



## **EMERGING TECHNOLOGIES AND SUSTAINABILITY OF BUSINESS EDUCATION DELIVERY IN THE WAKE OF PANDEMIC**

**DR. EDET E. OKON**

Business Education Unit  
Department of Vocational Education  
Faculty of Vocational & Science Education  
University of Calabar, Calabar - Nigeria  
[okon\\_e@ymail.com](mailto:okon_e@ymail.com)

### **Abstract**

*This study achieved three specific objectives, adopted ex post facto research design and was conducted in Cross River State using 1, 385 business education undergraduates with 302 respondents selected using the multi-stage sampling technique. Data was generated from a structured questionnaire tagged, "Emerging Technologies and Sustainability of Business Education Delivery in the Wake of Pandemic Questionnaire (ETSBEPQ)", duly validated and reliability tested with a coefficient of .68. Research questions were answered using descriptive statistics. The Analysis of Variance (ANOVA) was used to test the three null hypotheses at degrees of freedom 1 and 301 and .05 levels of significance. The grand (weighted) mean value of 2.97, 2.64 and 2.69 for virtual realities, wearable technologies, and Artificial Intelligence (AI) respectively have positive and high relationship with sustainability of business education in the wake of Pandemic. Null hypothesis one was upheld since the calculated F-Ratio of 3.462 is less than the critical F-Ratio of 3.94, implying that there is no significant relationship between virtual realities and sustainability of business education delivery in the wake of pandemic. The calculated F-Ratios of 266.594 and 379.094 for null hypotheses two and three respectively, were by far greater than the critical F-Ratio of 3.94 hence; null hypotheses two and three are rejected, implying that significant relationship exists between wearable technologies, Artificial Intelligence; and the sustainability of business education in the wake of pandemic. It is concluded that emerging technologies are vital to the sustainability of business education in the present and future realities. It is therefore, recommended that business educators should: Equip business education programme with Virtual Realities technologies; Wearable Technologies and Artificial Intelligence.*

**Keywords:** Emerging technologies; VR; WT; AI; Sustainability; Pandemic

### **Introduction**

Generally, the deployment of technology in business education can be advantageous. The educational process, especially teaching had long ceased to be a localised process with internalisation and globalisation demand of the 21<sup>st</sup> Century. In the words of Zolfaghari, Sabran and Zolfaghari (2009), internalisation is a dynamic process and not a set of isolated activities. Given this attribute, internalisation cannot excel without technology to carry information around either far or near. Technology therefore prevents these dimensions from being marginal, allow for delivery of ideas at both international and at the same time intercultural directions thus, reducing



any gap that may have existed among countries as well as among the multi-cultural and ethnic groups within and outside a country.

Antecedents in the development and deployment of technology in the work and business environment have evolved over time therefore prompting further expectation in the future of business education in response to emerging technologies and the need to be abreast with these changes. Umoru (2020:16) stated *inter alia*:

*..... the first and second Industrial Revolution brought dramatic changes but these changes cannot be compared to transformations which came with development of digital systems communication and rapid advances of computing power that have accentuated new ways of generating, processing and sharing information. Yet, these changes are nothing compared to the expected digitisation impact on the capabilities of humans and machines which the Forth Industrial Revolution, described as cyber physical systems will unleash. The conclusion is that a new kind of training is necessary, a training in basic, intermediate and advanced digital skills needed by business education students for employability in the digital workplace of the future thereby meeting the expected market demand of over 230 million jobs in Sub-Saharan Africa alone.*

Technology supports information and knowledge sharing on a large-scale, especially to a larger audience, makes available just-in-time information and knowledge for learning. Technology can significantly reduce costs without necessarily outliving the usefulness of business education in facilitating knowledge and skill programmes. Adesina (2013) observed that one of the most serious problems facing Nigeria like many other countries in the world include unemployment.

The sustainability of business education programme was threatened during the emergence of COVID-19 as classes were completely halted. Stakeholders in business education should note that this dreaded monster has not completely left humanity. In the event it continues to rage, delivery of business education under physical contact would be far from reality. The only avenue to stay afloat and avoid disruption is to embrace emerging technologies in administration, instructional delivery and supervision, evaluation, research, among others. Facts emerging after about a year of ease of lock down and eventual resumption of school across the globe confirm new cases of COVID-19.

At the foreign scene, international or foreign students are seriously affected. Kakuchi and Leung (2021) reported that as the new semester begins this month (referring to September 2021) in Japan, China, Taiwan and South Korea, local and foreign students are facing continued online teaching and in some cases border restrictions for international students even as vaccine programmes get under way, adding to the uncertainty for students.

A study by Oh and Chua (2021) on the relationship between teacher computer-mediated communication (CMC) competence and teacher attitude toward using Frog VLE through a virtual learning platform showed a medium level of attitude and a medium level of CMC competence toward using Frog VLE and statistically significant direct causal relationship between teacher CMC competence and teacher attitude toward using Frog VLE.

Among the emerging technologies for sustaining the future of business education include: Virtual realities, wearable technologies and artificial intelligence tools. Virtual reality is described as computer simulation with three dimensional environments for interaction with real objects using special electronic equipment. This equipment includes helmet with a screen, gloves fitted with



sensors, among others. Virtual reality according (VR) to ITF (2021) facilitates experimental learning by simulating real-world environments. Advantageously, learners can test their skills, record their work and interact with experts all with Virtual Reality. It also encourages learners to respond overwhelmingly positive to active learner engagement.

A study conducted by Addane (2021) on integrating virtual reality technology and education teaching asserted that Virtual Reality (VR) technologies are essential for teaching and learning, where findings showed that participants expressed a high level of appreciation of VR applications which could be attributed to the fact that more than three-quarters of the participants had never previously tried them either for educational or entertainment purpose. An overwhelming majority of participants ultimately agreed that VR technologies as instrumental tools would be very effective in visualising abstract concepts for practical understanding, making learning more interactive, encouraging active participation rather than passivity, and making learning more exciting and fun. In another study, Neves, Duarte, Dais and Saraiva (2017) presented the result of a pilot study conducted in a basic design rooted discipline named Laboratorio de Design in IADs graduation in Design where results suggest positive contributions of the VR tools.

Wearable technologies (WT) are modern tools that fit into the reality of the present and unforeseeable future realities. They are smart electronic devices with micro-controllers that can be worn on the body as implants or accessories. Industrial Training Fund (ITF) (2021) highlights these categories of modern technologies to include fashionable technology, wearable devices, tech togs or fashion electronics. Such technologies are useful in: Synchronising data and communication from other gadgets; navigation tools; media devices and communication gadgets. The application of wearable technologies in the classroom is already gaining momentum. Therefore, the classroom of the 21<sup>st</sup> Century embraces various avatars of wearable technologies such as Google Glass, Smartwatch, Wristband and Keyglove. In a study by Okon and Chukwurah (2020) on Technology-driven teaching skills' needs of business education lecturers and content delivery in a globalised economy, findings were that Technology-driven teaching skills significantly predict effective delivery of the content of business education, an implication that business educators require skills in the use of modern technology in teaching business education. The use of technology in the teaching of business education can be result-oriented and of critical significance to the future.

Artificial Intelligence (AI) is the development of computer systems to be able to perform tasks normally requiring human intelligence. Such tasks include: Visual perception; speech recognition; decision-making; and translation between languages. Thus, ITF (2021) explained that the emergence of AI has made it important to take a look at learning methods and consider how facilitators/lecturers/teachers and learners are spending their time. The question therefore is, "How can business education lecturers and students as well as administrators spend their time interactively with the emerging technology such as AI"? It is equally necessary to ask, "How possible was such face-to-face interaction during the surge of COVID-19 Pandemic"?

### **Statement of the problem**

The outburst of COVID-19, coupled with the demand of the 21<sup>st</sup> Century has rendered business education graduates jobless for lack of skills. Throughout the period that the Pandemic lasted in year 2020, teaching and learning activities remained suspended. The fear that the Pandemic is still surging signals further suspension of academic activities through physical contact.



The inability of business education stakeholders to address the problem of skill gap has been a major source of worry. It is therefore observed that poor skill among graduates of business education is largely due to lack of students' exposure to emerging and industry-based technologies. The lack of exposure of students is as a result of inability of stakeholders in business education to equip business education Programme with such technologies with ineffectiveness in collaborating with industries. This study is apt.

#### **Objectives of the study**

1. To determine the relationship between Virtual realities and sustainability of business education delivery in the wake of pandemic from learners' perspective
2. To determine the relationship between Wearable technologies and sustainability of business education delivery in the wake of pandemic from learners' perspective
3. To determine the relationship between artificial intelligence tools and sustainability of business education delivery in the wake of pandemic from learners' perspective

#### **Research questions**

1. What is the relationship between Virtual realities and sustainability of business education delivery in the wake of pandemic from learners' perspective?
2. What is the relationship between Wearable technologies and sustainability of business education delivery in the wake of pandemic from learners' perspective?
3. What is the relationship between Artificial intelligence tools and sustainability of business education delivery in the wake of pandemic from learners' perspective?

#### **Statement of hypotheses**

- H<sub>01</sub> There is no significant relationship between Virtual realities and sustainability of business education delivery in the wake of pandemic from undergraduate learners' perspective
- H<sub>02</sub> There is no significant relationship between Wearable technologies and sustainability of business education delivery in the wake of pandemic from undergraduate learners' perspective
- H<sub>03</sub> There is no significant relationship between Artificial intelligence tools and sustainability of business education delivery in the wake of pandemic from undergraduate learners' perspective

#### **Research methods**

This study adopted the ex-post facto research design and was conducted in Cross River State using a population of 1,385 and a sample of 302 respondents selected using multi-stage random sampling technique alongside Krejcie & Morgan, (1970) table of sampling determination. A structured questionnaire tagged, "Emerging Technologies and Sustainability of Business Education Delivery in the Wake of Pandemic Questionnaire (ETSBEPQ)" duly validated and reliability-tested using Cronbach Alpha reliability technique was used. The three research questions were answered using descriptive statistics. Linear Regression Analysis was used to test the three null hypotheses generated after coding.



## Results/Discussion of findings

### Research question one

What is the nature of relationship between Virtual realities and sustainability of business education delivery in the wake of pandemic from learners' perspective?

**Table 1**

Descriptive statistics of nature of relationship between VR and sustainability of Business Education in the wake of Pandemic

S/N		Weighted mean	Nature of Relationship
1.	VR uses computer simulation for business education delivery	2.5	Positive/High
2.	VR promotes three dimensional environments for interaction	2.5	Positive/High
3.	VR uses real objects for interaction	3.0	Positive/High
4.	VR equipment used for business education delivery includes helmet with a screen	3.4	Positive/High
5	VR equipment used for business education delivery includes gloves fitted with sensors.	3.7	Positive/High
6	VR facilitates experimental learning by simulating real-world environments	3.7	Positive/High
7	Learners can test their skills using VR	3.7	Positive/High
8	Learners can record their work and interact with experts all with VR.	2.7	Positive/High
9	VR encourages learners to respond overwhelmingly positive to active learner engagement.	2.7	Positive/High



10	I have used VR applications for educational use	2.7	Positive/High
11	VR technologies are instrumental tools for visualising abstract concepts for practical understanding		
	VR makes learning more interactive		Positive/High
	VR encourages active participation rather than passivity, and making learning more exciting and fun.	2.7	Positive/High
12	VR promotes students' performance	3.0	
13	VR makes acquisition of knowledge permanent		Positive/Low
	<b>TOTAL</b>	1.6	Positive/Very High
14		3.7	Positive/High
15		3.0	
			<b>Positive/High</b>
		<b>44.6/2.97</b>	

Table 1 presents answer to the research question one. Items 1 – 15 in ETSBEWPQ generated data analysed using weighted mean. Results presented indicate that the grand (weighted) mean value of 2.97 implies that the nature of relationship between virtual realities and the sustainability of business education is positive and high. Item-by-item analysis reveals that 13 items show positive and high relationship; one very high and the other low and positive relationship.

### Research question two

What is the nature of relationship between Wearable technologies and sustainability of business education delivery in the wake of pandemic from learners' perspective?

**Table 2**

Descriptive statistics of nature of relationship between Wearable technologies and the sustainability of Business Education in the wake of Pandemic

S/N		Weighted mean	Nature of Relationship
1.	Wearable technologies (WT) as modern tools fit into the reality of the present and unforeseeable future realities	2.09	Positive/Low
2.	Wearable technologies have smart electronic devices with micro-controllers that can be worn on the body as implants or accessories.	2.09	Positive/Low
3.	Wearable technologies are used for synchronising data and communication from other gadgets;	2.81	Positive/High
4.	Wearable technologies are used as navigation tools;	3.01	Positive/High
5.	Wearable technologies serve as media devices	3.35	Positive/High



6.	Wearable technologies serve as communication gadgets.	2.94	Positive/High
7.	Wearable technologies are applied in classroom	2.99	Positive/High
8.	Wearable technologies such as Smart watch is used in learning	3.7	Positive/High
9.	Wearable technologies such as Google Glass is applied in classroom interaction	3.02	Positive/High
10.	Wearable technologies such as Wristband used in learning	2.70	Positive/High
11.	Wearable technologies such as Key glove is used in learning		Positive/High
<b>TOTAL</b>		2.64	
		2.88	Positive/High

Table 2 presents results of nature of relationship between Wearable technologies and the sustainability of Business Education in the wake of Pandemic. Items 16 – 26 provided data used in answering the research question. The Grand (weighted) mean value of 2.64 indicates that the nature of relationship between Wearable technologies and the sustainability of business education in the wake of Pandemic is positive and high. Item-by-item assessment of the results reveal that out of the 11 items, only two items yielded positive and low relationship. All others produce positive and high relationship.

#### **Research question three**

What is the relationship between Artificial intelligence tools and sustainability of business education delivery in the wake of pandemic from learners' perspective?

**Table 3**

Descriptive statistics of nature of relationship between Virtual Realities and the sustainability of Business Education in the wake of Pandemic

S/N		Weighted mean	Nature of Relationship
1.	Artificial Intelligence (AI) performs tasks normally requiring human intelligence.	2.90	Positive/High
2.	Artificial Intelligence promotes visual perception	2.90	Positive/High
3.	Artificial Intelligence promotes speech recognition	2.90	Positive/High
4.	Artificial Intelligence promotes decision-making	2.95	Positive/High
5.	Artificial Intelligence promotes translation between languages.	2.05	Positive/Low
6.	Emergence of AI has made it important to take a look at learning methods	3.0	Positive/High



7.	Artificial intelligence determines how facilitators/lecturers/teachers and learners are spending their time.	2.14	Positive/Low
8.	Artificial Intelligence (AI) performs tasks normally requiring human intelligence. Artificial Intelligence promotes visual perception	2.4	Positive/Low
9.		3.0	Positive/High
10.	Artificial Intelligence promotes speech recognition	2.14	Positive/Low
11.	Artificial Intelligence promotes decision-making	2.9	Positive/High
12.	Artificial Intelligence promotes translation between languages.	3.0	Positive/High
<b>TOTAL</b>		<b>2.69</b>	<b>Positive/High</b>

Table 3 presents results of nature of relationship between Artificial Intelligence (AI) and the sustainability of business education in the wake of Pandemic. Item-by-item analysis shows that the grand (weighted) average value of 2.69 implies positive and high relationship. Again, out of the 12 items of the questionnaire assessed four show low relationships, while the remaining eight show high relationship.

#### Test of null hypotheses

##### Null hypothesis one

There is no significant relationship between Virtual realities and sustainability of business education delivery in the wake of pandemic from undergraduate learners' perspective

**Table 4**

Simple Linear Regression Analysis of no significant relationship between Virtual realities and sustainability of business education delivery in the wake of pandemic from undergraduate learners' perspective

Variable	$\beta$ SE	R	R2	Significant at .05
Virtual Realities	4.78269	.107	.011	Significant at .05

  

Model	Sum of Squares	df	Mean Square	F	Significant Level
Regression	79.179	1	79.179	3.462	.05
Residual	6862.225	300	22.874		
Total	6941.404	301			

Results presented in Table 4 reveal that the calculated F-Ratio of 3.462 is slightly less than the critical F-Ratio of 3.94 at degree of freedoms 1 and 301 at .05 levels of significance. With this revelation, the null hypothesis, "There is no significant relationship between Virtual realities and sustainability of business education delivery in the wake of pandemic from undergraduate learners' perspective" is upheld.

##### Null hypothesis two

There is no significant relationship between Wearable technologies and sustainability of business education delivery in the wake of pandemic from undergraduate learners' perspective.



**Table 5**

Simple Linear Regression Analysis of no significant relationship between Wearable technologies and sustainability of business education delivery in the wake of pandemic from undergraduate learners' perspective

Variable	$\beta$ SE	R	R <sup>2</sup>	Significant at .05
Virtual Realities	5.93128	.686	.471	Significant at .05

  

Model	Sum of Squares	df	Mean Square	F	Significant Level
Regression	7041.326	1	7041.326	266.594	.05
Residual	7923.645	300	26.412		
Total	14964.970	301			

Results presented in Table 5 reveal that the calculated F-Ratio of 266.594 is by far greater than the critical F-Ratio of 3.94 at degree of freedoms 1 and 301 at .05 levels of significance. Null hypothesis one is rejected, implying that significant relationship exists between Wearable technologies and the sustainability of business education in the wake of Pandemic.

**Null hypothesis three**

There is no significant relationship between Artificial intelligence tools and sustainability of business education delivery in the wake of pandemic from undergraduate learners' perspective

**Table 6**

Simple Linear Regression Analysis of no significant relationship between Artificial Intelligence and sustainability of business education delivery in the wake of pandemic from undergraduate learners' perspective

Variable	$\beta$ SE	R	R <sup>2</sup>	Significant at .05
Virtual Realities	6.23336	.747	.558	Significant at .05

  

Model	Sum of Squares	df	Mean Square	F	Significant Level
Regression	14729.640	1	14729.64	379.094	.05
Residual	11656.44	300	38.855		
Total	26386.079	301			

Results presented in Table 6 reveal that the calculated F-Ratio of 379.094 is by far greater than the critical F-Ratio of 3.94 at degree of freedoms 1 and 301 at .05 levels of significance. With this revelation, null hypothesis one is rejected, implying that Artificial Intelligence significantly relates with the sustainability of business education in the wake of Pandemic.

**Discussion of findings**

Findings from test of null hypothesis one, "there is no significant relationship between Virtual realities and the sustainability of business education in the wake of Pandemic" came as a surprise as it differed from earlier findings reviewed at the early stage of this research. For instance, Addane (2021) in a recent study conducted in Abuja investigated integrated virtual reality technology and education teaching claiming that Virtual Reality (VR) technologies are essential for teaching and learning. The study specifically assessed how much VR technologies could be practical tools to improve teaching and learning at the junior high school level from learners' perspective using 56 students randomly selected from five public secondary schools to use VR goggles to play games, watch videos, and see photograph contents based on virtual environments. Findings indicated that participants expressed a high level of appreciation of VR applications which could be attributed to the fact that more than three-quarters of the participants had never previously tried them either for educational or entertainment purpose. Findings further revealed that an overwhelming majority of the participants ultimately agreed that VR technologies as instrumental tools would be very effective in visualising abstract concepts for practical understanding, making learning more interactive, encouraging active participation rather than passivity, and making learning more exciting and fun.



The reason for the no relationship could be attributed to lack of exposure of students to virtual reality tools, the absence of such tools in delivery of business education programme or both could also account for the no relationship revealed in the findings.

Findings from null hypothesis two differed as it revealed that significant relationship exists between Wearable technologies and the sustainability of business education in the wake of Pandemic. This finding further strengthens the findings of other authors earlier reviewed such as Okon and Chukwurah that technology-driven teaching skills significantly predict effective delivery of the content of business education.

Finding from null hypothesis three that significant relationship exists between Artificial Intelligence and the sustainability of business education in the wake of Pandemic further affirmed the assertions of other authors earlier reviewed such as ITF (2021) that the emergence of AI has made it important to take a look at learning methods and consider how facilitators and learners are spending their time.

### **Conclusion**

Based on the findings of this study, it is concluded that emerging technologies are vital to the sustainability of business education now and the future as it facilitates business education delivery in the wake of any Pandemic. It is also concluded that the future of business education programme is threatened in the absence of emerging technologies such as Virtual Realities, Wearable Technologies and Artificial Intelligence.

### **Recommendations**

The following recommendations are made from the conclusions drawn

1. Management and business educators in institutions should equip business education laboratories with VR technologies.
2. Business education lecturers and students should acquire WT within their reach and others not within the reach of individual learners should be provided by the institution.
3. Virtual Intelligence should be made one of the requirements for establishing and accrediting Business Education Programme by appropriate regulatory agencies.

### **References**

- Adesina, O. S. (2013). Unemployment and security challenges in Nigeria. *International Journal of Humanities and Social Science*, 3(7), Available at: [https://www.researchgate.net/publication/316104478\\_Unemployment\\_and\\_Security\\_Challenges\\_in\\_Nigeria](https://www.researchgate.net/publication/316104478_Unemployment_and_Security_Challenges_in_Nigeria) [accessed Sep 11 2021].
- Addane, E. F. (2021). Investigating the influence of virtual reality technology in teaching and learning: From perception of Nigerian high school students. *Journal of Education and Practice*, 12(18), 29 – 42. Available at: <https://www.iiste.org/Journals/index.php/JEP/article/viewFile/56591/58437> . Accessed September 2021
- Industrial Training Fund – ITF (2021). Leveraging technology for effective SIWES supervision. *Training Manual*. A publication of Industrial Training Fund (ITF).
- Kakuchi, S. and Leung, M. (2021). New semester sees many foreign students still shut out. *University World News: The Global Window on Higher Education*. Available at: <https://www.universityworldnews.com/post.php>
- Neves, A. G.; Duarte, E.; Dais, D; and Saraiva, M. (2017). The impact of virtual-reality-based tool on a Basic Design rooted discipline: Early perceptions. *Design Doctoral Conference '17, Portugal*. Available at: <https://www.academia.edu/38212771/>
- Oh, S. P. and Chua, Y. P. (2021). Relationship between computer mediated communication competence and attitude towards using frog VLE among secondary school teachers. *International Journal of Web-based learning and teaching technologies*, 17(3), 1 – 16. Available at: <https://www.igi-global.com/gateway/article/full-text-pdf/281721.Doi:10.11591/edulearn.v14i3.14539>
- Okon, E. E. & Chukwurah, C. C. (2020). Technology-driven teaching skills' need of business education lecturers and content delivery in a globalised economy. *Journal of Education and Learning*, 14(3), 393 – 401. Available at: <https://eric.ed.gov/?id=EJ1266401> Accessed September 2021