

## ECONOMIES OF E-LEARNING AND SUSTAINABLE UNIVERSITY EDUCATION IN NIGERIA IN THE FACE OF COVID-19 PANDEMIC

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### **Abstract**

**Purpose:** *This study aimed at determining the influence of economies of e-learning on sustainable university education in Nigeria in the face of covid-19 pandemic.*

**Design/Methodology/Approach:** *Ex-post facto design was used for the study. The population of the study was 500 respondents. The instrument for the study was Economies of E-learning and Sustainable University Education Questionnaire (EESUEQ) developed in accordance with a Likert 4-point rating scale. The instrument was properly faced validated by three experts. A preliminary test was carried out and the reliability coefficient based on Cronbach Alpha statistic obtained for the sub-scales range from .83 to .85. The data obtained from the field were analysed using One-way Analysis of Variance (ANOVA) at .05 level of significance.*

**Findings:** *The findings revealed that cost efficiency and learning efficiency significantly influence sustainable university education in Nigeria in the face of covid-19 pandemic.*

**Practical Implication:** *Teaching and learning have been stalled by the COVID-19 related crisis in the most direct way, primarily due to the absence of options for face-to-face interactions for an extended period in our universities. Therefore, economies of e-learning which are the cost-saving advantages that both the Federal Government and the students could enjoy through the varied use of electronic media will be the solution to unsustainable university education in the face of this pandemic.*

**Originality/Value:** *It was recommended among others that e-learning should be encouraged among lecturers and students so as to guarantee learning efficiency for sustainable university education in Nigeria in the face of covid-19 pandemic.*

**Keywords:** *Covid-19 Pandemic, Economies of E-learning, Sustainable University Education.*

**Paper type:** *Empirical research.*

### **Introduction**

Every nation aims to develop a strong human capital base that will enhance its economic prosperity. University education in Nigeria was set up for such a purpose. The United Nations in 2015 came up with 17 Sustainable Development Goals (SDGs), the fourth of which was on inclusive and equitable quality education and promotion of lifelong learning opportunities for all. While the Federal Government is striving to resuscitate its seemingly unsustainable university education system effectiveness by recruiting qualified lecturers, providing adequate classrooms, increasing ICT utilization, and creating more programmes; the nation is fiercely attacked by the Corona Virus, the Covid-19 Pandemic, that has ravaged the human race resulting in lockdown and social distancing, thus making learning in the four-walls of the

classroom impossible. UNESCO International Institute for Higher Education in Latin America and the Caribbean (2020) reported that presently, the brief closures of higher education institutions as a result of COVID-19 pandemic is no longer rumour, because most countries have stopped face-to-face teaching. It further stated that this decision was necessitated by the belief that large gatherings of persons is life-threatening to safeguarding public health during the scourge. Hence, all educational institutions shut their doors in circumstances where some form of quarantine has been passed into law.

Today, all classroom activities have been suspended everywhere. Thus, the high touch, highly interactive, mobile, densely populated living and learning environment typical of most campuses is the exemplar of a congregate setting

with multiple risk factors for ready transmission of COVID-19 (American College Health Association, 2020). In the same vein, UNESCO International Institute for Higher Education in Latin America and the Caribbean (2020) further stated that, although the influence of the Covid-19 pandemic on higher education institutions was sudden without any exigent plan other than to attempt to end classes in the slightest bit, the pandemic has indeed intensifies immense difficulty to higher education globally because of the still unimaginable challenges it faced such as growth without quality assurance, inequities in access and achievement, and the progressive loss of public financing.

Teaching and learning have been stalled by the COVID-19-related crisis in the most direct way, primarily due to the absence of options for face-to-face interactions for an extended period. Aside teaching and learning, there are serious challenges regarding the academic calendar and associated issues such as examinations, admission, and graduation. Zhang, Wang, Yang and Wang as cited in Espino-Diaz, Fernandez-Caminero, Hernandez-Lloret, Gonzalez-Gonzalez and Alvarez-Castillo (2020) asserted that the current context under the threat of the of COVID-19 pandemic is causing a series of transformations in the different spheres of educational life as different governments have launched emergency policy initiatives based on the suspension of classes and the closure of educational centres to continue teaching activities from homes with the use of information and communication technologies to be able to stop the number of infections. This will, therefore, enhance a paradigm shift in tertiary education in terms of curriculum and practice for sustainable development policy in Nigeria, in accordance with the global sustainability agenda.

Arnhold, Brajkovic, Nikolaev and Zavalina (2020) also emphasized that as of 26 May 2020, there were 5,371,700 cases of COVID-19 worldwide, of which 1,828,598 were recorded in Europe, with Western Europe (France, Germany, Italy, Spain, and the UK) severely affected. Some countries in the Europe and Central Asia region initially stopped the education process at universities for a short break only: early holidays were announced in the UK, and an additional one week of vacation took place in Russia; the Kyrgyz Republic announced a longer holiday break to be able to prepare universities for distance learning, but, after discovering that the COVID-19 epidemic and quarantine measures would last for months, the learning process has continued in a distance mode using online technologies. In fact, most countries of the region have by now moved to online learning at the tertiary level.

E-learning is pedagogy empowered by digital technology (Tittrade, El Baaboua, Sion, & Mihalcescu, 2009). It is learning facilitated through electronic means. It is a personalized form of education, which makes learning more learner-centered. The new technology has helped institutions of higher education save money through improved processes, distance education, and cutting down costs. E-learning has expanded the scope and content of the curriculum and increased enrolment for colleges and universities (Horgan as cited in Kasraie & Kasrarie, 2010), thus, promoting cost and learning efficiency for sustainable university education in Nigeria.

Economies of e-learning are the cost-saving advantages or benefits that an institution derived from the use of digital technology in teaching and learning. These advantages are cost and learning efficiency (Ande, 2015; Anyanwuocha, 2011). Kasraie and Kasraie (2010) stated that the e-learning contribution is more cost efficient than the face-to face course. If an institution is to undertake the face-to-face teaching and learning over time in its campus, it would make for travel expenses for participants and variable costs such as utilities and building maintenance each time such that the economies of scale would not be realized to the same extent. Collaborating, Marengo and Marengo (2005) specified that elimination of travel expenses and other exigencies are the most direct identifiable economies. In that the cost of lecturers' transportation to lecture halls for face to face lessons as well as that of the technical management staff who assist with course management is not incurred. Also, a university may need to repeat the same course for different Students without incurring costs for each teaching session carried out.

Batalla, Rimbau and Serradell (2014) also indicated that the level attained by online students in several generic competencies is better than the one attained by face-to-face students. Such competencies include searching for information and time management. Chakrabarty, Rahman and Khanam (2014) further disclosed that conventionally, universities are labour intensive, replacing labour for information technology will intensify productivity by reducing costs while sustaining same outcomes relative to the traditional ways of handling day to day activities.

Marengo and Marengo (2005) opined that e-learning enhanced decrease on costs for teaching and learning materials such as printing, procurement of CD-ROMs, etc. and distribution, storage and management of teaching materials including books, handouts, CD-ROMs, etc., costs which are destined to be repeated with every content update. In Comparing e-education costs with face to face learning, Buchanan (2011) revealed that many countries of the world are emphasising on supply of digitally literate, technologically able graduates who are employable in the digital global economy.

Straub and Cardinali (2005) revealed that E-learning avail institutions the opportunity to adjust to swiftly changing environments and maintain a competitive advantage in the business world. Such initiatives increase the speed and dissemination of knowledge by giving prospects in the form of personalized learning and new collaborative learning opportunities. Marengo and Marengo (2005) maintained that e-learning enhanced increase in individual study time. The use of e-learning methodologies and technologies means that as the need to travel to the learning premises is reduced, the student can dedicate such time to study activities set out in the lessons.

While explaining the benefits of the virtual tour, Lewin as cited in Rao (2011) indicated that all students can look at their own copy of the material while a library might have only one book in printed form. Marengo and Marengo (2005) further opined that the used e-learning leads to reduction in teaching time. with e-learning, the time necessary to grasp the same learning objectives is lesser compared to that of

traditional paths. If this is so, the additional time could be used for individual study time which other teaching methods would use for face to face teaching. Hence, time reduction really is a result of greater efficiency in e-learning.

Collis as cited in Valaseca and Castillo (2008) stressed that the use of e-learning in the production of education is renovating the way universities are developing learning and teaching processes such that new openings have arisen to integrate pedagogical and technological resources, to widen flexibility across the learning process, and to improve the communication between teachers and students as well as the interaction between different educational resources. Chakrabarty, Rahman and Khanam (2014) suggested that in the verge of increasing cost of face to face learning in higher academic institutions students are showing a tremendous interest on e-learning.

Hogan and Kedrayate (2010) said that as universities move to deliver lifelong learning and increased educational access, e-learning is a good fit. Using this blended approach, universities can shorten semesters, offer more courses every semester, and reach citizens throughout the country. Since eLearning allows students to study anytime-anywhere, basic education and up skilling becomes more available to more people. Lewin (2001) in Rao (2011) explained that with today's advancement in the e-Learning technology, students can take around-the-world virtual field trips without ever leaving the homes.

#### **Purpose of the study**

The study aimed at determining the influence of economies of e-learning on sustainable university education in Nigeria in the face of covid-19 pandemic. Specifically, the study aimed at finding out the:

1. Influence of Cost efficiency on sustainable university education in Nigeria in the face of covid-19 pandemic.
2. Influence of learning efficiency on sustainable university education in Nigeria in the face of covid-19 pandemic.

### **Research questions**

1. How does cost efficiency influence sustainable university education in Nigeria in the face of covid-19 pandemic?
2. How does learning efficiency influence sustainable university education in Nigeria in the face of covid-19 pandemic?

### **Null hypotheses**

1. There is no significant influence of cost efficiency on sustainable university education in Nigeria in the face of covid-19 pandemic.
2. There is no significant influence of learning efficiency on sustainable university education in Nigeria in the face of covid-19 pandemic.

### **Methodology**

Ex-post-facto design was used for the study. This is a logical enquiry where the researchers do not have absolute control over the independent variables because their indicators have long occurred and they are typically not manipulated (Isangedighi, Joshua, Asim and Ekuri, 2004). Ex-post-facto design was suitable because the manipulation of such variables like cost and learning efficiency were impracticable in the course of this study. They have already interacted to produce the level of sustainable university education which the researchers only assessed. The population of the study was 500 respondents (300 lecturers and 200 post graduate students) who were in the researchers' chat and publishing groups. All of them were sampled. The structured questionnaire was sent through mail to 500 respondents. This was as a result of restriction of movement during the time of this study occasioned by covid-19 pandemic. Out of which, 460 were returned.

The instrument for the study was Economies of E-learning and Sustainable University Education Questionnaire (EESUEQ) developed in accordance with a Likert 4-point rating scale of Very Sure (VS), Sure (S), Not Sure (NS) and Not Very Sure (NVS) with weight of 4, 3, 2, and 1 for all positively worded items and weight of 1, 2, 3, and 4 for all negatively worded items respectively. The instrument was properly faced validated by three experts in the departments of Educational Foundations, Educational Management and Library Science of the University of Calabar, Calabar-Nigeria. To determine the internal stability of the instrument, a preliminary test was carried out and the reliability coefficient based on Cronbach Alpha statistic obtained for the sub-scales range from .83 to .85. The data obtained from the field were analyzed using One-way Analysis of Variance (ANOVA) at .05 level of significance. ANOVA was best used because the two independent sub-variables were categorized into four respectively.

### **Results**

The results for the test of hypotheses are presented hypothesis-by-hypothesis as follows:

**Hypothesis One:** There is no significant influence of cost efficiency on sustainable university education in Nigeria in the face of covid-19 pandemic.

To test this hypothesis, One-way Analysis of Variance (ANOVA) was applied with cost efficiency as independent variable or factor and sustainable university education in Nigeria in the face of covid-19 pandemic as dependent variable. The F-ratio was used to test the overall influence and Fishers Least Significant Difference (LSD) test to compare pairs of means as post hoc test. The ANOVA results are presented on Table 1.

Table 1: One-way ANOVA of influence of cost efficiency on sustainable university education in Nigeria in the face of covid-19 pandemic.

Cost efficiency	N	Mean	Std dev.
Elimination of transport expenses	90	10.023	1.59
Reduction in contraction /treatment of covid-19	136	10.894	1.01
Reduction in number of lecturers employed	180	10.477	1.25
Decrease in cost of learning Materials	54	10.415	1.72
Total	460	10.452	1.40

  

Source of variation	Sum of squares	Df	Mean square	F – value	P – value
Between groups	469.731	3	156.577	13.235*	.000
Within groups	5395.108	456	11.831		
Total	5864.839	459			

\*Significant at .05 level, P < .05

From Table 1, the mean showed that the cost efficiency in terms of reduction in contraction / treatment of covid-19 cases was the highest ( $\bar{x}$  =10.894) with a standard deviation of 1.01, followed by reduction in the number of lecturers employed ( $\bar{x}$  =10.477) with a standard deviation of 1.25 while the least was elimination of transport expenses ( $\bar{x}$  =10.023) with a standard deviation of 1.59. The p-value (.000) associated

with the computed F-value (13.235) was observed to be less than .05. Hence, the null hypothesis was rejected. This means that there is significant influence of cost efficiency on sustainable university education in Nigeria in the face of covid-19 pandemic.

To find out which pair of means was responsible for the observed significant results, Fisher’s LSD test was carried out. The results are presented in Table 2.

Table 2: LSD Pairwise comparison of influence of cost efficiency on sustainable university education in Nigeria in the face of covid-19 pandemic.

Cost efficiency	Elimination of transport expenses	Reduction in contraction/ treatment of Covid-19	Reduction in number of lecturers employed	Decrease in cost of learning materials
Elimination of trans. Expenses	10.807**	.434*	.291	.316*
Reduction in contraction/treat.	.001	10.661	.166*	.400
Reduction in number of lecturers	.000	.010	10.374	.385*
Decrease in cost of learning mat.	.021	.000	.005	10.682

\*Significant at .05 level, P< .05

\*\*Values along main diagonal are group means, above it are mean difference (MD) and below it are corresponding P-values

The results on Table 2 showed that the mean ( $\bar{x}$ ) of cost efficiency in terms of elimination of transport expenses was significantly different from reduction in contraction/ treatment of covid-19 cases (MD= .434, P= .001 < .05), and decrease in the cost of learning materials (MD= .316, P= .021 < .05). Cost efficiency in terms of reduction in contraction/ treatment of covid-19 cases was also significantly different from reduction in the number of lecturers employed

(MD= .166, P= .010 < .05). While cost efficiency in terms of reduction in the number of lecturers employed was significantly different from decrease in the cost of learning materials (MD= .385, P= .005 < .05), and all the other paired companions were not significant.

**Hypothesis Two:** There is no significant influence of learning efficiency on sustainable university education in Nigeria in the face of covid-19 pandemic.

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To test this hypothesis, One-way Analysis of Variance (ANOVA) was applied with learning efficiency as independent variable or factor and sustainable university education in Nigeria in the face of covid-19 pandemic as dependent variable. The F-ratio was used to test the overall influence and Fishers Least Significant Difference (LSD) test to compare pairs of means as post hoc test. The ANOVA results are presented on Table 3.

Table 3: One-way ANOVA of influence of learning efficiency on sustainable university education in Nigeria in the face of covid-19 pandemic.

Learning efficiency	N	Mean	Std dev.
Increase in personalize learning	122	10.547	0.91
Increase in personalize learning time	145	10.180	1.42
Decrease in teaching time	115	10.001	1.68
Increase interest in learning	78	10.119	1.50
Total	460	10.212	1.38

  

Source of variation	Sum of squares	Df	Mean square	F – value	P – value
Between groups	512.572	3	170.857	13.173*	.005
Within groups	5914.447	456	12.970		
Total	6427.019	459			

\*Significant at .05 level, P < .05

From Table 3, the mean showed that the learning efficiency in terms of increase in personalize learning was the highest ( $\bar{x}$  =10.894) with a standard deviation of 0.91, followed by increase in personalize learning time ( $\bar{x}$  =10.180) with a standard deviation of 1.42 while the least was decrease in teaching time ( $\bar{x}$  =10.001) with a standard deviation of 1.68. The p-value (.005) associated with the computed F-value (13.173)

was observed to be less than .05. Therefore, the null hypothesis was rejected. This means that there is significant influence of learning efficiency on sustainable university education in Nigeria in the face of covid-19 pandemic.

To find out which pair of means was responsible for the observed significant results, Fisher’s LSD test was carried out. The results are presented in Table 4.

Table 4: LSD Pairwise comparison of influence of learning efficiency on sustainable university education in Nigeria in the face of covid-19 pandemic.

Learning efficiency	Increase in personalized learning	Increase in personalized learning time	Decrease in teaching time	Increase interest in learning
Increase in personalized learning	10.412**	.279*	.084*	.228*
Increase in personized learning time	.000	10.705	.351*	.099
Decrease in teaching time	.004	.005	10.440	.307*
Increase interest in learning	.000	.051	.000	10.538

\*Significant at .05 level, P< .05

\*\*Values along main diagonal are group means, above it are mean difference (MD) and below it are corresponding P-values

The results on Table 4 showed that the mean ( $\bar{x}$ ) of learning efficiency in terms of increase in personalize learning was significantly different from increase in personalize learning time (MD= .279, P= .000 < .05), decrease in teaching time (MD= .084, P= .004 < .05) and increase interest in

learning (MD= .228, P= .000 < .05). Learning efficiency in terms of increase in personalize learning time was also significantly different from decrease in teaching time (MD= .351, P= .005 < .05). While learning efficiency in terms of decrease in teaching time was significantly different from increase interest in learning (MD=

.307,  $P = .000 < .05$ ), and all the other paired companions were not significant.

### **Discussion**

The results of hypothesis one revealed that there is significant influence of cost efficiency on sustainable university education in Nigeria in the face of covid-19 pandemic as the P-value (.000) associated with the computed F-value (13.235) is less than .05. This study supported Batalla, Rimbau and Serradell (2014) who indicated that the level attained by online students in several generic competencies is better than the one attained by face-to-face students. Such competencies include searching for information and time management. Chakrabarty, Rahman and Khanam (2014) further disclosed that conventionally, universities are labour intensive, replacing labour for information technology will intensify productivity by reducing costs while sustaining same outcomes relative to the traditional ways of handling day to day activities. This finding collaborated with Marengo and Marengo (2005) who specified that elimination of travel expenses and other exigencies are the most direct identifiable economies. In that the cost of lecturers' transportation to lecture halls for face to face lessons as well as that of the technical management staff who assist with course management is not incurred. Also, a university may need to repeat the same course for different Students without incurring costs for each teaching session carried out.

The study also aligned with Kasraie and Kasraie (2010) who stated that the e-Learning contribution is more cost efficient than the face-to face course. If an institution is to undertake the face-to-face teaching and learning over time in its campus, it would make for travel expenses for participants and variable costs such as utilities and building maintenance each time such that the economies of scale would not be realized to the same extent. This study affirmed Marengo and Marengo (2005) who opined that e-learning enhanced decrease on costs for teaching and learning materials such as printing, procurement of CD-ROMs, etc. and distribution, storage and management of teaching materials including books, handouts, CD-ROMs, etc., costs which are destined to be repeated with every content update.

The results of hypothesis two revealed that there is significant influence of learning efficiency on sustainable university education in Nigeria in the face of covid-19 pandemic as the P-value (.005) associated with the computed F-value (13.173) is less than .05. This finding is in agreement with Chakrabarty, Rahman and Khanam (2014) suggested that in the verge of increasing cost of face to face learning in higher academic institutions students are showing a tremendous interest on e-learning. This research aligned with Hogan and Kedrayate (2010) who said that as universities move to deliver lifelong learning and increased educational access, e-learning is a good fit. Using this blended approach, universities can shorten semesters, offer more courses every semester, and reach citizens throughout the country. Since e-learning allows students to study anytime-anywhere, basic education and up skilling becomes more available to more people. The finding also upheld Marengo and Marengo (2005) who maintained that e-learning enhanced increase in individual study time. The use of e-learning methodologies and technologies means that as the need to travel to the learning premises is reduced, the student can dedicate such time to study activities set out in the lessons.

This study was in agreement with Lewin as cited in Rao (2011) who while explaining the benefits of the virtual tour, indicated that all students can look at their own copy of the material while a library might have only one book in printed form. Collaborating, Collis as cited in Valaseca and Castillo (2008) stressed that the use of e-learning in the production of education is renovating the way universities are developing learning and teaching processes such that new openings have arisen to integrate pedagogical and technological resources, to widen flexibility across the learning process, and to improve the communication between teachers and students as well as the interaction between different educational resources. The result was in line with Marengo and Marengo (2005) who further opined that the used e-learning leads to reduction in teaching time. with e-learning, the time necessary to grasp the same learning objectives is lesser compared to that of traditional paths. If this is so, the additional time could be used for individual study time which

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other teaching methods would use for face to face teaching. Hence, time reduction really is a result of greater efficiency in e-learning. The finding was in conformity with Straub and Cardinali (2005) who revealed that e-learning avail institutions the opportunity to adjust to swiftly changing environments and maintain a competitive advantage in the business world. Such initiatives increase the speed and dissemination of knowledge by giving prospects in the form of personalized learning and new collaborative learning opportunities.

### **Conclusion**

Teaching and learning have been stalled by the COVID-19-related crisis in the most direct way, primarily due to the absence of options for face-to-face interactions for an extended period in our universities. Therefore, economies of e-learning which are the cost-saving advantages that both the Federal Government and the students could enjoy through the varied use of electronic media will be the solution to unsustainable university education in the face of this pandemic. These economies of e-learning include cost and learning efficiency which are thought of rendering the university education globally competitive thereby exposing it to global best practices; promoting technology-based methodologies in the university system thereby stepping up general technology appreciation in education; making Nigerian university graduates more self-assured as global citizens; reduction in contracting and treatment of COVID-19 cases among staff and students; reduction in the number of lecturers employed; saving the stress and cost of staff and students' movement among others.

### **Recommendations**

Based on the findings, the following recommendations were made:

1. E-learning should be given apt attention by the federal and state governments in the universities in order to ensure cost efficiency for its sustainability in the face of covid-19 pandemic.
2. E-learning should be encouraged among lecturers and students so as to guarantee learning efficiency for

sustainable university education in Nigeria in the face of covid-19 pandemic.

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