



ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING ON BUSINESS EDUCATION CURRICULA IN POLYTECHNICS IN ANAMBRA STATE



Nwankwo, Nkechi .C

Chukwuemeka Odumegwu Ojukwu University,
Igbariam Campus Anambra State.
Kakaluv30@gmail.com

Ugwunnamchi Uchenna .J

Chukwuemeka Odumegwu Ojukwu University,
Igbariam Campus Anambra State.
jacintauchenna24@gmail.com

&

Okpara Uchenna . G.

Chukwuemeka Odumegwu Ojukwu University,
Igbariam Campus Anambra State.
uchennaokpara@gmail.com

Abstract

This study examined the artificial intelligence and machine learning on business education curricula in polytechnics in Anambra State. The objectives of the study were to: Analyze the artificial intelligence on business education curricula in polytechnics in Anambra State. Determine the effect of machine learning on business education curricula in polytechnics in Anambra State. A Correlational survey research design will be adopted for the study. The population of the study consist of all the OND 11 and HND 11 in all the tertiary institutions in Anambra state which is four thousand seven hundred and fifty (4750). There are two (2) tertiary institutions. Simple random sampling was used in selecting the number of respondents. The sample for this study comprised of 750 students. The finding of the study shows; Artificial intelligence has significant effect on business education curricula in polytechnics in Anambra State. Machine learning has significant effect on business education curricula in polytechnics in Anambra State. The study recommends that Business educators should up-grade their skills/competencies on how to integrate new technologies in teaching. The three arms of the government (Federal, State and Local) should consider funding of business education programme in tertiary institutions a top priority considering the role it plays in National development.

Keywords: Business education, Machine learning, Artificial intelligence, Polytechnics

Introduction

The term artificial intelligence (AI) is often used as a generic term that refers to a collection of several digital technologies such as machine/deep learning, data mining, natural language processing, and neural networks, all of which serve the purpose of creating computing systems that can perform human-like processes like cognition, sensing, synthesis, and understanding of large data in order to solve complex problems (Baker & Smith, 2019; Chatterjee & Bhattacharjee, 2020). Although the idea of AI dates back to the 50s when Turing (1950) asked whether machines could imitate human intelligence and action, AI has just recently become the trigger of many digital innovations that are rapidly transforming personal, organizational, and societal operations (Bhatta, 2021; Stone, 2019).

Considering the unprecedented breakthroughs in the world of AI, it is estimated that AI could contribute \$15.7 trillion to the global economy by 2030 and could eliminate 85 million jobs while creating 97 million new ones by 2025 (Jovanovic, 2021). As a result, it would not be too early to state



that AI has already ‘established itself as a transformative force in a wide range of industries, including education’ (Kamalov et al., 2023). Machine learning is a core sub-area of artificial intelligence that gives machines access to data to make human work easier and makes reality easier only to let them learn the data for themselves. Learning is an important feature of artificial intelligence. This is a machine feature that captures data and feedback in real time and improves performance over time, developing self-learning algorithms to gain insight from that data to make predictions. Machine learning algorithms use computational methods to study information directly from data, without relying on a predetermined equation as a model. Machine learning is one of the most important technological approaches to AI and underpins many recent advances in AI and business applications.

Modern machine learning is a statistical process that helps define the output and future use of data (Niklas, 2016). Machine learning architectures are currently of the utmost interest in the industry as they seek to optimize the resources and output available to each process based on the available historical data. Machine learning has significant advantages in data prediction and analysis combined with data science technology. The machine learning architecture defines the various levels involved in the machine learning cycle and contains the basic steps to take when transforming raw data into training datasets that enable decision making in the system.

AI has manifested itself in the field of education through several technologies such as intelligent tutoring systems, adaptive teaching/learning, large-scale assessment and evaluation designs, predictive modeling and learning analytics, educational games, virtual/augmented reality, and several other forms of AI-assisted/enhanced instruction (Guan et al., 2020). Research has so far evidenced that AI could improve the learning environment through stimulating enthusiasm, enhancing the creativity of teachers and students, promoting better classroom management, or supporting customized learning (Colchester et al., 2017; Huang et al., 2021; Papadakis et al., 2024; Wang, 2021).

Objectives of the Study

The broad objective of the study is to effect of Artificial intelligence and machine learning on business education curricula in polytechnics in Anambra State, Nigeria. The following are the specific objectives:

- i. Analyze the effect of artificial intelligence on business education curricula in polytechnics in Anambra State.
- ii. Determine the effect of machine learning on business education curricula in polytechnics in Anambra State

Review Of Related Literature

Theoretical Framework

The appropriate theory relevant to this study is Digital Space Exponential Growth theory and this was propounded by George et al in 2014. The theory is all about entrepreneur’s knowledge of digital technologies in identifying business opportunities and future markets. For entrepreneurs to achieve entrepreneurial success, performance and survive in the environment of business, the adoption of digital technologies of artificial intelligence, block chain and robotic technologies are very essential. The Digital Space Exponential Growth theory for organization success is through the data generated by technology from the society. Artificial intelligence, robotics and block chain technology are knowledge information-based technology suitable for entrepreneurial better decision making in a complex business environment to predict customers behaviours and attitude for entrepreneurial optimal and quality decisions.

According to Saiz-Alvarez, (2020), circular economy depends on artificial intelligence and block chain technology for societal and human supports as this stops resources depletion, close energy and ensure the acceleration and achievement of United Nations SDGs by 2030 via micro (enterprises and customers, meso, (economic agents), and macro, (city regions and governments). Changes in digital space enhances entrepreneurial innovations and decision in business enterprise process by adopting strategy to meet up with the environment and customer demands and needs. Technology system of block chain and artificial intelligence and robotic system are all digital innovations for better and quality entrepreneurial decision making (Uford, 2022). According to Nusair et al, (2021), research



organizations with capabilities satisfies the customers more and this is achieved through employee engagement and better decision making. Kassa and Raju, (2015), buttressed the above points that, employee involvement in decision making ensures innovations. In addition, Dwivedi et al, (2019) opined that, artificial intelligence and algorithms ensures trust, security, and ethical considerations.

Empirical Studies

Olojuolawe, (2024) assesses the impact of artificial intelligence in promoting the sustainability of technical education in Nigeria. The over-reliance on the possession of hard skills alone cannot guarantee good quality jobs for the graduates. The quantitative research design that employs the descriptive study was used for the study. The sample for the study consisted of the entire population of 30 respondents. The instrument contains 20 items on the impact of artificial intelligence on technical education. The mean acceptance was set at 2.50 minimum for acceptability. The findings revealed that the adoption of artificial intelligence would positively influence the growth of technical education and the marketability of its graduates in the labour market. The study recommended the re-modeling of the curriculum of technical education to suit the reality of artificial intelligence.

Sani, Ibrahim and Shafiu, (2024) assessed the effectiveness of artificial intelligence in the implementation of public administration programme in the universities. Secondary data were used in the paper. The data were collected from print and online publications. The paper established that deployment of artificial in the universities has aided effective implementation of public administration programme in the universities. Specifically, the study maintained that artificial intelligence has aided effective implementation of teaching, research, community services and academic services in the universities in Nigeria.

Surugiu, Grădinaru and Surugiu, (2024) examined AI's support for educational activities, key drivers, and tools for business education. Survey data collected from 254 learners were analyzed using multivariate binary logistic regression. Two research questions were formulated to verify if AI supports educational activities and what AI tools support business educational activities. Results show learners appreciate AI for aiding teachers in administrative tasks, personalising learning plans, and saving time. However, learners are unfamiliar with most benefits of AI tools, except computer vision, edge computing, and AI chatbots.

Aregbesola, Haastrup and Nyinebi (2024) examined artificial intelligence creative compliance, and the future of science education: a study of Nigerian universities lecturers. An online cross-sectional questionnaire survey among science education lecturers were used across federal universities in five states and the Federal Capital Territory (FCT), Abuja. The survey used Google Forms as the survey tool and WhatsApp as the distribution platform. The population of the study consisted that of science education lecturers (Biology, Chemistry and Physics) in federal universities in North Central. Purposive sampling was used to select 90 science education lecturers as a sample size of the study. Artificial Intelligence and Creative Compliance among Science Educators Questionnaire was used as an instrument for the study (AICCSEQ). Data from the google forms were retrieved, coded, and analyzed using percentage, regression and ANCOVA. Findings of the study revealed that science education lecturers in federal universities are yet to be fully creative compliance to the use AI tools for their teaching and research purposes.

Olatunde-Aiyedun, (2024) investigated the integration of artificial intelligence (AI) into science curricula at Nigerian universities, motivated by the imperative to prepare students for the evolving demands of the digital age. Employing a mixed-methods approach, the research explores the impact of AI integration on learning outcomes, student engagement, and overall educational quality in science education. Quantitative analysis focuses on academic records, assessing the performance metrics of 180 science education students enrolled in AI-integrated courses across three Nigerian universities. Qualitative data undergoes thematic analysis, revealing key insights and recurring themes within educators' and students' narratives. The results demonstrate a tangible link between AI integration and science education, offering a nuanced understanding of advantages and disadvantages.



Method

Design of the Study

The descriptive survey research design will be adopted for the study. The design is considered appropriate for the study because the study aims at finding out the Artificial intelligence and machine learning on business education curricula in polytechnics in Anambra State. The population of this study comprised 4750 OND (2) and HND (3) Business education students from public polytechnic institutions offering business education in Anambra state, Nigeria. Data for this study will be collected by means of structured questionnaires developed by the researcher. The data will be collected using a structured questionnaire developed by the researcher for the study. Copies of the questionnaires will be administered personally by the researcher and four research assistants who will be briefed and guided on the modalities for the administration and collection of the questionnaire. A period of four weeks will be used for the distribution and collection of the instrument. The copies of questionnaire successfully retrieved will be used for data analysis. In interpreting the values of the null hypotheses, when p-value is less than or equal to 0.05 ($P \leq 0.05$), the null hypothesis will be rejected and when the p-value is greater than 0.05 alpha level ($p > 0.05$), the null hypothesis will not be rejected. The analysis will be done with the application of a computer software programme: Statistical Package for Social Sciences (SPSS) version 23.

Data Analysis And Results Presentation

Descriptive Statistics

	BEC	AI	ML
Mean	2.234860	3.537666	1.800591
Median	2.000000	4.000000	2.000000
Maximum	5.000000	5.000000	3.000000
Minimum	1.000000	1.000000	1.000000
Std. Dev.	1.127689	1.496687	0.776961
Skewness	0.533218	-0.569501	0.361372
Kurtosis	2.027473	1.966498	1.739532
Jarque-Bera	58.76061	66.72543	59.55168
Probability	0.000000	0.000000	0.000000
Sum	1513.000	2395.000	1219.000
Sum Sq. Dev.	859.6573	1514.290	408.0798
Observations	677	677	677

Table 4.1 shows the descriptive statistics of the variables for the study. It presents the standard deviation, mean maximum and minimum values of the data set obtained from the annual reports. business education curriculum, which showed a maximum value of 5% and a minimum value of 1% with a mean value of 2.23% and standard deviation of 1.27%. The Artificial intelligent maximum value of this ratio is 5% while the minimum value is 1%. The mean obtained from the computation gave 3.53% with a standard deviation of 1.4%. The machine learning showed a maximum value of 3% and a minimum value of 1% with a mean value of 1.8% and standard deviation of 0.77%.



Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					
					R Square Change	F Change	df1	df2	Sig. Change	Durbin-Watson
1	.760 ^a	.578	.577	.73361	.578	461.655	2	674	.000	1.707

a. Predictors: (Constant), ML, AI

b. Dependent Variable: BEC

The R-Squared, which is the co-efficient of determination or measure of goodness of fit of the model, tests the explanatory power of the independent variables in any regression model. From our result $R^2 = 57\%$, This showed that our model displayed a good fit because the R^2 is closer to 100%, the explanatory variables can impact up to 57% out of the expected 100%, leaving the remaining 43% which would be accounted for by other variables outside the model as captured by the error term.

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	496.917	2	248.458	46.1655	.000 ^b
	Residual	362.741	674	.538		
	Total	859.657	676			

a. Dependent Variable: BEC

b. Predictors: (Constant), ML, AI

The f-statistics measures the overall significance of the explanatory parameters in the model. From our table above the calculated value of the f-statistics is 46.1655, its probability is 0.0000, which is less than 0.05. We accept and state that there is a significance relationship between the variables. This means that the parameter estimates are statistically significant in explaining the relationship in the dependent variable.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.387	.088		4.405	.000	.214	.559
	AI	0.050	.020	.067	2.565	.011	-.088	-.012
	ML	0.125	.038	.775	2.987	.000	1.051	1.199

a. Dependent Variable: BEC

The a’p priori expectation is used to determine the existing education theories and this indicates the signs and magnitude of our variables. From our regression, artificial intelligent has positive sign given its value as 0.050, this implies that increases in artificial intelligent the business education curriculum by 5%, this also suggest further that it satisfied the condition of a’p priori expectation. It is observed that machine learning has a positive sign given its value as 0.125 however increases in machine learning increases the business education curriculum by 12%. This implies that it is line with a’p priori expectation.

The t-statistics helps in measuring the individuals’ statistical significance of the parameters in the model from the result report. it is observed from table above that artificial intelligent is statistically



insignificant with its value as 2.565, this implies that it has contributed significantly to business education curriculum. Machine learning is statistically significant with its value as -2.987. This also shows that it contributes to business education curriculum at 1% level of significant.

The Durbin Watson (DW) test for autocorrelation will be used to test for the presence of first order autocorrelation, when the value of DW is closer and a little above 2.00, it means the absence of autocorrelation among the explanatory variables. From the table 4.3 above, Durbin Watson is (1.7). This does satisfy the above stated condition and implies the absence of autocorrelation; hence our variables can be used for predictive purposes.

Hypothesis Testing

H₀₁; Artificial intelligence has no significant effect on business education curricula in polytechnics in Anambra State

From the result of our test in table above, we found out that the value of our t-test for Artificial intelligence is 2.565 with a probability of 0.0011; this probability value is lesser than the desired level of significance (0.05). We reject the null hypothesis and accept the alternative hypothesis, that artificial intelligence has significant effect on business education curricula in polytechnics in Anambra State.

Hypothesis Two

H₀₂; Machine learning has no significant effect on on business education curricula in polytechnics in Anambra State

From the result of our test in the table above, we found out the value of our T-test for Machine learning size is 2.987 with a probability of 0.000, this probability value is lesser than the desired level of significance (0.05). We reject the null and accept the alternative hypothesis, that Machine learning has significant effect on business education curricula in polytechnics in Anambra State.

Conclusion And Recommendations

The findings in research question one revealed that Artificial intelligence has significant effect on business education curricula in polytechnics in Anambra State. The finding agrees with Onekpe (2002) assertion that most youths that did not have access to formal education talks for restiveness. The findings also agreed with the opinion expressed in Federal Government of Nigeria (FRN, 2004) that students are only taught theory without the practical aspect of the courses. The study also revealed that the business educators generally accepted that all the items listed except lack of space/accommodation as major challenges of integrating the new technologies for teaching and learning business education programme in tertiary Institutions. This is because the mean scores were above 3.50 which was the cut of point or the boundary real limit. The first hypothesis revealed that there was no significant difference in the mean ratings of respondents on the challenges of integrating modern technologies in teaching and learning business education programme.

Machine learning has significant effect on business education curricula in polytechnics in Anambra State. Machine learning is forecast to disrupt any field of activity that is founded on time-stamped ledgers. Within education, activities that could be impacted by BC technology include certification, management of student records, intellectual property management, issuing of payments and student information system architecture. Grech and Camilleri, (2017) stated that BC allows self-sovereignty whereby users can maintain direct control over the storage and management of their personal data; trust, as the technical infrastructure gives people enough confidence in its operations to carry through with transactions such as payments or the issuance of certificates. Transparency and provenance that enables users conduct transactions with the knowledge that each party has the capacity to enter into that transaction and immutability records that can be written and stored permanently, without the possibility of modification. Also in disintermediation there is no more need for a central controlling authority to manage transactions or keep records as parties have the ability to transact directly with each other, without the need for third parties through collaboration



Recommendations

Based on the finding of this study, the following recommendations were made:

1. Business educators should up-grade their skills/competencies on how to integrate new technologies in teaching
2. The three arms of the government (Federal, State and Local) should consider funding of business education programme in tertiary institutions a top priority considering the role it plays in National development.
3. The others stakeholders in Education should also contribute maximally to the funding of business education programme

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