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Appropriate Technology for Teaching and Learning in Ghanaian Higher Educational Institutions during and Post Covid-19 Era

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Abstract:

The Covid-19 pandemic disrupted learning and resulted in a paradigm shift pertaining to the delivery of higher education services. In light of the guidelines on social distancing, online learning dominated teaching and learning in higher educational institutions across the globe. The Ghanaian higher educational sector had to adapt to the changing circumstances and wide adoption of electronic learning was a viable option. This study examines the extent to which higher educational institutions were able to embrace online learning. However, institutions of higher learning in Africa, in general, and in Ghana, in particular, seem to have deficiencies in terms of acquiring the necessary technology. Skills deficiency on the part of technicians, the inadequacy of infrastructure, and limited electronic readiness are among the factors compromising the effective use of information communication technologies (ICTs) in teaching and learning in Ghanaian higher educational institutions. Quality assurance is a central feature of a framework for enhancing the success of online teaching and learning. The other key elements include increasing the level of electronic readiness in Ghana, building the capacity of ICT technicians to develop the appropriate software, ensuring affordability of hardware, software, and data services, and training of both the lecturers and students. Huge financial investments, beyond the scope of the Ghanaian government, are required and multi-stakeholder collaborations seem to be viable funding options.

Keywords: Covid-19 pandemic, higher educational institutions, online learning, information communication technologies

1. Introduction and Background to the Study

The global Covid-19 epidemic ignited shockwaves all over the world. The public health crisis, without precedence, culminated in significant human misery and loss of life.) Yarrow (2020) posits that the Covid-19 pandemic strained health systems because of the rapid increase in infected people, combined with the devastating effects of severe cases of the disease. The lockdown measures adopted by the governments to contain the spread of the virus triggered a massive economic disaster, with a decline of 5.2% in global Gross Domestic Product (GDP) in 2020 (El-Said, 2021). There is no doubt that the Covid-19 pandemic has radically changed human lives across the globe. The pandemic manifested as a multifaceted crisis as the health systems of many countries has been found wanting, resulting in deaths. The global economy has plummeted into recession, as the governments curtailed the freedoms of citizens (Haishan and Angela, 2020).

The Covid-19 pandemic had a severe impact on the higher and tertiary education sector. Throughout the whole world, universities closed their premises in response to lockdown measures imposed by national governments (Jena, 2020). In the United States, state authorities have mandated closure but the vast majority of campuses had already closed, particularly those of large public and private universities that had closed weeks before the government's intervention. As the pandemic spreads, which seems inevitable, the remaining countries will also institute mandatory measures to suspend face-to-face activities for all educational institutions. In Latin America, there was the adoption of confinement or quarantine measures, in some cases, with a long-term perspective (Sawahel, 2021). There was the suspension of face-to-face classes, which resulted in the massive closure of higher educational institutions.

Most governments in Africa struggled to respond to the Covid-19 pandemic in an effective way. Among the pandemic's countless consequences, educational systems were severely affected globally, leading to partial and total closures of major schools and universities. On the African continent, South Africa and Egypt were the worst affected countries in terms of infections and deaths (Sawahel, 2021). Like elsewhere, in the Sub Sahara African (SSA) countries, there was no alternative but to shut their higher education institutions as an element of their lockdown measures to prevent the spread of the virus (Lesley, 2020). Higher education institutions had no alternative but to have a remedy to the use of information and communications technology (ICT) to convey their programmes online at a detachment to their enrolled students. Although higher education institutions were quick to blend face-to-face lectures with online learning,

these closures affected learning and examinations as well as the safety and legal status of international students in their host country.

In light of the Covid-19 pandemic, universities in Ghana, like elsewhere, had to innovate and adopted online teaching and learning. According to Al-Youbi *et al.* (2021), innovation means the new ways or methods and facilitating positive change. To ensure the continuity of education despite the lockdown, higher education institutions have sought to use technology and offer online classes and learning experiences as a substitute for in-class time. However, many universities struggled and lacked the experience and time they needed to conceive new ways to deliver instruction and assignments. It has been challenging for students without access to the internet, and these digital inequalities persist across all countries. Therefore, this study sought to formulate a framework for ensuring that there is an appropriate technology for teaching and learning during and after the Covid-19 pandemic. The specific research objectives were to:

- Examine the influence of the Covid-19 pandemic on teaching and learning in Ghanaian higher educational institutions;
- Discuss the relevance of online teaching and learning in Ghanaian Higher Education Institutions;
- Isolate the factors compromising the sound of online teaching and learning in Ghanaian Higher Education Institutions; and
- Propose options for enhancing the usage of appropriate technology in the Higher Educational Institutions in Ghana.

2. Theoretical Framework

There is a presentation on three theories related to this study. These are the Technology Acceptance Model (TAM), Diffusion of Innovation Theory (DIT), and the McKinsey '7S' framework. The three theories aim to explain the process of accepting or adopting technology in society, which in turn, influence the sound adoption of online learning in Ghanaian higher educational institutions.

2.1. Technology Acceptance Model (TAM)

Akinyemi and Mushunje (2020) state that one of the emerging models used to explain the adoption of new technology is the TAM, introduced by Fred Davis in 1986, and its adoption was from the Theory of Reasoned Action (TRA). TRA postulates that Behavioural Intention (BI) determines human behavior, which also depends on norms and attitude. As an advancement of the TRA, the TAM positioned attitude toward the use of new technology and its construct is from two perceived variables, which are usefulness and perceived ease-of-use (Gbongli *et al.*, 2019). According to TAM, a user's adoption of a new service or technology is determined by the user's intention to use the system, which is in turn determined by the user's beliefs about the system (Abdinoor and Mbamba, 2017). In its basic form, TAM postulates that perceived usefulness (PU) and perceived ease of use (PEOU) are the factors that influence BI and that their impact is positive. TAM deals with perceptions and not real usage of systems and points out that when there is an introduction of new technology, the customers experience either PU or PEOU, which influence their decision to adopt (Akinyemi and Mushunje, 2020).

According to Davis *et al.* (1992), as cited by Bhuvana and Vasantha (2019), perceived usefulness refers to users' perceptions regarding the outcome of the experience. PU refers to the extent to which a person believes that using a particular technology will enhance her/his experiences. It defines the degree to which a customer believes a particular system is making job performance easier (Hough and Chan, 2018). The perceived usefulness of online learning in Ghanaian higher educational institutions depends on the nature of ICT technologies available, the software, the cost of devices, and the availability of other support services like the internet. PU is 'The degree to which a person believes that using a particular system would enhance his or her job performance' (Akinyemi and Mushunje, 2020: 5).

PEOU is the extent to which a person accepts an innovation on the basis that it will be easy to use or there is a cost to that individual (Gbongli *et al.*, 2019). PEOU is the level of confidence that users put on a system, and the enthusiasm to uptake it is dependent on the perception of the customer in supporting needs. An example is that uptake of ICTs will increase when one believes that online platforms enable teaching and learning at limited costs and effort, provide convenience, and facilitate higher education in a secure environment (Abdinoor and Mbamba, 2017).

In addition, in a study that applied TAM in the banking sector, Bhuvana and Vasantha (2019) also discussed the other constructs, which can be added to the Model, which are Perceived Credibility (PC), Perceived Financial Cost (PFC), and Attitude (A). PC is the extent to which a person believes that the use of modern technology will have no security or privacy issues. PFC relates to the extent to which a person believes that the use of modern technology will cost money. Finally, Attitude (A) refers to an individual's positive and negative feelings about performing the target behavior (Bhuvana and Vasantha, 2019).

According to Gbongli *et al.* (2019), TAM is one of the most widely used theories in the area of technological research. TAM could be the most robust, and persuasive model that explains the acceptance of innovations, and behavior (Hough and Chan, 2018).

2.2. Diffusion of Innovations Theory

Another model that adoption of technology is the Diffusion of Innovations Theory (DIT), coined by Rogers in 1962 (Ndirangu and Thairu, 2016). The DIT has its foundations in communications and states that an idea or product gains momentum and spreads through a specific population or social system. The result of this diffusion is that users take up the new idea or innovation. Adoption, as brought out in the theory, assumes that users react differently to innovation compared to previous products or innovations, and this facilitates the diffusion process (Syahadiyanti and Subriadi, 2018).

Hart (2007), as cited by Ndirangu and Thairu (2016), argued that DIT theoretically posits that about 49%-87% of the variance of an innovator's rate of adoption is explained by its perceived attributes, type of innovation-decision, and nature of the social system which the innovation is diffusing and the extent of the agents' promotion efforts in diffusing the innovation.

The DIT looks into the stages through which an innovation (new idea, product, practice, or philosophy) can be transferred from one generation to another, or from one economic agent to another, through various ways, from just spreading the word to saturation (Abdinoor and Mbamba, 2017). Rogers (2003) as cited by Syahadiyanti and Subriadi (2018) defines diffusion as the process in which an innovation is communicated through certain channels over time among the members of a social system. The diffusion of innovation theory postulates five adopter categories, namely Innovators, Early Adopters, Early Majority, Late Majority, and Laggards (Khraisha and Arthur, 2018). When there is an innovation, including financial technology, the focus is on a number of factors, including the costs associated with the innovation, the effectiveness of the innovation, level of simplicity, compatibility with getting the same result, and the ability to implement appropriate adjustments (Syahadiyanti and Subriadi, 2018).

The DIT is important for this study, as it will help understand the adoption of online learning by the higher educational institutions in Ghana. There is an examination of the extent to which the technology factors influence the adoption of online learning.

2.3. McKinsey '7S' Framework

One of the objectives of this study is to propose changes in Ghanaian higher educational institutions so that there is sound adoption of online learning. One of the models used in the management of changes is the McKinsey 7S Framework, which was developed by Robert Waterman and Tom Peters during the early 1980s by the two consultants McKinsey Consulting Organisation (Ravanfar, 2015). The Model is a powerful tool for assessing and analyzing strategies in the internal situation of an organization. It is based on 7 key elements, which determine the organization's success, which should be interdependent and aligned for producing synergistic outcomes. The McKinsey 7S Model refers to the seven key interrelated or integrated elements of an organization, which are subdivided into hard and soft elements. (Pike, 2017). The Hard Elements are within the direct control of the management as they can be easily defined and identified. The following elements are the hard elements in an organization:

- Strategy: It is the plan of action, or the roadmap, or the blueprint by way of which an organization gains a competitive advantage or a leading-edge;
- Structure: This refers to organizational structure or the reporting pattern; and
- Systems: This includes the day-to-day activities in which the staff members involve themselves in ensuring the completion of their assigned tasks.
- The Soft Elements are less tangible and are difficult to be defined and identified as such elements are more governed by the culture. Nevertheless, according to the proponents of this model, these Soft Elements are equally important as the hard elements in determining an organization's success as well as growth in the industry (Burnes 2017). The following elements are the soft elements in an organization:
- Shared Values: The superordinate goals or the core values, which get reflected within the organizational culture or influence the code of ethics.
- Style: This lays emphasis on the leadership style and how it influences strategic decisions, people motivation, and organizational performance;
- Staff: The general staff or the capabilities of the employees; and
- Skills: The core competencies or the key skills of the employees play a vital role in defining organizational success

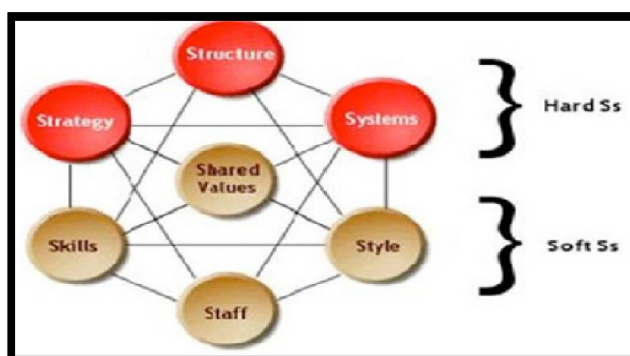


Figure 1: The 7S Framework
Source: Burnes (2017)

As per Figure 1, the shared values in the center of the model influence all the other elements of the model, which are interconnected and interrelated. The rest other elements originate from the very reason for the existence of the organization which is the vision that is formed by the creators of the values in an organization. If the values change, the rest other parameters equally undergo a change. All the areas are interconnected. This means that a change to one area will have implications for all other areas (Burnes et al., 2015). There is no hierarchy and all areas are the same size. This indicates that all areas are considered to be equally important. The areas are divided into hard and soft areas. Hard areas

are easy for management to influence and change. Soft areas are woollier and more influenced by the culture of the organization. Positioning shared values in the center of the 7S Framework indicates that the organization's values are central to all elements. The 7S Model identifies the inconsistencies or gaps between various elements and provides a strategic plan of action for reaching from the current state to the desired organizational state (Blomquist, 2017).

3. Methodology

This research applied the qualitative approach because it allowed for a detailed analysis. A multi-case study of four universities in Ghana was conducted, with two public and two private institutions being selected. In the public universities' strata, there was a random selection of the University of Ghana, and the University of Education, while in the private strata, the Catholic University College and the Methodist University College were selected. The study population also comprised the regulatory institutions, that is, the National Accreditation Board (NAB), and the National Council for Tertiary Education (NCTE). Quota and purposive were used to select the participants. Quota sampling aimed to ensure representation of all the categories of stakeholders while purposive sampling entailed that the researcher shall use judgment in order to identify the knowledgeable participants to provide the required data. The knowledgeable participants in the public and private universities targeted in this study included the Universities' Registrars (four participants, one from each university), Deans of Faculties (eight participants, two from each university), eight Departmental Chairpersons (two per university), 16 Lecturers (for per university), and four student representatives (one from each university). There was also the selection of two participants from NAB and NCTE, one from each institution.

Therefore, a total of 42 participants were targeted in this research. The determination of the estimated numbers was guided by the need to have manageable numbers as well as having an adequate size to validate the research findings. The sample had to be small enough so that data could be collected at least cost and time, and it should be large enough to yield the required data.

Data were collected using in-depth interviews (telephone calls and Zoom Meetings). The data collected was discontinued when at least 50% percent of the interviews, in all the categories were conducted. To complement the findings from the in-depth interviews, documentary sources were used that refer to already existing information about the study. The documentary analysis largely included a review of policy documents, and annual reports of the selected universities.

Data collected in this study were analyzed qualitatively. The open-ended questions that were used in interviews produced multi-varied and multi-diverse responses and the thematic data analysis procedure was suitable. This involved an analysis of words, concepts, literary devices, and or non-verbal cues. Findings from the research of similar nature were then grouped together. The data were presented in line with the research objectives.

3.1. Influence of the Covid-19 Pandemic on Teaching and Learning in Ghanaian Higher Educational Institutions

The objectives of the universities in Ghana include training mature citizens, carrying out research, and providing consultancy services to make significant impacts on the country's development in various sectors of the economy. There is no doubt that the Covid-19 pandemic affected higher educational institutions. Across many countries, globally, universities were shut down. As the spread of the coronavirus continues across the world, many questions remain unanswered, not least what is going to happen to those thousands of students whose universities were by the pandemic.

It is worthy to note that, before the Covid-19 pandemic, Ghanaian universities were already facing formidable challenges in fulfilling the promise of education as a basic human right. Thus, from a policy implementers' point of view, the challenge was already daunting before Covid-19 such that universities were going to be trapped in the ossification trap.

In a short time, the Covid-19 disrupted the landscape of learning in Ghanaian higher educational institutions by limiting how students accessed learning. In addition to the devastating health consequences on people directly affected by the virus, the Covid-19 pandemic has had major implications for the way higher education students live and work, affecting their physical and mental well-being in a profound way. Universities closed and stopped face-to-face teaching.

University students were among the most strongly affected by Covid-19 because of uncertainty regarding academic success, future careers, and social life during college. The performance of students was affected, by educational plans, current labor market participation, and expectations about future employment. This crisis raises questions about the value of the educational content of online learning therefore this research would help the higher learning institutions on how to move on whenever there is a pandemic as well as the importance of re-inventing in order to escape the ossifying trap. Examinations were also affected, causing disruption to students' learning trajectories and progression.

University leaders also faced internal and external pressures due to the Covid-19 pandemic. They are faced with challenges that are different from those that they were used to dealing with. These challenges need new strategies for continuity of education despite the pandemic. The effective development and implementation of the strategy depend on the strategic capability of the organization, which will include the ability not only to formulate strategic goals but also to develop and implement strategic plans through the process of strategic management.

Containing the spread of the Covid-19 entails physical distancing, limiting traffic on campuses, and ensuring that much teaching and learning is online. To remain relevant and to escape ossification, universities needed to re-invent their learning environments so that digitalization expands to suit all students, lecturers, and administration staff. Thus, in the midst of the Covid-19 pandemic, there was an opportunity for technological advancement. The Covid-19 crisis accelerated an expansion of online learning in higher educational institutions.

3.2. Relevance of Online Teaching and Learning in Ghanaian Higher Education Institutions

The Covid-19 was a rude awakening for the Ghanaian universities, it helped the executives to see the relevance of re-inventing. If universities do not re-invent, they will fail to deliver and students will leave the universities and go to other countries. Therefore, universities had to re-invent lest they ossify. In this regard, the Covid-19 pandemic forced the universities to close face-to-face education and send student's home. This forced universities to introduce courses through online portals. One of the key informants highlighted several issues related to the online learning management systems in universities such as the lack of trained lectures, slow down of the internet speed, WIFI coverage, infrastructure, the interface of design, quality of content, system use, and students' adoption. For continuity purposes, universities adopted the technologies such as digital video conferencing platforms like Zoom, Microsoft platform, telegram, Webex Blackboard, and Google Classroom.

This study reaffirmed the notion that, in contemporary times, online teaching and learning is getting very popular worldwide. Online teaching and learning are the delivery of learning through technology and the internet. Almost all the universities in Ghana developed online learning portals for their students and faculties. In the 21st century, online teaching and learning create a more significant impact on all types of students, such as part-time and full-time or distance-learning students in higher education institutions. Nowadays, the majority of the postgraduate students are registered as part-time students, because they will be employed. Online teaching and learning help them a lot because of their time constrain.

The Covid-19 affected teaching and learning institutions for two years and could be around in the unforeseeable future, thus online learning systems are relevant. The Covid-19 provided new opportunities for education systems, particularly in the integration of technology into learning. Stakeholders saw it as a chance for governments to evolve education systems into something fit for the 21st century where specific technologies are useful in teaching and learning. There is a need for technological advancement, increased access to gadgets, affordable internet services, and facilitating software and online system development. Most important is the need for training of lecturers, students, and support staff (ICT personnel). However, online teaching and learning, as new and expanding methods, still have challenges. The next section elaborates on the challenges.

3.3. Factors Compromising Sound Online Teaching and Learning in Ghanaian Higher Education Institutions

Some of the factors that have hitherto hampered the adoption of ICTs in higher educational institutions are many among which are establishing cost, accessibility, data security, network reliability, privacy and confidentiality, threat, the authenticity of products, citizen's income, and education (Wangari, 2019). More so, According to Chikalipah (2017: 10), 'Africa is ranked the lowest among the developing economies in terms of access to infrastructure, far behind Latin America and East Asia.' Lack of access to technology is the biggest barrier for learning during the current pandemic together with school closures in the African continent. The author notes that learners in rural communities were the most disadvantaged to online learning due to the lack of availability and affordability of the internet. A large majority of educators have not received financial support for teaching and learning tools from their governments to help them continue teaching in the crisis, and there have been no sufficient preparations to help them adapt.

University staff, students, and lecturers had no prior experience in teaching and learning outside the classroom. For lecturers, the main impediment was the lack of appropriate training to design and manage distance learning programmes. This was compounded by a lack of infrastructure such as electricity, connectivity, devices, and a lack of appropriate learning materials like books, television, and internet-enabled devices. The students gave mixed reviews for the forced transition to online courses. Some of them find it difficult to stay focused, believe that online lectures are less effective, and struggle to interact online with lecturers and peers. This is not only because of internet access issues but also because students (and staff) are not used to such environments or do not have the skills to make optimal use of such platforms.

The essential infrastructure such as security services, telecommunication facilities are still underdeveloped in Africa, and the situation is much worse in rural areas (Isukul and Tantua, 2021). Much of the service provision is concentrated in the urban areas, neglecting the rural communities (Chikalipah, 2017). The rural populations are also at a disadvantage when accessing and using information technology services; they face greater physical distances (and therefore higher costs), may earn lower and more inconsistent incomes, and may have less documentation (in particular if working in informal sectors). Thus, the use of ICTs still has untapped potential in Ghana and needs to ensure the provision of services that are tailored to local context and end-user characteristics.

Access to electricity is also a challenge in the rural areas in most African countries, and this compromises e-commerce. According to the United Nations (2020), deficits in electricity are increasingly concentrated in SSA, affecting about 548 million people, or 53% of the population. The proportion of the global population with access to electricity increased from 83% in 2010 to 90% in 2018, meaning that over 1 billion people acquired this essential service. Yet, about 789 million people (85% in rural areas), lacked electricity in 2018 (United Nations, 2020).

In Ghana, the experience of the Covid-19 pandemic has been traumatic and some institutions took steps that showed foresight, imagination, and innovation. However, funding remains a challenge hindering the success of the innovations. One of the members of the management in one of the Universities said that funding was a huge constraint. Funding is lacking to enable lecturers to do proper research. Most Ghanaian universities are driven by new technologies that integrate ICT and therefore do not have the ability to effectively implement the new system. As such, it is a problem as there are limited facilities and access to available facilities is restricted. Among other factors such as organizational culture and structure, resource availability is important when implementing changes.

In light of the aforementioned challenges compromising sound online teaching and learning in Ghanaian higher educational institutions, there is a need for action. The next section presents the options for enhancing online teaching and learning.

3.4. Enhancing Usage of Appropriate Technology in the Higher Educational Institutions in Ghana

In light of the challenges mentioned in the previous section, there is a need for a solution. A number of options can help to enhance access to technology and online learning in Ghanaian higher educational institutions. There is a need for adequate resources, knowledge dissemination, adequate time to 'fine-tune' online learning, affordability of the digital product and services, governments to formulate sound strategies for e-governance, and multi-stakeholder collaborations. When asked the question pertaining to the options for enhancing online teaching and learning, one of the participants said that more funding is needed. Funding can be through the initiation of public-private partnerships. Findings found out that lack of adequate financial resources is one of the many factors hindering the sound implementation of online teaching and learning. As a result, the participants recommended that it is time that the universities in Ghana engage and collaborate with non-public partners which include civil society and private sectors if they need to fully put in force and fulfil their goals and goals as stipulated above.

Almost all of the participants underscored the need for capacity building. Upgrading the competencies of academics in line with the changing times is essential. Additionally, the adoption of the promoting infrastructure and giving academic incentives will boom competency within the group and ultimately accomplish the supposed curriculum dreams. Knowledge dissemination is essential for the adoption of new technology, which can facilitate online learning. Adoption is the acceptance and continued use of a particular product, service, or idea. The users go through a process of knowledge, persuasion, decision, and confirmation before they are ready to adopt a product or service. Therefore, adoption or rejection of innovation begins when the consumer becomes aware of the product or service (Chitungo and Munongo, 2013). Akinyemi and Mushunje (2020) observe that the technology adoption process begins exclusively with knowledge of specific technology and subsequently by the decision to either reject or adopt the technology. Information relating to technology is a necessary impetus that must precede the adoption of any technological innovation. Nevertheless, by its make-up, the mobile phone is the connection between inventors and adopters that enhances the flow of information.

There is a need for learning support measures to equip higher educational institutions with digital platforms and tools for distance learning, lend digital devices to less well-off students, and train school staff in methodologies and techniques for distance learning. Extra funding is required to cover costs arising from responses to the pandemic crisis. This extra funding will cover the costs associated with special services, safety equipment, and cleaning material needed in universities for the next academic year, among other things.

More time, for online teaching and learning to be perfected, is necessary. According to the Theory of Reasoned Action (TRA) and the Technology Acceptance Model (TAM), it is essential that all the relevant stakeholders in the Ghanaian higher educational institutions exhibit appropriate behavior so that there is full adoption of online teaching and learning. The online methods ought to be useful and easy so that there is ensure perceived usefulness (PU) and perceived ease of use (PEOU). In line with this argument, Al-Youbi *et al.* (2021) point out that innovation is produced through exerting time and effort in researching an idea, developing ideas, or marketing them for beneficiaries.

The affordability of technological resources is also important. In any product or service, there is cost, which includes infrastructure cost, software development costs, mobile network charges for sending communication traffic (including SMS or data), and mobile device cost (Chitungo and Munongo, 2013). In this regard, there is a need to ensure that technological products are affordable. There is a need for adequate and appropriate technology to facilitate the adoption of online learning, especially in remote rural areas. The resources include physical infrastructure, hardware, software, and human resources (capacitate the communities). Another way of referring to technological resources is using the term 'digital platforms', which are multisided electronic frameworks that shape the terms on which participants interact. Digital platforms are also complex mixtures of software, hardware, operations, and networks (Moro-Visconti *et al.*, 2020). The ICT products and services also ought to be affordable so that even the low-income earners can buy the gadgets.

In addition, Quality Assurance (QA) remains one of the top priorities of contemporary higher education policies in Africa. This can be attributed to the fact that many African countries, including Ghana, have formed national quality assurance units purposely to enhance access to higher education and ensure that higher education institutions do not compromise on quality. The aim of quality assurance in higher education has been identified as accountability and improvement. A strong quality assurance framework in high education must meet the basic condition of stability if it is to achieve quality enhancement. A myriad of studies on quality assurance in higher education has exhibited that a resilient external quality assurance without equally resilient internal quality assurance does not warrant real improvement in quality. In light of this, there is the need for higher education institutions to have resilient internal quality in accompaniment of external quality assurance in order to build quality.

Quality assurance is a planned and systematic process of reviewing institutions or programmes to establish if there is the maintenance of acceptable standards (Tsevi, 2019). Quality higher education is critical for affiliating development. Quality assurance helps to ensure that higher education becomes more relevant to developmental needs. According to Wells (2018), as the student numbers are exploding around the world, there has never been a greater need for quality tertiary education, which contributes towards sustainable development. Quality education is one of the priorities of Ghana in order to boost the welfare of her citizenry and is considered as an essential driving force for economic and social development. Education as a way to transmit knowledge, facilitate learning, and inspire innovation, is

essential for individual and societal development. For this reason, there is a need to understand and examine the quality of higher education in Ghana within the context of significant educational expansion in institutions of higher learning.

Most important, there is a need for countries to formulate vibrant strategies for electronic government (e-government). E-government pertains to the use of information communication technologies (ICTs) to improve the efficiency, effectiveness, transparency, and accountability of government operations (Ambarkhane *et al.*, 2016). According to Akinyemi and Mushunje (2020), e-government or the use of ICTs have the potential for economic growth and social empowerment. E-government seeks to enhance the connection between government institutions and citizens. Through e-government, the public sector is able to use ICT to deliver services to citizens, there is reliability of the information, and easy access to information facilitates understanding of the governing processes and encourages active participation. E-government makes it possible for the citizens to be 'comfortable' with ICTs products and services, and there is a high probability of them using e-banking services, thus enhancing financial inclusion. As part of the e-government strategy, the government will in turn improve the ICT infrastructure, which is also necessary for electronic banking and for financial inclusion. It is also essential to note that technology goes through periods of incremental change followed by radical technological breakthroughs, and thus the innovation response must vary to suit the environment (Ndirangu and Thairu, 2016). Thus, success in terms of the adoption of e-government is a process and not an event.

In education, there is more emphasis on high-quality outcomes that impact learning and achievements and to build policies and strategies that will enhance students' abilities to achieve their full potential. It is in this regard that Sustainable Development Goal 4 stresses quality education which states, 'Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all' (United Nations, 2020). In line with the Diffusion of Innovation Theory, the management in Ghanaian higher educational institutions ought to understand that innovations take some time to be fully adopted. As the new innovations are being diffused, there are also a need to ensure that appropriate changes in terms of the key elements of universities, as organizations, are in place. In line with the 7 'S' framework, there is a need for sound strategies, structures, and systems (the hard elements). Equally important is the need for shared values (regarding online teaching and learning), appropriate leadership styles, adequate staff, and the cultivation of the right skills (soft elements).

This study proposes a framework for enhancing sound online teaching and learning, amid the Covid-19 pandemic. Figure 2 shows the key elements of this framework.

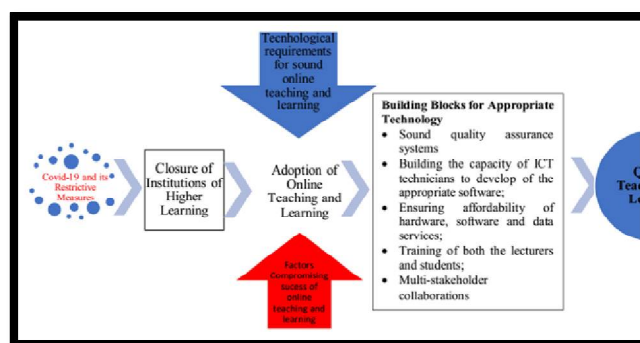


Figure 2: Conceptual Model for Sound Online Teaching and Learning in Ghanaian Higher Educational Institutions

According to Figure 2, the Covid-19 pandemic, with its restrictive measures, resulted in the closure of universities, thus affecting teaching and learning. Universities adopted online learning as a mitigation strategy, though the e-learning platforms are not yet perfect. Thus, there is a need to put in place the building blocks for enhancing sound online teaching and learning. Quality assurance is a central feature of a framework for enhancing the success of online teaching and learning. The other key elements include increasing the level of electronic readiness in Ghana, building the capacity of ICT technicians to develop the appropriate software, ensuring affordability of hardware, software, and data services, and training of both the lecturers and students. Huge financial investments, beyond the scope of the Ghanaian government, are required and multi-stakeholder collaborations seem to be viable funding options.

4. Conclusion

This study showed that the Covid-19 pandemic has negative implications on teaching and learning in Ghanaian higher educational institutions, which was predominantly on a face-to-face basis. Accordingly, the national lockdown measure for preventing the spread of the Covid-19 pandemic affected teaching and learning, leading to the adoption of online platforms. Online learning is necessary to facilitate the continuation of studies during the Covid-19 pandemic. However, there are challenges associated with online learning including limited resources, lack of internet facilities, and skills deficiency. There is also the argument that implementation was rushed and staff is demotivated. Inadequate participation of the key stakeholders, in particular, the lecturers, is also another challenge. The study concluded that more funding is required to enhance the sound online teaching and learning in Ghanaian higher educational institutions. Equally important is the need for adequate participation of stakeholders, capacity building, and staff motivation. Partnerships with the private sector would also unlock the required funding. Moreover, the successful implementation of online teaching and learning requires monitoring and evaluation of progress, as well as continuous improvement. To escape the ossification trap, universities have to move towards a re-invention model. They are expected to move 'great leap forward' in terms of fulfilling facilities such as ICT centers, establishing joint lab centers with the industries, research, and technology

incubation centers. Universities should actively engage themselves in commercializing their research outputs to the market by collaborating with both domestic and international industries.

5. References

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