibility and sustainability. A sustainable world requires a critical mass of citizens who remain conscious of actions (and inactions) that might jeopardize the greater good. Thus, a sustainable curriculum must equip learners with a commitment to consciousness and

the disposition to act upon germane observations. (Hay & Reinders, 2020).

Interestingly, the rapid development of computer and web technologies will definitely result in the use of these technologies in all kinds of educational activities and will create information and educational space. The introduction and use of teaching capabilities of the Internet, Web technologies (Web services, educational Web resources, and network), software (Microsoft Word, Microsoft Internet Explorer, Microsoft Power Point, Windows Movie Maker, on-line resource Prezi) in the educational process of higher education are priority to develop the information and educational space. (Erenchionova & Proudchenko 2017). The 21st century world is a world of technology and artificial intelligence. Technology is gradually dominating the present world in all facets and ramifications. Since this is the trend, it is the view and belief of the researchers that a sustainable learning and education, however you view it, cannot be possible without leveraging on the opportunities and capabilities provided by the web resources. The effects of the coronavirus (Covid-19) buttress this point. Meanwhile the world is already digitalize with more promise of more sophisticated advancement, learning and education must follow the trend if it must be sustainable. This bring us to the concept of web technology in education.

What is the rate of acceptability of e-learning in Nigeria? What are the structures on ground to implement this innovation to the fullest in the educational system in Nigeria? Will this solve the problem of sustainable learning and education in Nigeria? Using a content analysis discourse approach, this research will attempt an answer to this questions.

Empirical Review

Hay and Reinders (2020) introduces sustainable learning and education (SLE), an emerging philosophy of learning and teaching founded on principles of sustainability. They opined that SLE is not necessarily education for sustainability, but rather sustainable learning, a new and different idea. The intention behind SLE is to create and proliferate sustainable curricula and methods of learning and teaching. These are designed to instil in people the skills and dispositions to thrive in complicated, challenging and ever-changing circumstances, and contribute to making the world a better place. This article contributes to the literature by (1) elucidating the concept and purpose of SLE; (2) enumerating principles of sustainability that apply in the educational and professional development context; and

(3) proposing a curriculum for SLE framed as a university course or professional development programme. The authors emphasize the importance of systems and ecological thinking and the essential role of self-sufficiency as both a means and an end of sustainable learning and education. They conclude with a comment on community: the more fully we accept and appreciate our neighbours, organizations and societies as important, interdependent and deserving of a viable future, and the more we engage with them towards positive ends, the more universally accepted the imperative of sustainability will be, and the more likely we are to attain it.

Erenchionova and Proudchenko (2017) the article deals with the issues of using Web resources in the learning process. They represent basic information about the possibility to create comfortable environments for learning processes by creating information and communication learning environments. The tasks that inspired genuine collaborative learning were characterized by a certain complexity in terms of multimodality and technology, or professional knowledge combining academic and practical experience. The authors stress the main advantages of use of Web resources in the learning process and describe various computer software used by students along with Web resources. The article is meant for public reading and for those, who are interested in creating comfortable environment during the learning process

A study was conducted by Anene and Imam (2014) to investigate e-learning in Nigerian University, the purpose was to determine the following: Availability of facilities for e-learning in Nigerian Universities, availability of e-learning materials in Nigerian Universities, if students make use of e-learning in their studies in Nigerian Universities. A total of two hundred and twenty eight students constituted the sample for the study in the six Geo-political zones of Nigeria. Percentages statistic was employed in analyzing data of the study. The findings of the study revealed that formidable obstacle to the use of information and communication technology is infrastructure deficiencies. Majority of the students reported that their Universities do not have e-learning library domain, no online seminars and no discussion with lecturers, no online examination, and there are limited bandwidth.

Similarly, Oye, Salleh and Ishad (2011) presented a review of the challenges of e-learning in Nigerian University education based on the experience of four developed

countries, United Kingdom, Australia, South Korea and France. The survey shows that these countries have: (i) vision and action plans for e-learning, (ii) they have good government policies and financial support, (iii) they earmark action programs and set committees with sufficient funds to pursue these goals, (iv) they believe in research as a fundamental part of e-learning strategy, and lastly (v) they embark on awareness, training and motivational programs. The paper pointed out that, for the challenges of Nigerian university education to be reduced to minimum, the Federal Government should improve on educational funding as UNESCO recommended 26% of the annual budget. In addition the government should fulfill her promise on the issue of improving electricity supply in the country. Furthermore, the university administrators should embark on awareness and training of staff on the use of ICTs, with motivations attached. The Internet is a major driver of ICT in education and bandwidth is a major issue in the deployment of e-learning. Therefore government should make Internet connectivity a priority for higher education to be able to leverage on the promises and opportunities ICTs present.

Folorunso, Ogunseye, Sharma (2006) carried an exploratory study on the critical factors affecting the acceptability of e-learning in Nigeria and discoverd that education delivery via electronic media is becoming relevant in Nigeria educational systems, especially the universities. In spite of this, there are hindrances affecting the total acceptability of this technology. The paper investigated these critical factors by analyzing the questionnaires collected from three sampled universities in Nigeria: private, public and state owned universities. The results obtained indicated that mass unawareness, low computer literacy level and cost were identified as the critical factors affecting the acceptability of the technology. Analysis herein has shown the factors affecting the acceptability of e-learning in Nigeria. The results obtained will assist policy makers by finding solutions to literacy problems in Nigeria.

Even though the works reviewed gives very helpful insight on the sustainable education and e-learning, this work is justify by the fact that none of the work reviewed centered particularly on effect of coronavirus and sustainable education in Nigeria. However, we acknowledge they serve as groundwork for this research.

2.1 Conceptual Review

Effect

The result or outcome of cause. Effect is that which has the tendency and potential to produce an impression or sensation. In sound engineering, effect entails an alteration; a device for the producing an alteration in sound after it has been produced. In essence, effect is outcome arising from a process or event that can alter an existing process or phenomenon.

Coronavirus

Corona viruses (Cov) are a large family of viruses that cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). A Novel Corona Virus (CoV) is a new strain that has not been previously identified in humans (WHO, 2020). Corona viruses are zoonotic, meaning they are transmitted between animals and people. Common signs of infection include respiratory symptoms, fever, and cough, shortness of breath and breathing difficulties. In more severe cases, infection can cause pneumonia, severe acute respiratory syndrome, kidney failure and even death (WHO, 2020; Arikekpar, 2020).

Coronavirus effect

Coronavirus effect therefore refers to the outcome arising from the pandemic. It entails the disruption of processes that has alter the existing status quo in facets of human life, globally.

E-learning

E-learning refers to the use of ICTs to enhance and support teaching and learning process. E-learning ranges from the way student use e-mail and accessing course work online while following a course on campus to programs offered entirely online. Again e-learning allows for efficient transfer of knowledge anywhere and anytime, regardless of subject matter. It opens up a world of learning unavailable in most corners of the world, while at the same time empowering learners with the information technology awareness and skills crucial to succeed in today global knowledge economy (Oye, *et al*, 2011). E-learning embraces any technologically driving process of giving and acquiring information and knowledge both formally and in an informal settings. It is also referred to as online learning, virtual learning- According to Veronica (2017) Virtual learning is a learning experience that is enhanced through utilizing computers and/or the internet both outside and inside the facilities of the educational organization. The instruction most

commonly takes place in an online environment.

Bandwidth

Bandwidth refers to the amount of information that can be sent or received at a point on a computer network, the greater the bandwidth, the greater the carrying capacity and speed of transmission. The higher the quality and quantity of audio, video, interaction and processing tasks, the more sophisticated the communications technology required.

Quality Education

A quality education provides resources and directs policy to ensure that each child enters school healthy and learns about and practices a healthy lifestyle; learns in an environment that is physically and emotionally safe for students and adults; is actively engaged in learning and is connected to the school and broader community; has access to personalized learning and is supported by qualified, caring adults; and is challenged academically and prepared for success in college or further study and for employment and participation in a global environment. A quality education provides the outcomes needed for individuals, communities, and societies to prosper. It allows schools to align and integrate fully with their communities and access a range of services across sectors designed to support the educational development of their students. (Slade, 2017).

Sustainable Education

By dictionary definition, sustainability refers to a means of configuring civilization and human activities so that society, its member and its economics are able to meet their need and express their greatest potential in the present, while preserving bio-diversity and natural ecosystem, planning and acting for the ability to maintain this ideal for future generation. Sustainable education is formal and informal education and professional development that continually renews itself, incorporating principles and aspirations of sustainability in design and delivery, and educating in ways that promote sustainable learning. It is less structured and “fixed” than conventional education, and operates more organically and responsively (Hay & Reinders, 2020). Therefore sustainable learning is the process of learning where learning is configured and structured to meet the needs and express its potentials in the present while maintaining the ideal for future generation. From the foregoing

sustainable learning will occur when the traditional classroom or face-to- face education is combined with web-based education for practical and quality education that can meet the need of the future while serving the present.

Theoretical Framework

In this study we adopted the Integrated Model proposed by Picciano (2017). The integrated model heavily depended on the work of Anderson's model which assumed that none of the instruction is delivered in traditional, face-to- face mode, and so excluded blended learning models that have some face-to-face component. Anderson (2011) considered a number of theories and models but focused on the well-respected work of Bransford, Brown, and Cocking (1999) who posited that effective learning environments are framed within the convergence of four overlapping lenses: community-centeredness, knowledge-centeredness, learner-centeredness, and assessment centeredness. These lenses provided the foundational framework for Anderson's approach to building an online education theory, as he examined in detail the characteristics and facilities that the Internet provides with regards to each of the four lenses. Second, he noted that the Internet had evolved from a text-based environment to one in which all forms of media are supported and readily available. He also accurately commented that the Internet's hyperlink capacity is most compatible with the way human knowledge is stored and accessed

The model suggested that blending the objectives, activities, and approaches within multiple modalities might be most effective for, and appeal to, a wide range of students. The model contains six basic pedagogical goals, and approaches for achieving them, to form learning modules. The most important feature of this model is that pedagogy drives the approaches that will work best to support student learning. The modules are also shown as intersecting but this is optional; they may or may not intersect or overlap depending upon the approaches used. For instance, some reflection can be incorporated into collaboration or not, depending upon how the collaborative activity is designed. It might be beneficial to have the collaborative groups reflect specifically on their activities. Similar scenarios are possible for the other modules. Ultimately important is that all the modules used blend together into a coherent whole. The following paragraphs briefly review each of these modules.

Content is one of the primary drivers of instruction and there are many ways in

which content can be delivered and presented. While much of what is taught is delivered linguistically (teacher speaks/students listen or teacher writes/students write), this does not have to be the case, either in face-to-face or online environments. Mayer (2009) has done extensive reviews of the research and has concluded that learning is greatly enhanced by visualization. Certain subject areas, such as science, are highly dependent upon the use of visual simulations to demonstrate processes and systems. The humanities, especially art, history, and literature, can be greatly enhanced by rich digital images as well. Course/learning management systems (CMS/LMS) such as Blackboard, Canvas, or Moodle provide basic content delivery mechanisms for blended learning and easily handle the delivery of a variety of media including text, video, and audio. Games have also evolved and now play a larger role in instructional content. In providing and presenting content, the Blending with Pedagogical Purpose model suggests that multiple technologies and media be utilized.

The Blending with Pedagogical Purpose model posits that instruction is not simply about learning content or a skill but also supports students **socially and emotionally**. As noted, constructivists view teaching and learning as inherently social activities. The physical presence of a teacher or tutor, in addition to providing instruction, is comforting and familiar. While perhaps more traditionally recognized as critical for K-12 students, social and emotional development must be acknowledged as important to education at all levels. Faculty members who have taught graduate courses know that students, even at this advanced level, frequently need someone with whom to speak, whether to help understand a complex concept or to provide advice about career and professional opportunities. While fully online courses and programs have evolved to the point where faculty members can provide some social and emotional support where possible and appropriate, in blended courses and programs this is more frequently provided in a face-to-face mode.

Dialectics or questioning is an important activity that allows faculty members to probe what students know and to help refine their knowledge. The Socratic Method remains one of the major techniques used in instruction, and many successful teachers are proud of their ability to stimulate discussion by asking the “right” questions to help students think critically about a topic or issue. In many cases, these questions serve to refine and narrow a

discussion to very specific "points" or aspects of the topic at hand, and are not meant to be open-ended activities. For dialectic and questioning activities, a simple-to-use, threaded electronic discussion board or forum such as Voice Thread is an effective approach. A well-organized discussion board activity generally seeks to present a topic or issue and have students respond to questions and provide their own perspectives, while evaluating and responding to the opinions of others. The simple, direct visual of the "thread" also allows students to see how the entire discussion or lesson has evolved. In sum, for instructors who want to focus attention and dialogue on a specific topic, the main activity for many online courses has been, and continues to be, the electronic discussion board.

Reflection can be incorporated as a powerful pedagogical strategy under the right circumstances. There is an extensive body of scholarship on the "reflective teacher" and the "reflective learner" dating from the early 20th century (Dewey, 1916; Shon, 1983 in Picciano, 2017). While reflection can be a deeply personal activity, the ability to share one's reflections with others can be beneficial. Pedagogical activities that require students to reflect on what they learn and to share their reflections with their teachers and fellow students extend and enrich reflection. Blogs and blogging, whether as group exercises or for individual journaling activities, have evolved into appropriate tools for student reflection and other aspects of course activities.

Collaborative learning has evolved over decades. In face-to-face classes, group work grew in popularity and became commonplace in many course activities. Many professional programs, such as business administration, education, health science, and social work, rely heavily on collaborative learning as a technique for group problem solving. In the past, the logistics and time needed for effective collaboration in face-to-face classes were sometimes problematic. Now, email, mobile technology, and other forms of electronic communication alleviate some of these logistical issues. Wikis, especially, have grown in popularity and are becoming a staple in group projects and writing assignments. They are seen as important vehicles for creating knowledge and content, as well as for generating peer-review and evaluation (Fredericksen, 2015). Unlike face- to-face group work that typically ended up on the instructor's desk when delivered in paper form, wikis allow students to generate content that can be

shared with others during and beyond the end of a semester. Papers and projects developed through wikis can pass seamlessly from one group to another and from one class to another.

Evaluation of learning is perhaps the most important component of the model. CMSs/LMSs and other online tools and platforms provide a number of mechanisms to assist in this area. Papers, tests, assignments, and portfolios are among the major methods used for student learning assessment, and are easily done electronically. Essays and term projects pass back and forth between teacher and student without the need for paper. Oral classroom presentations are giving way to YouTube videos and podcasts. The portfolio is evolving into an electronic multimedia presentation of images, video, and audio that goes far beyond the three-inch, paper- filled binder. Weekly class discussions on discussion boards or blogs provide the instructor with an electronic record that can be reviewed over and over again to examine how students have participated and progressed over time. They are also most helpful to instructors to assess their own teaching and to review what worked and what did not work in a class. Increasingly, learning analytics are seen as the mechanisms for mining this trove of data to improve learning and teaching. In sum, online technology allows for a more seamless sharing of evaluation and assessment activities, and provides a permanent, accessible record for students and teachers.

The six components of the model described above form an integrated community of learning in which rich interaction, whether online or face-to-face, can be provided and blended across all modules. Furthermore, not every course must incorporate all of the activities and approaches of the model. The pedagogical objectives of a course should drive the activities and, hence, the approaches. For example, not every course needs to require collaborative learning or dialectic questioning. In addition to individual courses, faculty and instructional designers might consider examining an entire academic program to determine which components of the model best fit with overall programmatic goals and objectives. Here, the concept of learning extends beyond the course to the larger academic program where activities might integrate across courses.

First, the concept of a learning community as promoted by Garrison, Anderson & Archer (2000) and Wenger and Lave (1991) is emphasized. A course is conceived of as a learning community. This community can

be extended to a larger academic program. Second, it is understood that interaction is a basic characteristic of the community and permeates the model to the extent needed. Third, and perhaps the most important revision, is the addition of the self-study/independent learning module that Anderson emphasized as incompatible with any of the community-based models. In this model, self-study/independent learning can be integrated with other modules as needed or as the primary mode of instructional delivery. Adaptive learning software, an increasingly popular form of self-study, can stand alone or be integrated into other components of the model. The latter is commonly done at the secondary school level where adaptive software programs are used primarily in stand-alone mode with teachers available to act as tutors when needed. Adaptive software is also integrated into traditional, face-to-face classes, such as science, where it is possible to have the instructor assign a lab activity that uses adaptive learning simulation software.

Methodology

The research adopts a discourse approach based on content analysis. The approach majorly analyzed the variable of sustainable learning and education (SLE) as propounded by Hay and Reinders (2020), adding the variable of web resources learning as expounded by Erencionova and Proudchenko (2017) to it and measuring it with education in Nigeria based on what is on ground and what should make Nigerian education sustainable within the context of integrated model.

Discussion

Hay and Reinders (2020) believed that SLE programme if realized, would have its unique and relevant learning objectives and outcomes. The important thing to remember is to make the material and assessments as representative of the real world (and of the learner's actual work and day-to-day life) as possible (Ashford-Rowe et al. 2014) whilst emphasizing sustainable practice. Lessons and assessments should be immersive and deeply engaging, as it is unlikely that the essence of sustainability will be internalized through instruction that treats the subject superficially (Hays 2015). We shall introduced the principle of SLE by Hay and Reinders which will give us perspective of sustainable education.

These principles are drawn and inferred from Hay and Reinders (2020) who themselves drew from a range of sources, including Gudmundsson and Höjer (1996); Hammond and Churchman (2008); Orr (1996); Resnick (2003); Selby (2000); Sterling (2001); Wals and Jickling (2002);

Dewulf and Van Langenhove (2005) and Choi et al. (2001).

• See that sustainability is not an option, but an imperative.

• Design and build to solve more than one problem or requirement.

• Accept that sustainability equals ecology.

• Design and build for need and meaningful purpose, rather than for profit and consumerism

• Reduce production of "consumables"; when they cannot be reduced, make them recyclable or degradable.

• Reduce waste. Do not pollute. Use waste as a recyclable resource or as "nourishment" for other systems and processes.

• Design and build for durability

• Design and build for efficiency.

• Design and build for flexibility, adaptability and ease of modification (multi-use and purpose). • Accept responsibility for future generations and the welfare of the planet.

• Strive to become self-sustaining and self-sufficient (lessen dependence on external support and funding). Build internal capacity through learning.

• Always investigate and ascertain as far as possible the place of a new product or idea in the wider system and its long-term contributions and impacts.

• Use renewable energy, particularly sunlight.

• Strive for optimization rather than maximization.

• Use ethical judgment in determining what is worth doing and how it may best be done (adding value to the community; reducing harm or threat to the ecosystem).

• Strive for diversity in membership, perspective, experience, discipline and focus.

• Strive for the flourishing of all, seeking equity and balance across stakeholders and generations.

• Strive to co-exist with nature and within the limits of nature's offerings.

• Remember that a system is only as strong as its weakest link.

• Know that members of a community (like a species) are not interchangeable or easily replaced.

• Decentralize where possible and loosen control. Foster interaction, independence and interdependence.

• Think of organizations (and machines, technological processes and tools) organically – as living systems that must play a part in ecosystem health, vitality and longevity. If they do not contribute to long-term well-being, they should be stopped. Think less of a product's life cycle, and more about its impact on the lives of those who use or are affected by it.

• Promote (rather than destroy or neglect) bio- diversity in one's surroundings (landscaping, gardening, preserving natural habitat).

• Keep in mind that problems (and opportunities) are usually more complex than they appear; resolving (or capitalizing upon) them is not merely a matter of rational analysis, but also of ethics, judgment and practical reasoning based on critical reflection (see Ulrich 1993).

• Emphasize sufficiency – the idea that enough is enough. Too much of a good thing is wasteful, self-serving and potentially destructive (after Princen 2003).

Generally, the state of education in Nigeria, is nothing to write home about. The problem of underfunding, infrastructural decay, examination malpractices, corruption and other vices have crippled the education system. The truth is that the education in Nigeria is anything but sustainable in any guise. Oraka, Ogbodo & Ezejiofor, (2017) collaborate this when they aver that "The universities and other tertiary institutions were in a state of advanced decay with most of the teaching staff leaving the country in droves in search of greener pastures abroad". This impasse is not peculiar to the higher institutions alone but all levels of education. This has led to rampant crises in the system resulting in strikes by academic and non-academic staff, dearth of equipment and facilities, indiscipline among staff and students, upsurge in the activities of secret cults among others. (Oraka, Ogbodo & Ezejiofor, 2017; Oweh, 2013; Agha & Udu, 2015; Ezeali & Esiagu, 2009)

Having appraised the connection between sustainable learning and education and e-learning, we shall review the current challenges facing e- learning in Nigeria. Anene & Imam (2014) opined that the challenges facing e-learning in Nigeria are: poor technical infrastructure, financial restrictions, lack of computer literacy, inappropriate teachers training, internet connectivity, and energy related problems and limited expertise. Scholars have found that mass unawareness, low computer literacy level and cost were identified as critical factors affecting the acceptability of e-learning by students and lecturers of

Nigerian universities and indeed other higher institutions of learning. Moreover e-learning places high demand on learners who have to be more proactive and disciplined than in traditional face-to-face education (Folorunso, Ogunseye & Sharma, 2006; Ajadi, Salawu, & Adeoye, 2008; Sharma, Ekundayo, & Ng, 2009; Oye, Salleh,& Ishad, 2011).

The internet is a major driver of ICT in education. Bandwidth is a major issue in the deployment of e-learning. Bandwidth refers to the amount of information that can be sent or received at a point on a computer network, the greater the bandwidth, the greater the carrying capacity and speed of transmission. The higher the quality and quantity of audio, video, interaction and processing tasks, the more sophisticated the communications technology required. Bandwidth costs money, so there is a financial imperative to manage the amount of bandwidth used for elearning, particularly where it is used to support remote and distance users who may not have access to fast data connections. Furthermore, the content and services that can be accessed through internet are dictated by the bandwidth available (Zook, 2004 in Oye *et al*, 2011). Oye *et al*, further assert that Nigerian contributed only approximately 2% among the Internet users worldwide. In consonance, Economist Intelligence Unit in (2008 cited in Anene & Imam (2014)) ranked Nigeria 62 among the nations in terms of the ability of a nation's institutions to use ICT to achieve their mission and vision. Thereby collaborating Anene & Imam (2014)'s findings that majority of the student reported that their Universities do not have e-learning library domain, that their bandwidth were limited and that their electricity supply was limited.

Covid-19 disrupted all human activity including education. Nigerian and other developing countries are the worst hit since, the level of acceptability of e-learning is still very low in Nigeria (Folorunso *et al*, 2006). But we believed that the lessons of covid-19 among other things, exposed the essential of e-learning which is the right direction to take for a sustainable learning and education for the 21st century going forward. . What better time to take this bull by the horn? Except this period of covid-19. By observing social distance, carried capacity will be maintained, the dilapidated overcrowded infrastructures (hostels, offices, laboratories, classroom etc) can receive attention in line with NCDC protocol to avoid spread of the virus. Since health is part of sustainable learning, by providing water and other sanitary conditions for curtailing the virus, we

would have been injecting quality and environmental sustainability all at once. Consequently, we would achieve quality and sustainable education by the effect of coronavirus pandemic.

Conclusion

We agree with Hay & Reinders (2020) that SLE sets out to build capabilities in resilience, responsiveness and change-readiness. More than that, it is committed to building the skills and orientations necessary to "learn forward": to anticipate challenges and opportunities that might arise, to proactively learn, develop and prepare by choice and design rather than being held hostage to change and environmental turbulence; and, moreover, to lead learning and innovation in such circumstances (Dochy & Segers 2018;). Increasing the level of e-learning's presence in Nigerian universities and other sectors and levels of learning would solve the problems of overcrowding in lecture rooms and hostels, low lecturer to student ratios, insufficient laboratory equipment, cultism, too many applicants for too few schools and a lot more (Elearnframe, 2000; Folorunso, Ogunseye, Sharma (2006), which has led the depreciation of the country's human resource and accounts for many of the social ills observed in the country today. Apparently, e-learning has the ability to provide a remedy for these problems, and should be encouraged in accordance with the policies of the government in Nigeria. (Folorunso *et al*, 2006) and thereby rejig learning and education to a sustainable standard.

Recommendations

We lend our voice to the unearthing of viable steps to promoting (sustainable) e-learning according to Oye *et al* (2011) which asserts that vision and action plans for e-learning must be in place; good government policies and financial support; concrete and honest earmarked action programs and committees with sufficient funds to pursue the goal of sustainable education; entrenching the consciousness that research is a fundamental part of e-learning strategy, and vigorous action for awareness, training and motivational programs towards (sustainable) e-learning. We strongly support the call for the Federal Government to improve on educational funding as UNESCO recommended 26% of the annual budget and leverage on the covid-19 pandemic to provide the technical infrastructures needed to rejig the educational system in Nigeria. Government should by any means possible improve and sustain steady supply of power as well as the bandwidth for connectivity. As a major stakeholder, government should provide the

legal framework, policies and structure that will support sustainable learning and education by all stakeholder. Private or public. Incidentally, the time to take this all important action and get it (sustainable education) right is now. Like the song legend-Sunny Okosun says, (Africa) Nigeria is now or never! You have to do it now or leave it forever.

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