Research Article

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Electronic Infrastructure and the Sustainable Development of Business Education Programmes in the 21st Century

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Abstract

This study primary goal was to investigate the electronic infrastructure-based and the sustainable development of business education programmes in the 21st century. This study used a survey research approach, with 23 participants, including 14 male and 9 female of business education lecturers. There was no sample in this study because the total population was small enough to be studied as a whole. The necessary data were gathered using one study instrument known as the "Electronic Infrastructure-based and Sustainable Development of Business Education Programme Questionnaire" (EISDBEPQ). The questionnaire was validated by three experts: one from measurement and evaluation and two from the business education department. Cronbach Alpha statistics were used to test the instrument's reliability, and the results showed that it had an overall reliability coefficient of 0.94. The data collected were analyzed using mean and standard deviation, and the null hypothesis was tested using an independent t-test at the.05 level of significance. The findings of the study showed that electronic infrastructure-based programmes were not utilized, and strategies to improve the utilization of electronic infrastructure-based programmes are necessary for the sustainability of business education programs. It was concluded that it is critical to promote the use of electronic infrastructure in order to efficiently enhance the business education programme in Nigerian universities. And it was recommended, among others, that information and communication technology should indeed be highly interwoven into the business education curriculum to enhance the security of migrating the teaching process from the traditional method to the digital form.

Keywords: *Electronic, Infrastructure, Sustainable, development and Business Education Programmes*

1. Introduction

Over the last twenty years, educators, researchers, and academic institutions have investigated how electronic knowledge can enhance classroom instruction and prepare students for the obstacles of the 21st century era of digitalization. As a result of this modernization, the use of digitalization in personal, institutional, and educational institutions has now become critical. Electronic infrastructure encompasses the combination of multiple technologies such as the World Wide Web, internet access pathways, power for computation, memory bandwidth for provisioning, storage of information, grid-based utilization of resources, and so on that are required for advanced collaboration. To continue information and communication technology development and meet the challenges of globalization that lead to markets that are highly competitive, there is an ongoing requirement to make investments in quality infrastructure, promote research and development initiatives, create intellectual property in interactions, the Internet, and internet access technology, and tackle associated policy problems. Infrastructure has historically been critical to a country's economic development and success, but the physical framework required for the modern economy continues to evolve as the field of information and communication technology advances. The arrival of this fresh infrastructure, some of which is blended infrastructure that combines both digital and physical elements, while others are pure electronic infrastructure, is essential for following through on the forthcoming wave of technological advancement and economic expansion in every country but the most impoverished of them. Electronic infrastructures include digital tools, system devices, and resources that generate, store, or process data, social networking, hypermedia, and cellular phones that could enhance the teaching and learning of business education content digitally.

According to Mary and Neena (2017), digital instructional-based learning is any procedure in which a teacher and a learner use electronic tools such as a desktop (or a tablet, ipad, MP3 player, or docking station) to access online technologies such as learning management systems and virtual classrooms and/or become acquainted with digitalization tools that improve students' abilities and expertise. Electronic learning environments are instructional in nature and could aid in both education and the instructional delivery of educational programmes. Nnajiofor and Ejikeme (2020) defined electronic instructional technology as the system and networking equipment, tools, methodologies, and strategies used to achieve a specific set of predetermined academic objectives. Globally, knowledge and comprehension are essential to civilization, and they should be acquired through an effective teaching and learning process. Education has come to be recognized around the globe as an opportunity for society to pass on its culture and heritage, knowledge and experience, beliefs, behaviors, and abilities through one cohort to the next (Nzeneri, 2012). As a result, education can be obtained at various levels. Higher education institutions are an example of such a level. In Nigeria, tertiary institutions offer education courses that provide systems for the transformation of understanding, skills, and attitudes, particularly in the process of learning and instruction (Atah, 2018). One of such courses is business education.

Business education is a programme aimed at acquiring the expertise (Atah, 2019); and abilities required in the workplace (Wonah, Egbula, and Atah, 2018). Otum and Atah (2021) look at business education as a course of study aimed at providing students with the understanding and abilities that enable them to start creating or obtaining employment, remain in those employments, and continue to expand within these occupations. A business education programme, according to Iyanade (2018), is designed to equip its recipients with the understanding, perceptions, and skills required to successfully operate their individual businesses and monetary systems, in addition to the skills required for entry into and development in a variety of occupations. According to Bessong, Atah, and Ititim (2019), business education is an aspect of a vocational training programme that prepares an ordinary person for a business-related occupation as well as for being an informed citizen of economic goods and services. The writers further clarified that business education provides the students with the needed competencies, capabilities, knowledge, comprehension, and perceptions to successfully compete as employees in industry sectors, civil servants, and entrepreneurs of

businesses. In the context of this research, business education is referred to as a course of study that fosters skills that empower a person to function efficiently and effectively as a labourer or employer. The acquisition of the skills and competences taught in business education is heavily reliant on digital infrastructure.

Electronic infrastructures are those digital devices that necessitate utilizing an electronic gadget that is intimately linked to a computerized device (CD-ROM drive) or device network or the internet (Inko-Tariah, 2014). This definition excludes electronic information resources that do not necessitate being accessed via a computer, such as music CDs and video cassettes. Electronic infrastructure-based educational materials, according to Otum and Atah (2021), are online educational materials that aid in the process of learning and instruction. Electronic infrastructure educational materials, as defined by the Otum and Atah (2021), include electronic testing facilities, master classes, educational materials, and gadgets such as contemporary teaching software and computer equipment. The foregoing are inputs that help teachers achieve a certain level of instructional effectiveness and efficiency. Similarly, Akeke, Ushie and Atah (2019) identify computer systems, YouTube clip conventions, tape recordings, videos, removable storage devices (DVD players), and introductory television shows as electronic learning media. The importance of electronic teaching materials throughout education, which includes business educational programs in Nigeria, cannot be overstated. Implicit in the foregoing is the notion that, infrastructure-based media is anything that an instructor employs to accomplish training goals and other online operations. Using electronic document will undoubtedly lead to success in both instruction and learning while also increasing learners' ability to contribute to sustain advancement (Ukah and Atah, 2022).

Sustainable development is defined by the United Nations Educational, Scientific, and Cultural Organization (UNESCO, 2014) as a systematic approach to development and growth, in addition to the management of one's personal, natural resources as well as social welfare, in order to preserve them for a better future. Sustainable development is that which empowers people to attain good education, economic expansion, and development in other areas of human endeavour (Bessong and Atah, 2019). In our view, sustainability may enable business educators and individuals to obtain great business academic qualifications, inventions, collaborations, and economic expansion that will promote successful international partnerships, business, and scholarly exchange, resulting in the worldwide well-being of all residents. It will really, in some manner, influence the economic growth of the country and, to a large extent, impact development in the country, particularly in the educational sector. According to Agim, Ochui, and Atah (2020); and Undie, Agbogo, and Pius (2023), adopting ideas that are sustainable can assist administrators of business education courses in positioning business education to contribute to the development of the economy over time. In our opinion, if electronic infrastructure are used effectively in business education programmes, they can directly assist business educators and individual citizens in dealing with changes in technology, raising general living standards, enabling the acquisition of vocational skills, fostering personality, eradicating poverty, enhancing financial well-being, and developing views and principles that should clearly make a significant contribution to the current societal sustenance.

2. Statement of Problem

Sustainable development of business education demands pedagogical strategies which encourage and inspire learners to modify how they act and start initiatives that support long-term development (UNESCO, 2014). Each student who receives business education in a sustainable method will gain the understanding, abilities, mindsets, and principles required for building a future that is economically viable. Unfortunately, most academic courses worldwide are being badly impacted by educational interruptions along with novel obstacles occasioned by the pandemic of COVID-19. The closures of schools caused by the global epidemic of COVID-19 have had disastrous implications for the educational experience of students. This predicament necessitates an innovative approach to the educational system, a shift from traditional to online learning (United Nations, 2022). This shift's

major prerequisites include an interactive virtual classroom environment, cloud-based storage for archiving, plus adequate electronic materials accessibility (Panda, 2020). This study assumes that in the twenty-first century, sustained education may be achievable through the use of electronic distribution materials. Regrettably, many business educators have yet to exploit cutting edge technologies for classroom instruction, necessitating research in this area.

3. Purpose of the Study

The study's overarching goal is to evaluate electronic infrastructure and the sustainable development of business education programmmes in the twenty-first century. The study aimed to determine the extent of:

1. Electronic infrastructure-based and the sustainable development of business education programmes in the twenty-first century
2. Strategies for improving the utilization of electronic infrastructure and the sustainable development of business education programmes in the twenty-first century

3.1 Research Questions

The following research questions gave direction for the study:

1. What is the extent of utilization of electronic infrastructure and sustainable development of the business education programmes?
2. What are the strategies for improving the utilization of electronic infrastructure and the sustainability of the Business Education programmes?

3.2 Research hypothesis

To guide the study, the following null hypotheses was developed and tested

1. There is no significant difference in the mean rating of male and female respondents on the extent of utilization of electronic infrastructure and sustainable development of the business education programmes.
2. There is no significant difference in the rating of strategies for improving the utilization of electronic infrastructure and the sustainability of the business education programmes based on institutional type.

4. Methodology

This study used a survey research approach with 24 participants, including 14 male and 9 female business education lecturers from two universities in Ebonyi State, Abakaliki (Academic Planning Unit, 2023). Since the population was small enough to be researched as a whole, the entire population was investigated. As a result, the respondents were chosen using a census method. These universities used in the study were Ebonyi State University, Alex Ekwueme University, Ndufu-Alike, Ebonyi State. A twenty-item questionnaire was developed by the researchers to guide the study. The study's instrument was a four-point rating scale questionnaire titled "Electronic Infrastructure-based and Sustainable Development of Business Education questionnaire (EISDBEQ)." Highly Utilized (HU), Utilized (U), Lowly Utilized (LU), and Not Utilized (NU) with items assessing electronic infrastructure while items assessing the strategies for improving the utilization of electronic infrastructure were created on a scale with the same four-point scale of strongly agree (SA) and agree (A), Disagree (D) and strongly disagree (SD). The instrument was trial tested with ten business education lecturers at the University of Calabar who were not part of the student body, and the pilot test yielded an overall coefficient of 0.93, which indicates that the instrument was reliable for the research work. The instrument was administered to the 23 respondents, and all 23 copies were

returned. The mean and standard deviation were used to answer the research questions, and an independent t-test was used to test the null hypotheses at the 0.05 level of significance. The decision rules were based on a cutoff point of 2.50, which was considered highly utilized, while any item below 2.50 was considered not utilized. For the hypotheses, if the t-value calculated was greater than the p-value at the 0.05 level of significance, the null hypothesis was accepted; if not, it was rejected. The hypotheses were tested at the 0.05 level of significance. The population distribution is shown in figure 1.

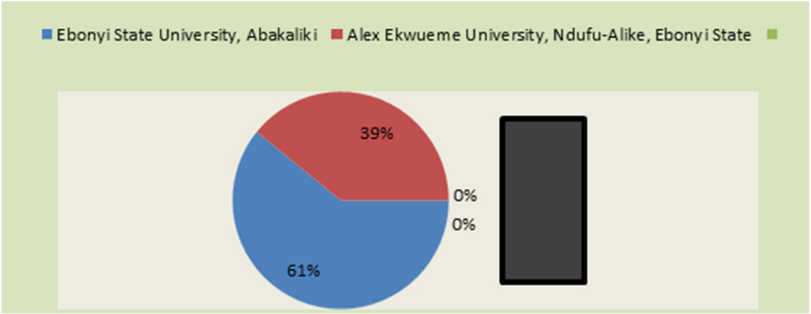

Figure 1: Pie chart shpwing respondents

5. Findings of the Study

5.1 Research Question One

What is the extent of utilization of electronic infrastructure and sustainable development of the business education programme

Table 1: Mean rating of respondents on electronic instructional material and sustainable development

S/No.	Electronic materials	N	Mean	Std. Deviation	Decision
1	Fidelity Bluetooth speakers	23	1.5652	0.72777	Not Utilized
2	Live scribe 2GB echo smart phone	23	1.5652	0.89575	Not Utilized
3	Animato great video slide shows	23	1.6957	0.97397	Not Utilized
4	Vice thread cloud app	23	1.7826	0.99802	Not Utilized
5	Poll anywhere mobile app	23	1.4783	0.59311	Not Utilized
6	Skype smart digital board	23	1.6087	0.98807	Not Utilized
7	Video/Audio conferencing	23	2.913	0.84816	Utilized
8	Laptops computer devices	23	3.2174	0.95139	Utilized
9	Smart phone devices	23	3.3913	1.07615	Utilized
10	Flat screen television	23	3.1739	0.83406	Utilized
	Grand mean		**2.2381**	**0.8886**	**Not Utilized**

In the results in Table 1, items 1–6 have a mean rating of 1.4783 to 1.7826, which fell within the range of not used, and items 7–10 had a mean score ranging from 2.923 to 3.3913, which fell within the range of used. Furthermore, the grand mean of 2.2381 falls within the range of not utilized. As a result, business education lecturers in universities, particularly in Ebonyi State, Nigeria, do not rely on electronic infrastructure to ensure the programme's sustainability. The respondents' opinions on items one through ten did not differ according to the standard deviation, which was in the range of 0.59311 to 1.07615. Figure 2 depicts the outcome further.

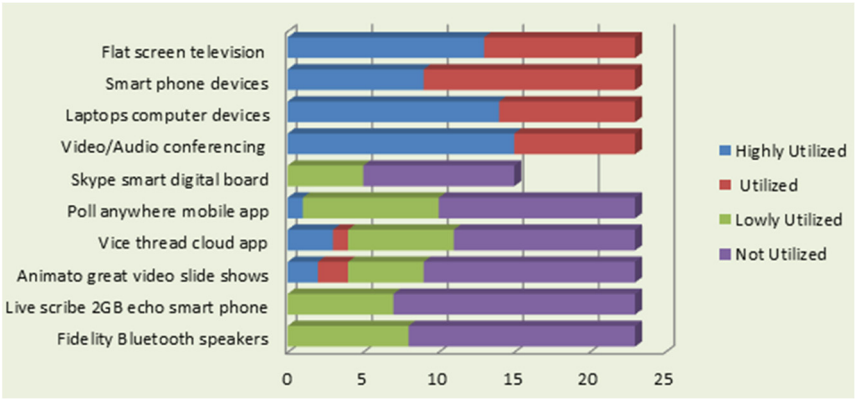

Figure 2: Bar graph showing respondents decision

5.2 *Research question two*

What are the strategies for improving the utilization of electronic infrastructure and the sustainability of the business education programme?

Table 2: Mean rating of the respondents on strategies for improving the utilization of electronic infrastructure and the sustainability of business education

S/No.	Strategies for improving:	N	Mean	Std. Deviation	Decision
11	Electronic materials supply	23	3.001	1.08711	Agree
12	Energy supply	23	2.913	0.94931	Agree
13	maintenance culture	23	3.1304	1.01374	Agree
14	Free Wi-Fi connectivity	23	2.9565	1.02151	Agree
15	Supervision of business education teaching and learning	23	3.2174	1.04257	Agree
16	Training and retraining of business education teachers	23	2.9130	1.04067	Agree
17	Allocation of adequate time to business education teachers	23	2.8696	1.01374	Agree
18	Special allowance to business education teachers	23	2.9565	1.14726	Agree
19	Provision of electronic materials	23	3.3043	0.92612	Agree
20	Free provision of data to business education teachers	23	3.2174	0.95139	Agree
	Grand mean		**3.04781**	**1.01934**	**Agree**

According to the data in Table 2, all the items 11 to 20 have a mean rating of 2.913 to 3.3043, indicating that the respondents agree that the strategies enumerated here are strategic enough to improve the utilization of electronic infrastructure and the sustainability of business education programmes in universities in Nigeria, especially in Ebonyi State, Abakaliki. Moreover, the grand mean of 3.04781 is within the improvement range. As a result, business education lecturers believe that encouraging the use of electronic infrastructure-based programmes is critical to the long-term viability of business education programmes. The standard deviation varied from 0.92612 to 1.14726, showing that the respondents' opinions on items 11 to 20 were consistent. Figure 3 depicts the outcome in greater detail.

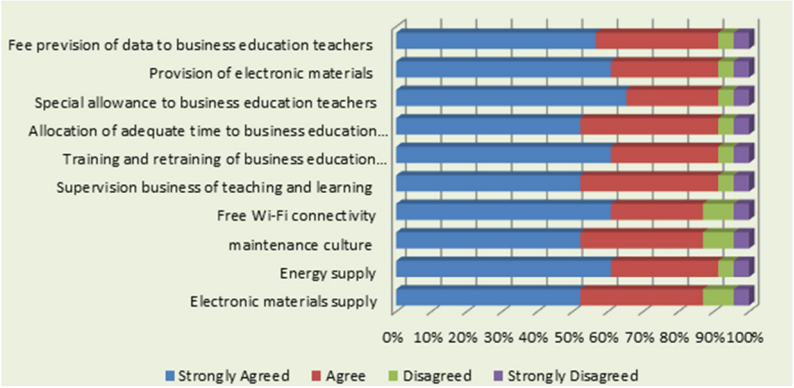

Figure 3: Bar graph showing respondents decision

5.3 *Hypothesis one*

There is no significant difference in the mean rating of male and female respondents on the extent of utilization of electronic infrastructure and sustainable development of business education programme.

Table 3: One sample t-test result on respondents' decision on the electronic infrastructure-based and sustainable development of business education programme

S/No.	Category of Respondents	N	Mean	Std. Deviation	df	t-cal	Alpha	p-val	Decision
1	Male	14	1.5714	.85163	21	.050	.050	.961	NS
	female	9	1.5556	.52705					
2	Male	14	1.7857	1.05090	21	1.515	0.05	.145	NS
	female	9	1.2222	.44096					
3	Male	14	2.0000	1.10940	21	1.991	0.05	.060	NS
	female	9	1.2222	.44096					
4	Male	14	1.9286	.99725	21	.870	0.05	.394	NS
	female	9	1.5556	1.01379					
5	Male	14	1.5000	.65044	21	.214	.050	.832	NS
	female	9	1.4444	.52705					
6	Male	14	1.6429	1.08182	21	.202	.050	.842	NS
	female	9	1.5556	.88192					
7	Male	14	2.6429	.92878	21	-2.037	0.05	.054	NS
	female	9	3.3333	.50000					
8	Male	14	2.7857	.97496	21	-3.251	0.05	.004	NS
	female	9	3.8889	.33333					
9	Male	14	3.0000	1.24035	21	-2.398	0.05	.026	NS
	female	9	4.0000	0.00000					
10	Male	14	3.0000	.96077	21	-1.264	0.05	.220	NS
	female	9	3.4444	.52705					
	Male	**14**	**21.8571**	**9.8463**	**21**	**-4.108**	**0.05**	**3.537**	**NS**
	female	**9**	**23.2222**	**5.1921**					

Analyzed data in table 3, shows that t- calculated value of -4.108 was less than the p-value of 3.357 at 0.05 levels of significance and 21 degrees of freedom. As a result, the null hypothesis is accepted: This demonstrates that there is no statistically significant difference between the mean ratings of male and female respondents on the extent of use of electronic infrastructure-based and the long-term development of a business education programmes**.** Figure 4 further indicates the respondents' decision using radar graph.

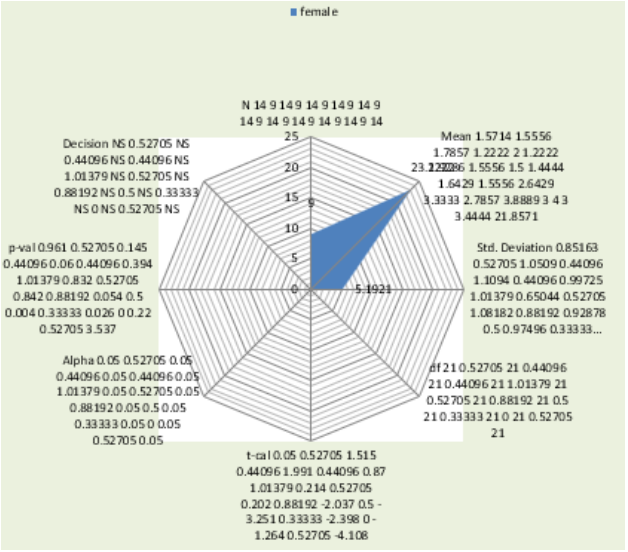

Figure 4: Radar grapg showing respondents decision

5.4 Hypothesis two

There is no significant difference in the strategies for improving the utilization of electronic infrastructure and the sustainability of the business education programme

Table 4: One sample t-test result on respondents' decision on strategies for improving the utilization of electronic infrastructure and the sustainable development of business education progamme

S/No.	Category of Respondents	N	Mean	Std. Deviation	df	t-cal	Alpha	P-val	Decision
11	Public University	9	3.2222	.97183		.779	0.05	.445	NS
	State University	14	2.8571	1.16732					
12	Public University	9	3.0000	.50000	21	.345	0.05	.733	NS
	State University	14	2.8571	1.16732					
13	Public University	9	3.2222	.83333	21	.341	0.05	.736	NS
	State University	14	3.0714	1.14114					
14	Public University	9	2.8889	1.16667	21	-.249	0.05	.806	NS
	State University	14	3.0000	.96077					
15	Public University	9	3.2222	1.09291	21	.017	0.05	.986	NS
	State University	14	3.2143	1.05090					
16	Public University	9	3.1111	1.05409	21	.724	0.05	.477	NS
	State University	14	2.7857	1.05090					
17	Public University	9	3.0000	1.11803	21	.486	0.05	.632	NS
	State University	14	2.7857	.97496					
18	Public University	9	3.0000	1.00000	21	.142	0.05	.888	NS
	State University	14	2.9286	1.26881					
19	Public University	9	3.5556	.72648	21	1.045	0.05	.308	NS
	State University	14	3.1429	1.02711					
20	Public University	9	3.3333	1.00000	21	.460	0.05	.650	NS
	State University	14	3.1429	.94926					
	Public University	**9**	**31.556**	**9.46334**	**21**	**4.091**	**0.05**	**6.662**	**NS**
	State University	**14**	**29.786**	**10.7585**					

Analyzed data in Table 4 reveals that the t-cal of 4.091 was less than the p-vale of 6.662 at 0.05 levels of significance and 21 degrees of freedom. As a result, the null hypothesis indicates that there is no significant difference in the mean rating of the strategies for improving the utilization of electronic infrastructure and the sustainability of the business education programmes is accepted. Figure 5 further demonstrates the result using radar graph.

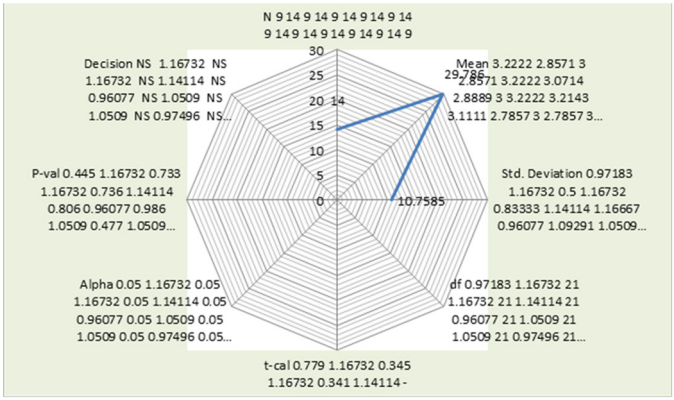

Figure 5: Radar graph showing the respondents decision

6. Discussion

The first research question finding reveals that business education lecturers in universities, particularly in Ebonyi State, Nigeria, do not use electronic infrastructure to ensure the sustainability of the business education programmes in the twenty-first century digital world. The first hypothesis found no significant difference in the mean rating of male and female scores on the extent of utilization of electronic infrastructure-based and sustainable development of business education based on male and female lecturers' decisions. This finding is consistent with the findings of Aina (2019) and Nnaijofor and Ejikeme (2020), that many business educators in the university system lack adequate instructional technological skills to use emerging technology for teaching and learning. This shortcoming has had a negative impact on the extent to which electronic infrastructure-based tools are used by students to acquire employability skills required in the workplace. Nonetheless, the findings of this study agree with those of Ugochukwu and Osita (2017), that business educators continue to rely on non-electronic infrastructure-based materials such as textbooks, chalkboards, and flip charts, and that these traditional materials have the potential to make the teaching and learning process boring. According to Ugochukwu and Osita (2017), the use of electronic infrastructure had no effect on the academic achievements or long-term development of business educators. Variety is the spice of life in the age of globalization. Teaching, learning, and research in today's world are all dependent on the use of information and communication technology, specifically electronic resources and infrastructure-based technology. Finding of this research is consistent with Rajhans (2020) opinion that the COVID-19 pandemic is proving to be a constructive disruptor, providing an opportunity to restructure the current traditional classroom-based educational system. He also stated that the advantages of electronic infrastructure-based over traditional facial expression classrooms kept teachers motivated to adapt to the electronic education mode. The outcome of this study also backs Atah, C. A. (2019) assertion that school materials in business education departments fall below the programme's required minimum academic standards level, which could lead to the implementation of electronic infrastructure for the business education programme's teaching and learning for sustainability. Agim, Ochui, and Atah's (2020) study confirmed that the inadequacy of new technologies for the delivery of business education content is essential and paramount to any

institution, and there is a need for business education lecturers to involve themselves in using electronic infrastructure-based for the teaching and learning process, particularly in this twenty-first century classroom sitting. Finding of this study is in sync with Otum and Atah (2021) argument that business education in Nigerian universities needs more than facilities to be able to impact their generation. They express the opinion that business education lecturers should be able to involve themselves in management collaboration and management resource exhibition strategies to enhance graduates acquisition of skills and competencies.

The research question two finding revealed that business education lecturers in universities, particularly in Ebonyi State, Nigeria, believe that strategies for the use of electronic infrastructure are necessary for the sustainability of business education programmes. The results of hypotheses two, there was no significant difference in the strategies for improving the utilization of electronic infrastructure-based and the sustainability of the business education program in Nigerian universities, in Ebonyi State, Abakaliki, based on institutional type. This finding is consistent with those of Ogonu (2019), that epileptic electric power supplies have a negative impact on the use of electronic infrastructure-based in the teaching and learning of business education content in Nigerian universities. Finding of this study agrees with Atah, Nwosu, and Bessong (2022) conclusion that business educators are ineffective in their use of new technologies, which may contribute to low utilization of electronic infrastructure-based. The inability to use electronic infrastructure is due to a lack of appropriate professional development for business educators who are required to integrate or migrate from the analog to the digital age to meet the current needs of society (Bessong & Atah, 2021). This points the need for adoption of strategies for improving the application of electronic infrastructure in the teaching and learning of business education. Atah, Nwuso, and Bessong (2022) agreed that strategies should be put in place to train and retrain business educators for maximum performance in the use of electronic infrastructure in the teaching and learning process. The finding is consistent with the findings of an Inko-Tariah (2014) study, which discovered that improvisation of infrastructure, remuneration of facilitators, and constant power supply are some of the strategies for promoting the use of 'electronic infrastructure-based in business education. This is due to the fact that the world is on a continuum and that individuals must constantly update in order to stay current with global standards of excellence.

7. Conclusion

A Third World country like Nigeria needs a business education course to guarantee sustainable development. To achieve this, it is critical to promote the use of electronic infrastructure systems in order to effectively improve business education programmes in Nigerian universities. According to the study's findings, there continues to be a greater dependence on non-electronic course resources such as reading materials and blackboards that makes the learning process uninteresting. In view of this, developing nations, including Nigeria, should strive for virtual learning in all of their education programs, notwithstanding the educational challenges. No one can operate effectively beyond the level of education he obtains. As a result, in order to be globally relevant, the effectiveness of business education programmes in Nigeria must be improved. Electronic infrastructure-based instructional and educational tools are reliably instructional tools for businesses' educational programmes for sustainable development. Despite the numerous benefits of digitalization, a few business education teachers nevertheless find it difficult to shift from analogue to digital approaches in teaching and learning, and this has resulted in a significant impact on the business education academic programme in terms of the acquisition of relevant employability skills. The reason for this could be that lecturers use conceptual approaches to instruct and gain knowledge of the subject, owing to a lack of educational technologies even during the COVID-19 global epidemic. Given the significance of digital technologies for instructional delivery, it is critical that policies be put in place to encourage the use of electronic instructional delivery and the long-term viability of business education programs, especially in the 21st century.

8. Recommendations

Based on the study's findings, the recommendations that follow are offered:

1. Information and communication technology should indeed be highly interwoven into the education curriculum so that lecturers and students can benefit.
2. All levels of government, development partners, and entities must work together to ensure adequate electronic infrastructure are consistently made available for business educational programmes.
3. Business educators in positions of authority should ensure constant power supply to facilitate effective delivery of programmes.
4. Business education lecturers and students should develop better servicing procedures to protect previously offered assets.

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